

## **Application of Technology in Teaching Finance**

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### **Abstract**

In this paper I present my experiences in the use of technology for teaching Finance at the undergraduate level. The resources used include spreadsheet modelling, readymade spreadsheet templates, books with CDs, electronic databases and internet resources. I also attempt to show how this leads to constructivism and motivation in the learning process.

Key words: K-15, finance, quantitative techniques, computer, internet, constructivism, motivation

### **Introduction**

The aim of this paper is to share my experiences in the use of technology at the undergraduate level, and to correlate it with the theories of learning.

I have been teaching Investment Analysis (students specializing in Finance) and Quantitative Techniques (all BBS students). Finance is a popular and important subject of study, however the quantitative aspects are perceived as difficult and sometimes abstract. Similarly Quantitative Techniques for Management is taught in all management courses but is perceived as very mathematical and full of tedious computations by many students. I found that these problems can be solved to a great extent with the use of computers and some innovations in the teaching process.

I use computer applications in all papers that I have taught at the Shaheed Sukhdev College of Business Studies. This was based on my experience in the corporate sector and feedback from ex students. This includes popular software such as Excel, software that comes with books, a paid electronic database and free internet resources. I also send and receive assignments and give feedback through e-mail. I find this whole process enhances the learning process for students. The interactive process also increases my knowledge and helps improve my teaching every year.

## **Theories of Learning**

There are two major theories of learning that are of interest in this context, namely constructivism and motivation.

### ***Constructivism***

Constructivism is basically a theory based on observation and scientific study about how people learn. It says that people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences.

In the classroom, it means encouraging students to use active techniques such as problem solving and experiments to create more knowledge and then to reflect on and talk about what they are doing and how their understanding is changing.

Both teacher and students think of knowledge not as inert facts to be memorized, but as a dynamic, ever-changing view of the world we live in and the ability to successfully stretch and explore that view. Students learn more, and enjoy learning more when they are actively involved, rather than passive listeners. Students solve problems beyond their actual developmental level under teacher guidance or in collaboration with more capable peers. The students are also more likely to retain and transfer the new knowledge to real life.

However some critics feel that constructivism has been most successful with children from privileged backgrounds with outstanding teachers, committed parents, and financial resources, while disadvantaged children, benefit more from more explicit instruction. Some studies also found that students in constructivist classrooms lag behind those in traditional classrooms.

What is required therefore is a mixture of subject mastery and constructivism.

### ***Motivation***

Intrinsic motivation is the stimulation or drive stemming from within oneself. These include the feeling of achievement, responsibility, challenge and peer recognition. This develops life long learners who are self-initiating and self-regulating.

Extrinsic motivation is encouragement from an outside force such as grades, money or praise. Extrinsic rewards can be abused to bribe or coerce someone into doing something that they would not do on their own. However they do not produce permanent changes. When students don't care about what they are learning, tests and grades force them to learn what they don't care about knowing.

Project based learning is one way of providing an environment suited to the nurturing of intrinsic motivation. It can be used to challenge students with real world problems. It also helps students use diverse skills - research, data gathering, hypothesis generation and testing, and problem solving. Moreover projects allow more than one “correct” approach and solution as the focus is on the process, not the end product. If done in a group project work also promotes collaboration.

### **My experiences with the use of technology in the classroom**

Sixteen years ago, I started with the use of spreadsheets for Finance and a software that came along with a book for Quantitative Techniques (QT). Spread sheets were used to solve questions requiring long, tedious or repetitive calculations and the QT software for long cases that are difficult to solve manually. Students looked forward to these computer exercises, and I found I could help them formulate, solve and interpret more complicated problems and cases than I would have with manual calculations. We have come a long way since then; I give below details of what we use at present.

#### **For the Investment Analysis papers**

***Excel spreadsheet models*** : where students build in the formulae themselves and solve large problems. This helps understand concepts without tedious and repetitive calculations. In real life situations all finance professionals use computers. Areas where these are used include company valuation using discounted cash flows, bond yields and duration, portfolio optimisation and CAPM

***Excel templates***: where students simply fill in data and see results and interpret them. I use templates for the valuation of options using the Black and Scholes Model.

