

APPLICATION OF BUSINESS INTELLIGENCE (BI) TOOLS FOR EDUCATION INDUSTRY IN INDIA NEED OF THE HOUR

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Abstract— In India right from ancient time's education evolution is a continuously happening process. This has great history in fields such as Agriculture, Medicine, Arithmetic, Linguistics and many more. As it is happening in other fields, it has started growing as industry in India. This industry is facing various challenges such as decreasing quality of input, economic as well demographic diversity etc. Applying combinations of BI tools has become essential to face these challenges. The BI tools such as Data Management, Data Mining using AI (artificial intelligence) tools, Report Management, Score Cards, Visualization tools and presentation usage will not only help in increasing the efficiency and effectiveness of this industry but also help in generating revenue for development.

This is an attempt to analyze historical evolution in these tools in three main categories Primary education, Higher Education and IT education. This is based on the successful expert's knowledge sharing mechanism using various available tools.

Keywords— Data Mining, Gurukul, Artificial Intelligence.

I. INTRODUCTION

Business Intelligence, a term that encompasses all the capabilities required to turn data into intelligence, to strive for the ultimate goal: getting the right information to the right people at the right time through the right channel.

For success of organization, it requires lot of planning and implementation along with support of management. As application of IT tools has made this very effective and efficient. Certainly it requires lot of knowledge, understanding, and correct execution of the whole teaching learning process. This is time consuming activity which requires whole hearted efforts, lots of patience and divinity of mind of the teacher towards profession. This is practiced by many families' years together in India at various parts of the country. There are number of family members involved in Various activities of this continuous evolving process of education. This is rather complete personality development work which not only helps to provide bread and butter to the people from all the layers of the society without any bar of cast and religion. This also helps in progress of families and generating revenues. In return they don't expect something,

As very rightly said in:

“Bhagwatgita” : “Karmanyewadhikarastu Ma Khaleshu Kadachan”. They are very satisfied with the progress of their “Shishyas” that is thought followers and their progress in the respective fields.

II. BUSINESS INTELLIGENCE REQUIREMENT

Business Intelligence (BI) is a core discipline that is essential to get real value from that data that we

collect and the information that we manage. Data and information deliver value when they are applied in ways that make successful and sustainable businesses or effective and mission-fulfilling public-sector organizations.

Howard Dresner, in the early 1990's while with the Gartner Group, provided the earliest definition of BI as "the use of facts and fact-based systems to improve decision-making in business." Nearly two decades later, BI is a mainstream business practice. Today we view business intelligence as "the ability of an organization or business to reason, plan, predict, solve problems, think abstractly, comprehend, innovate and learn in ways that increase organizational knowledge, inform decision processes, enable effective actions, and help to establish and achieve business goals." This recent definition, created by Dave Wells and acknowledged by Dresner, gives a sense of the scope and complexity of modern business intelligence. The range of BI disciplines and practices includes data analysis, business analytics, decision processes, measurement, metrics, feedback systems, and much more. In a 1958 article, IBM researcher Hans Peter Luhn used the term business intelligence. He defined intelligence as: "the ability to apprehend the interrelationships of presented facts in such a way as to guide action towards a desired goal."

Business intelligence as it is understood today is said to have evolved from the decision support systems that began in the 1960s and developed throughout the mid-1980s. DSS originated in the computer-aided models created to assist with decision making and planning. From DSS, data warehouses, Executive Information Systems, OLAP and business intelligence came into focus beginning in the late 80s. In 1989; Howard Dresner (later a Gartner Group

analyst) proposed "business intelligence" as an umbrella term to describe "concepts and methods to improve business decision making by using fact-based support systems." It was not until the late 1990s that this usage was widespread.

Business intelligence (BI) is the ability of an organization to collect, maintains, and organizes data. This produces large amounts of information that can help develop new opportunities. Identifying these opportunities, and implementing an effective strategy, can provide a competitive market advantage and long-term stability.

BI technologies provide historical, current and predictive views of business operations. Common functions of business intelligence technologies are reporting, online analytical processing, analytics, data mining, process mining, complex event processing, business performance management, benchmarking, text mining, predictive analytics and prescriptive analytics.

The goal of modern business intelligence deployments is to support better business decision-making. Thus a BI system can be called a decision support system (DSS). Though the term business intelligence is sometimes a synonym for competitive intelligence (because they both support decision making), BI uses technologies, processes, and applications to analyze mostly internal, structured data and business processes while competitive intelligence gathers, analyzes and disseminates information with a topical focus on company competitors. If understood broadly, business intelligence can include the subset of competitive intelligence.

