# Teaching XBRL to Graduate Business Students: A Hands-on Approach

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## Introduction

EXtensible Business Reporting Language (XBRL) is a non-proprietary, computer language that has many uses. Known primarily as the Extensible Markup Language (XML) for business reporting, XBRL allows entities to report their business information (i.e., financial statements, announcements, etc.) on the Internet and communicate with other entities' computer systems regardless of the specific hardware or software used. XBRL has been named the number one technology to be aware of (Leone 2002) and is part of the application that is number one on the American Institute of Certified Public Accountants' top technologies list (Editorial Staff 2002).

XBRL is currently being piloted and used in many countries around the world. For example, under an initiative called D2A (Direct to APRA), Australian corporations are required to report pertinent information via XBRL to the Australian Prudential Regulatory Authority (APRA). In the United States, leading companies (e.g., Microsoft and Morgan Stanley) and many federal governmental agencies have begun XML or XBRL initiatives. Specifically, a recent report developed by the Joint Financial Management Improvement Program recommends that U.S. governmental agencies (including the Treasury Department and the General Accounting Office) use XBRL (Hannon 2002).

One of the intended uses of XBRL is to provide more accessible corporate information to stock market investors to support their investment decisions. MBA students have previously been used in accounting research to proxy for investors (Hunton et al. 2002; Bloomfield and Hales 2001). The MBA participants in the current paper analyzed outputs of XBRL and not XBRL itself in the experimental task. However, they needed to know what XBRL did "behind the scenes" of the data in order to understand how the data was provided and to knowledgeably complete the questionnaire. The perceived experiential gains and student commentaries provided support for this approach. Therefore, based on the results obtained, it would appear that teaching the basic concepts involved with XBRL, before having MBA students examine a specific XBRL application, were appropriate.

In essence, the purposes of the current paper are twofold: first, to provide a guideline for teaching XBRL to graduate business students; and second, to report on an experiment based on the documented approach. XBRL use and growth worldwide is expected to be exponential in the coming years. It is up to educators to provide graduate business students with the basic knowledge and hands-on experience to ensure preparation in the increasingly global "new economy." Given the software tools that both currently and will exist in the future (specific examples to be discussed); business graduates may not need to know how to program in XBRL or other XML derivatives. However, they should know how to use the XBRL-provided data in order to be successful in their jobs, whether they are in accounting, finance, management, or information systems.

The first part of the paper presents the teaching methodology that I advocate and use in my MBA classes. The second part describes the experimental task performed by the students, as well as the statistical results and commentary received in general support of XBRL for corporate reporting.

## Teaching Methodology: Preliminary Background Work

I strongly recommend reading "XBRL Essentials" by Hoffman and Strand (2001) before attempting to teach XBRL. The book provides a plain-English approach that explains the background, current uses, and future importance of XBRL. To supplement the book, I also encourage instructors to read all of the news items posted at the following websites: www.XBRL.org, web.bryant.edu/~xbrl, and www.pwc.com/xbrl. Combining these sources provides ample information for XBRL lectures.

Early in the preparation process, the instructor should decide on the degree of programming to be taught. My purposes in the XBRL module of the class were to introduce the students to the technology, teach them the major concepts involved, and, for one section, teach them how to apply it in a real-world project. Several XBRL-enabled tools either currently exist or will soon be introduced to the businessworld. Both Hitachi and Semansys

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have XBRL Instance Document creation software and Taxonomy Builders that are popular in the marketplace (both are to be described in a later section). SAP has an application called Strategic Enterprise Management that supports the converting of exiting data into meta-data and the mapping of XBRL taxonomies to a company's various applications (Goff 2003). PeopleSoft, Microsoft (through Office 11), and Hyperion (the global leader of business performance measurement software) are all releasing key XBRL-enabled software in 2003 and 2004.

For each product listed above, the student need not know how to program in XBRL in able to use it. Rather, user-friendly instructions and tutorials make the tools very helpful in business data gathering, processing, and analysis. If the students were interested in programming in XBRL, the initial content knowledge from my course would help if they decided to take a computer science elective or learn on their own. Additionally, there are simple methods in which students can see the XBRL code behind each of the previously cited products if they would like to self-learn the coding schemas.

## Order of Lecture Material

Begin by stating why there is a need for XBRL. Since many entities have different computer systems (hardware and software), it is difficult to both electronically communicate critical business information within and outside an entity, and to reliably extract and manipulate entity information from the Internet. Hypertext Markup Language (HTML) is good for static web pages and display purposes, but is inadequate for interacting with data due to its unstructured data. As a result, inefficiencies exist when electronic information is downloaded, but then retyped into a proprietary entity application. XML's (and thus, XBRL's) flexibility allows it to be portable and communicable across any software that is XML-enabled. It should be noted that many estimates place the majority of software to be XML-enabled by the end of 2004. Currently, XML can be read using a special XML parser separately obtained or contained in Explorer 6.0 (a free download on Microsoft's website).

