

# **Opportunities and Challenges of Visual Business Intelligence Course for MBA Students**

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## **ABSTRACT**

As social network diffuses so does the data generated through them. This data contains much variety like text, videos, graphs, pictures etc. Data is generated at the speed of light and organizations must take advantage of it. Organizations are demanding graduates who can understand, manage and make sense of such data. Universities are obligated to provide such skills to their graduates. This paper is an attempt in that direction. A new course which combines visualization and intelligence was developed. Developing a new course always creates challenges and opportunities. We discuss challenges that were encountered and how we resolved them. Institutions planning to develop such a course can learn from our experiences and modify it based on their needs.

## **INTRODUCTION**

Visualization is becoming an important tool for exploring data. Data comes in many forms depending on its original destination. It could come from social media or from corporate documents or from sensors or from any other intelligent device. This data is described as ‘big’ data which is characterized by three basic features: high volume, high variety and high velocity (Aggarwal, 2016; Sheng, 2017 etc.). Several researchers (Aggarwal, 2016; Chen et al, 2016 and Osvaldo Jr (2017); Tay et al, 2017) have presented models for processing big data into meaningful form which can be analyzed further. Visualization typically has two parts. Exploration and Explanation. First part deals with data analysis and modeling and second part deals with data validation and story building. These parts are not mutually exclusive. According to SAS® ([https://www.sas.com/en\\_us/insights/big-data/data-visualization.html](https://www.sas.com/en_us/insights/big-data/data-visualization.html)), data visualization, ”is the presentation of data in a pictorial or graphical format. It enables decision makers to see analytics presented visually, so they can grasp difficult concepts or identify new patterns. With interactive visualization, you can take the concept a step further by using technology to drill down into charts and graphs for more detail, interactively changing what data you see and how it’s processed”.

It is clear from above definition, data visualization has three basic pillars:

1. Exploration
2. Explanation
3. Business Intelligence (BI) tools

Exploration requires data analysis using simple or complex models, Explanation requires story building in terms of cause/effect, association, classification etc. and BI tools facilitate these. The next section discuss the new course.

## **THE COURSE**

The course was developed for MBA students at a mid-western university. Most students work and go to school part time. This was an on-line class. After several iteration course definition evolved as:

Business Intelligence (BI) equips enterprises to gain business advantage, helping turn data into knowledge. Business Intelligence refers to the use of the information technology to analyze complex information about an organization and its competitors for use in business planning and decision making. The objective is to create more timely and higher quality input to the decision process. BI makes an organization agile thereby giving it a competitive edge. The course details BI components, important techniques as well as the critical variables needed to implement an effective BI program. This course takes a managerial approach to Business Intelligence, and therefore emphasizes the BI applications and implementations. This exposure allows students to truly understand how Business Intelligence works so they can adopt it in their future managerial roles.

In addition, following course learning objectives (LO) were identified:

- Become familiar with BI concepts and frameworks using visualization
- Identify BI components
- Understand data warehouse
- Understand how to develop BI applications
- Understand and use analytical techniques
- Know the business uses and value of BI

Once learning objectives were identified, the next step was to design the content and map learning objectives to lesson plans.

## **Challenges of Designing the Course**

During the design process typical challenges were encountered. Several could be controlled by designers but some were uncontrollable.

### **Uncontrollable challenges**

Skill requirements

External (administrative) constraints

### **Controllable challenges**

Book/software selection  
Book/Software availability

We discuss each of these briefly.

### **Skill Requirements**

The above mentioned three pillars require several skills. Following skills (ideally) were identified for a student to successfully complete this course.

- Database
- Statistics
- Information Technology
- Management Science
- Psychology
- Ethics

Given the above list it is not possible for any one student to have competency in all of them. In addition, business students do not have much statistical and/or optimization background making it challenging to include BI components in visualization. Database is another skills which maybe lacking in many students. Course had to be designed to keep these in mind. It was decided to teach BI techniques without going into mathematical details. Emphasis was on understanding modeling concepts of each BI technique. This would allow students to identify technique(s) which may be suitable for their problem, apply it and analyze the outcome. In addition, data warehouse part was omitted. Students interested in data warehouse could take database course which is offered as a separate course (not required of MBAs).

### **External Constraints**

Administration wanted to keep pre requisites at a minimum to attract MBA students from different functional concentration. It was decided to keep only the basic information technology competency course as a pre requisite. This course is required of all MBAs. This would allow students from marketing, management, finance etc. to enroll in the course. The course needed to be data-driven with visualization to be useful to business students.

### **Book/Software selection/availability**

There are several books available in visualization (Stephen Few, 2006 etc.) and BI (Shmueli et al, 2016, etc.) respectively, however there are no books that deal with both subjects simultaneously. This makes book selection a challenging task. It was decided to provide students with supplement materials and streaming videos on topics not covered in the book.

There are many visualization and analytical software available however not many have both visualization and modeling capabilities. SAS visual analytics® comes closest to this requirement. This software has some modeling capabilities with visualization of results. This was the appropriate software for this course.

## Course Implementation

Once the course was designed the next step was to deliver it online. Each LO was mapped into an individual assignment. There was forum discussion on both visualization and BI related topics and especially on interpretation of results. It is important for MBA students to understand the results and interpret it properly. Students were asked to develop story of a real life data freely available from government websites. This assignment measured several of the learning objectives of the course.

## CONCLUSION

This new phenomenon merges two fields visualization and BI. It is important that our students understand the combined approach instead of existing isolated concepts of visualization and analytics. Opportunities are emerging as software like SAS, JMP and Tableau are making business intelligence and visualization a reality. There will always be challenges due to business background of students. This, however, should not be a drawback but an opportunity to bring different students together to get different inputs. The course, itself, is evolving and the next step is to study JMP for visual suitability and maybe remove data warehouse from the learning objective. This will allow professors to concentrate on data visualization and resulting story to ‘discover’ opportunities in the classroom.

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