III. EDUCATION

Education in its general sense is a form of learning in which knowledge, skills, and habits of a group of people are transferred from one generation to the next through teaching, training, research, or simply through auto didacticism. Generally, it occurs through any experience that has a formative effect on the way one thinks, feels, or acts.

In formal education, a curriculum is the set of courses and their content offered at a school or university. As an idea, curriculum stems from the Latin word for racecourse, referring to the course of deeds and experiences through which children grow to become mature adults. A curriculum is prescriptive, and is based on a more general syllabus which merely specifies what topics must be understood and to what level to achieve a particular grade or standard.

An academic discipline is a branch of knowledge which is formally taught, either at the university—or via some other such method. Each discipline usually

has several sub-disciplines or branches, and distinguishing lines are often both arbitrary and ambiguous. Examples of broad areas of academic disciplines include the natural sciences, mathematics, computer science, social sciences, humanities and applied sciences.

Educational institutions may incorporate fine arts as part of K-12 grade curriculums or within majors at colleges and universities as electives. The various types of fine arts are music, dance, and theatre.

The first large established university is thought to be Nalanda established in 427 A.D in India. At its peak, the university attracted scholars and students from as far away as Tibet, China, Greece, and Persia. The first university establishments in the western world are thought to be University of Bologna (founded in 1088) and later Oxford University (founded around 1096).

Primary (or elementary) education consists of the first 5–7 years of formal, structured education. In general, primary education consists of six or eight years of schooling starting at the age of five or six, although this varies between, and sometimes within, countries. Globally, around 89% of primary-age children are enrolled in primary education, and this proportion is rising. Under the Education for All programs driven by UNESCO, most countries have committed to achieving universal enrolment in primary education by 2015, and in many countries, it is compulsory for children to receive primary education. The division between primary and secondary education is somewhat arbitrary, but it generally occurs at about eleven or twelve years of age. Some education systems have separate middle schools, with the transition to the final stage of secondary education taking place at around the age of fourteen. Schools that provide primary education are mostly referred to as primary schools. Primary schools in these countries are often subdivided into infant schools and junior school.

In India, compulsory education spans over twelve years, out of which children receive elementary education for 8 years. Elementary schooling consists of five years of primary schooling and 3 years of upper primary schooling. Various states in the republic of India provide 12 years of compulsory school education based on national curriculum framework designed by the National Council of Educational Research and Training.

Higher education, also called tertiary, third stage, or post secondary education, is the non-compulsory educational level that follows the completion of a school providing a secondary education, such as a high school or secondary school. Tertiary education is normally taken to include undergraduate and postgraduate education, as well as vocational

education and training. Colleges and universities are the main institutions that provide tertiary education. Collectively, these are sometimes known as tertiary institutions. Tertiary education generally results in the receipt of certificates, diplomas, or academic degrees. Higher education generally involves work towards a degree-level or foundation degree qualification. In most developed countries a high proportion of the population (up to 50%) now enter higher education at some time in their lives. Higher education is therefore very important to national economies, both as a significant industry in its own right, and as a source of trained and educated personnel for the rest of the economy.

IV. GURUKUL

A 'gurukul' or 'vedic school' (Sanskrit guru "teacher" or "master"; kul domain, from kula, "extended family") is a type of school in India and in several other countries, residential in nature, with pupils shishya living near the guru, often within the same house. In a gurukul, shishyas live together as equals, irrespective of their social standing, learn from the guru and help the guru in his day-to-day life, including the carrying out of mundane chores such as washing clothes, cooking, etc. The guru-shishya tradition (parampara) is a hallowed one in Hinduism and appears in other religious groups in India, such as Jainism, Buddhism and Sikhism.

Typically, a guru does not receive any fees from the shishyas studying with him. At the end of his studies, a shishya offers the guru dakshina before leaving the "gurukul" or ashram. The gurudakshina is a traditional gesture of acknowledgment, respect and thanks to the great guru, which may be monetary, but may also be a special task the teacher wants the student to accomplish. While living in a gurukul the students had to be away from his house and family completely. The gurus didn't take any fees and so they had to serve the guru. Gurukul Method of Teaching and Learning Process: In India even as on today this method is practiced to make to students "Self Supported, Well Mannered and Disciplined citizen of India". The daily routine of this method is very much planned lessons, execution completely aligned with environment and the natural needs of humans. This normally starts with early in the morning with pleasant state of body and mind, followed by mantra chanting and prayers. This help them doing focusing themselves to achieve the desire goal. Then starts studying and various literatures related to agriculture, medicine, arithmetic and many more. This is followed by breakfast prepared with them (with the help of motherly made, in Hindus it is called "Guru Mauli"). This activity is very well planned with menus and ingredients. Nutritious supplements are also provided to them like milk, fruits etc. This activity is normally sponsored

by wealthy well wishers associated with the family who understands its contribution for development.