***Power Point Presentations***: To show charts/graphs or large amount of information that cannot be put on OHP slides. For example, I use this for fundamental analysis where I demonstrate what is contained in a business confidence survey.

***Internet Resources*** : to demonstrate concepts that make use of certain specialized software. For example in Technical Analysis I show them charts with real life current data. Students can choose the stock, the type of chart and parameters and see the results. In bond analysis they can see the latest yield curves on the National Stock Exchange site.

***Hands on learning***: I also use a stock simulation game available on the internet so they can formulate a policy on how to trade and check the profit/loss by trading at current prices on that basis.

### ***Use of technology for project work***

Data Collection- ***Prowess database*** (subscribed by college last year) & Internet

Data Analysis- Excel and ***SPSS software*** (we used the trial version available on the internet last year and are planning to get paid version this year)

Project Report- word processor with charts, graphs, etc.

Presentation – students make power point presentations, some including video clips

### **For Quantitative Techniques and Production and Operations Management papers :**

***Software available with books*** : was used to make students formulate and solve large problems, not normally done manually, and then interpret the results. This is what will be done in real life. Book used-Quantitative Systems for Business, by Chang & Yi-Long I used this for linear programming, integer linear programming, goal programming, transportation and transshipment, quality control especially OC curves, job shop scheduling, and project scheduling ie PERT and CPM.

***Giving and receiving assignments through e-mail:*** This saves time in class, and ensures all students get the information even if they are absent. I can easily check work done using spreadsheets. When I send the instructions / solution along with the formulae in a spreadsheet, the student can preserve and study it at his convenience. Larger assignments are submitted by students on a CD.

### ***Future Plans:***

***Barra Software*** is a very sophisticated portfolio optimization software used by professional fund managers all over the world. We have got a free student version of this software; I plan to use it this term.

### **Some Examples of Observable Results**

In the quantitative methods paper, I once gave a long case study in linear programming with 8-9 constraints to be formulated and solved using the software program. I got three different formulations with two, three and four variables respectively. The computer solution and profit was the same, but interpretation of results had to be done in a different manner for each. Without the computer, it would have been a very tedious process to prove that all the formulations were correct. I used these to encourage students to think independently and to have the courage to question me if I use a different approach.

In the finance term paper, I asked students to take one stock each and plot technical charts<sup>1</sup> and identify trends and patterns. This motivated some students to do their 60 mark project paper on advanced technical analysis, which was a learning experience for all of us.

The introduction of the Prowess data base last year also motivated students to use the SPSS trial version for analysis. I advised them keep the data ready for processing and briefed them on the capabilities of the program so they could complete the analysis in the 15 day trial period. This helped students to do quality research for the project paper. One such project has already been published in a refereed journal<sup>2</sup> and two more are in the pipeline.

### **What I learnt about innovations in teaching**

I found that supplementing regular lectures with such exercises keeps students interest and motivates them to learn and to achieve more. However, this does not happen with all the students. Some are still motivated by marks, so I introduced a few marks from internal assessment for computer assignments, hoping they would get involved in the process over time.

Innovations in teaching are also influenced by the culture of the organisation. At our college, I was given an opportunity to revise the syllabus and the freedom to adopt new teaching methods.

Innovation in teaching is also a two way process. We are fortunate to have very bright students with inquisitive minds and the desire to achieve more. In addition to resources provided by the college, students also used their home computers and cyber cafes to do their work.

I also realised that the learning and teaching process evolves over time; the learning process in my courses advanced with the availability of resources and positive student response. The direction of further improvement was partly influenced by my efforts to provide more relevant interesting experiences and partly due to students curiosity and their interests.

### **Conclusion**

My experience in the classroom shows that the use of technology in teaching helps in constructivism and motivation. It is facilitated when there is infrastructural and administrative support and positive student response.

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<sup>1</sup> using website [www. iCharts.in](http://www.iCharts.in)

<sup>2</sup> Empirical Testing of Strong Form of Market Efficiency, Asia Pacific Business Review Vol. IV, No. (3) July to September 2008. Deepak Gupta, Arti Anand & Rohini Singh.

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