As an effect of fast changing lifestyles, innovation and invention in the technology has given rise to many issues in this field. Communication technology is playing major role in this process of evolution. Application of ICT tools such as Mobiles, Computers, and Internet has become their part and partial of life. These tools are mainly used for establishing communications, managing resources as well as improving the complete teaching learning process. Huge sea of information, i.e. internet has given open and free access to information. It has opened many doors for knowledge seekers for the getting accurate and timely information from the excellent sources all over the world. Following is examples of application of IT Tools i.e. Scanners: This tool is mainly used for data storage, which is basically inherited knowledge base. To restore literature of ancient horoscope called "Brugu Sahita". It is also very well used my many "Gharanas" i.e families of Singers to store musical notations called "taranas" which is basically very valuable knowledge base for any singer.

V. FUTURE OF EDUCATION

One of the most substantial uses in education is the use of technology. Also technology is an increasingly influential factor in education. Computers and mobile phones are used in developed countries both to complement established education practices and develop new ways of learning such as online education (a type of distance education). This gives students the opportunity to choose what they are interested in learning. The proliferation of computers also means the increase of programming and blogging. Technology offers powerful learning tools that demand new skills and understandings of students, including Multimedia, and provides new ways to engage students, such as Virtual learning environments. One such tool are virtual manipulative, which are an "interactive, Web-based visual representation of a dynamic object that presents opportunities for constructing mathematical knowledge" (Moyer, Bolyard, & Spikell, 2002). In short, virtual manipulative are dynamic visual/pictorial replicas of physical mathematical manipulative, which have long been used to demonstrate and teach various mathematical concepts. Virtual manipulative can be easily accessed on the Internet as stand-alone applets, allowing for easy access and use in a variety of educational settings. Emerging research into the effectiveness of virtual manipulative as a teaching tool have yielded promising results, suggesting comparable, and in many cases superior overall concept-teaching effectiveness compared to standard teaching methods. Technology is being used more not only in

administrative duties in education but also in the instruction of students. The use of technologies such as PowerPoint and interactive whiteboard is capturing the attention of students in the classroom. Technology is also being used in the assessment of students. One example is the Audience Response System (ARS), which allows immediate feedback tests and classroom discussions.

VI. IMPORTANCE OF BI IN EDUCATION

With the increasing demands for accountability and performance in the education sector—and the ongoing challenge of cost containment—better decision-making and accurate tracking are becoming more and more important. One must get the facts in a new collection of online resources prepared specifically for the education sector. The BI education is a way to find an array of case studies, interactive BI demos, and education-focused solution overviews and more—all dedicated to the issues and opportunities faced by today's educators and the systems they use.

- New medical school enjoys strong, fast start with open source, self-service Business Intelligence. The Commonwealth Medical College users access both formatted and ad hoc reports. Server-based Technology to keep cost low.
- University of East London chooses Business Intelligence for their student administration system. The University of East London tracks student information, citing Business Intelligence for ease of deployment, intuitive UI and performance.
- Learning Management Solutions Provider Meets Steep Enterprise Requirements—With Help From Business Intelligence Solutions. Remote-Learner has integrated a full slate of Business Intelligence -powered reports into its Enterprise Learning Intelligence Suite (ELIS), shaving months off time-to-market.
- Education Management software vendor brings cost-effective Business Intelligence to educators worldwide Business Intelligence powers the Management in Spiral Universe's cloud-based school management solution—which is growing faster as a result.

VII. THE WAY FORWARD

Business intelligence is for many of us in the field a specific set of analytic skills and technologies. We know that BI refers to the technologies, applications and practices for the collection, integration, analysis and presentation of information used for decision making. Do those outside of the field share this

understanding. In *Competing on Analytics*, authors Thomas Davenport and Jeanne Harris argue that business intelligence involves sophisticated quantitative and statistical analysis and predictive modelling. The emphasis in this book is on analytical competition. Vendors, however, often define BI in terms of specific technologies such as data mining, data warehouses, financial analysis, decision support systems, data cubes, dashboards, OLAP, market basket analysis and other tools. What these

Technologies are used for, the education needed and the role of BI in business is oftentimes not clearly articulated. Hence, to the average layperson, business intelligence and its career opportunities may be misunderstood or unknown. There are business intelligence programs at both the undergraduate and graduate levels. These programs are only a few years old, and they have only recently begun to attract the attention of on-campus students. One of the issues our program has is that the typical college student has no idea what business intelligence is or what it means. They understand the traditional business majors such as marketing, finance, management and accounting, but they have never heard of business intelligence as a field of study. What concerns is how educators and practitioners can begin to educate high school and college students and their parents that business intelligence is an attractive position in industry that deals with decision making. That is, how do we articulate and promote to people that business intelligence is a viable major and career choice for students. Let's face it, most people have heard of computer science, information systems or management information systems. In many universities, these fields are offered as majors. However, having these majors does not necessarily mean that graduates of these programs are capable of serving as BI professionals. While they may have a thorough education in technology and in many of its applications, they have not necessarily been educated in the analytics needed to serve in a BI function. At the other end of the spectrum, there are many students who major in math, statistics, operations management, finance or management science who have strong analytical skills but are weak in their technology capabilities. In their education, they may never be introduced to what business intelligence is or understand its role in business. And this is not surprising, because most institutions do not even use the term business intelligence in any of their programs or course descriptions.

Unless we are willing to say that degrees in computer science, information systems or statistics qualify a person to be business intelligence professional, then one should think we have work to do. Vendors, educators and the press need to think about how we can market business intelligence as a distinct field of practice so as to attract the attention of universities

and students in order to formalize it as a distinct field of study. The success criteria for such an endeavour would be the proliferation of business intelligence majors at universities with students increasingly declaring it as a major.

Most firms today do use some form of business intelligence, although only a few operate complete BI systems. To simplify the cost discussion, consider a firm starting from scratch. Putting a BI system in place includes:

- Hardware costs. These costs depend on what is already installed. If a data warehouse is in use, then the principal hardware needed is a data mart specifically for BI and, perhaps, an upgrade for the data warehouse. However, other hardware may be required such as an intranet (and extranet) to transmit data to the user community.
- Software costs. Typical BI packages can cost \$60,000. Subscriptions to various data services also need to be taken into account. For example, firms in the retail industry buy scanner data to ascertain how demand for their products and competing products responds to special offers, new introductions, and other day-to-day changes in the marketplace.
- Implementation costs. Once the hardware and software are acquired, a large one-time expense is implementation, including initial training. Training is also an ongoing cost as new people are brought in to use the system and as the system is upgraded. In addition, annual software maintenance contracts typically run 15% of the purchase costs.
- Personnel costs. Personnel costs for people assigned to perform BI and for IT support personnel, need to be fully considered to take into account salary and overhead, space, computing equipment, and other infrastructure for individuals. A sophisticated cost analysis also takes into account the time spent reading BI output and the time spent searching the Internet and other sources for BI.

BI is being taught at the university level in only a few schools a search of a number of current DSS books found only three Moss and Atre, Power, Turban and Aronson that even mentioned BI.

- University of Technology Sydney, Australia- Two BI courses in its e-Business masters: Business Intelligence
- 1: Advanced analysis (#22797) and Business Intelligence 2: Advanced planning (#22783).
- North-western Polytechnic University, UK- 1 course in MBA program
- Tilburg University, Netherlands 1 course

- Claremont Graduate University Included as half of a course in executive MBA program.
- University of California at Irvine 1 course covering Business Intelligence and Knowledge Management at the graduate and one at the undergraduate level.

VIII. USE OF OPEN SOURCE TECHNOLOGY

Proprietary tools from Oracle have long been used for these projects by both faculty and students in the department. But in more recent years, the department's applied research efforts have encountered increased use of open source tools within real-world enterprises. As a philosophy, we should let students choose which specific tools they want to use—we're generally pretty agnostic about them. We should try to expose them to many different software tools, open source and commercial, explain how they accomplish their goals, plus the pros and cons. Then we let students choose based on look-and-feel, feature set, or career aspirations. This approach also shows students the value of matching a tool to the specific need—something they will want to do once they move into the workplace. To help both faculty and students assess for themselves the value of open source software solutions, various software vendors have provided full suite of BI solutions to the Universities without charge, under the Scholars Program- an educational license that stipulates the software cannot be used for commercial purposes. For the two in-depth BI case studies, students typically use Oracle tools for one and variety of other tools for the other.

The students seem to like playing around with open source tools a lot, when they go to internships; they often see that organizations out there are using both commercial and open source tools—so it's good for one to prepare them for that reality.

CONCLUSION

Technology will become ever more interwoven into the fabric of academic life. The tenure and promotional requirements will need to be re-weighted to include Technology-based teaching criteria. But perhaps the most critical question facing the academic world is something far more fundamental: namely, what it will mean to be an educated person in the 21st century. As it indicates, these sweeping technological changes will effectively change the skill-sets of the future workforce, as well as its approach to work in general. As a result, societies around the world will need to consider how to make the most of these new opportunities and thus ensure that they remain competitive in the global marketplace.

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