XML and its derivatives have become increasingly important data formats for storing and exchanging business data among various accounting systems on the Internet. Through the use of Web services and a transmitting protocol such as Simple Object Access Protocol (SOAP), enterprises all over the world are able to send and report business information in almost real-time (Feng et al. 2002). As a result of all of XML/XBRL's benefits, companies are able to electronically post and communicate key financial and nonfinancial information very quickly

and precisely. For example, Microsoft and Morgan Stanley/Dean Witter have been using XBRL in their reporting process since 2001.

At this point, it should be explained how XML "works." XML collects information and assigns tags to it in a computer and human readable format. For standardization purposes, the rules for the tags are defined by a group of world industry leaders called the World Wide Web Consortium (W3C). Thus, the information within the tags has the same meaning regardless of language, country, or accounting rules created. The human readability aspect allows easier troubleshooting for non-programmers.

XBRL is XML for business reporting. Each industry has its own standard called a taxonomy. U.S. taxonomies for different industries are still being finalized, with two (one for commercial and industrial entities and the other for banking and finance) currently available. Additionally, the XBRL specification provides the set of rules for creating taxonomies and an instance document (ID).

Next, it is important to put the tag, taxonomy, and specification concepts together for a single use. An XBRL ID contains the coding for whatever business information needs to be reported. The ID has data from the user company surrounded by tags from the taxonomy used. For example, if an entity wanted to report its quarterly earnings in XBRL, there would be an ID with the information encoded in XBRL tags. If instead the entity wanted to report all of its financial statements and its quarterly information, it would still need only to produce one ID with the proper tags. This is a good time to show the students what an ID and the tags look like. Go to a room that has Internet access and use the Great Plains demo available at www.XBRLsolutions.com. The demo contains both the finished reported product (i.e., financial statements) as business students are used to seeing them and the ID written in XBRL displaying the tags. The instructor should explain that the use of style sheets (i.e., set of instructions on how to sort, filter, and transform XML/XBRL) "translates" the information from XBRL on the ID to the more readily understandable text-based format.

The final stage of instruction involves showing students how XBRL information is transferred from one computer application to another and providing multiple examples. The simple example I like to use as a supplement is one most students can relate to: communicating information written in Microsoft Word to another party who uses WordPerfect (or vice versa). The information begins in Word. Then, it is converted into XBRL by right clicking the mouse and choosing "save as XBRL" (an option that is soon to exist). The information is sent via the Internet, Local Area Network, or Wide Area Network through a XML/XBRL translator (which is only

necessary if the information is not tagged in XBRL already or if the user wants to change from one XML presentation to another). Finally, the information is received by the second party already tagged in XBRL and ready for use in WordPerfect (please see Appendix A).

Practically, the instructor should go through business examples of how the same communication process would work. For example, use of XBRL and XML-enabled software would allow a bank to receive a loan application with supporting documentation, import the information into their system, and make an acceptance decision is minutes rather than the 1.75 days the process currently averages. Another example would be the lower cost of capital benefit available to companies that post business information in real-time to their websites using XBRL.

## Research Design and Sample Demographics

After the XBRL lectures were completed, the students in two MBA accounting classes were required to analyze two companies in terms of investment opportunities. Both classes were told how to access and use the Excel Investor's Assistant tool, which contains company information in XBRL, available on the NASDAQ website (www.Nasdaq.com/XBRL). Only one of the classes was shown an example analysis and required to use the tool in their analysis (please see Appendix B for specific form used). All students had one week to complete the project and their grade was considered 20% of their final exam score.

All of the MBA students were given a questionnaire (Appendix C), which was completely voluntary to fill out, along with the project. A total of 40 students completed it and turned it in. 38 out of the 40 (95%) reported their gender with 18 females (47.4%) and 20 males (52.6%).

In terms of education, 37 students (92.5%) were seeking MBA degrees; whereas the other 3 students (7.5%) were seeking various other graduate degrees. 18 students (45%) were taking my course as their first accounting course and 16 (40%) were taking at least their third accounting course. In many circumstances, MBA students earn their undergraduate degrees from non-business schools. If they desire a business degree later on, quite often they choose to earn an MBA, rather than an undergraduate business degree. In examining the sample, exactly half (50%) of the sample received their undergraduate degrees from a college of business, with the other half (50%) received their degrees from non-business colleges.

In terms of work experience, 34 students (85%) had at least 2 years of work experience with 13 students (32.5%) having exactly 2 years. Only 37 out of 40 students (92.5%) reported their area of primary work experience. Of those that reported, 28 (75.7%) had primary work experience outside of accounting, finance, and computers. Taken together, the sample appeared to possess a diverse educational and work background that contained at least some practical work experience.

Two measures of task difficulty were used and summed together to assess the sample's perception of difficulty related to the financial analysis task. The summed scale had a range from 2 (easy) to 14 (difficult), where 8 was the midpoint that represented a somewhat difficult task. The sample had a mean of 9 and a median of 9.4. 3 students (7.5%) had scores of at the low end of the scale (3 or 4) and 3 others had scores at the high end of the scale (13 or 14). The results indicated most students fell outside of the extremes of the scale and perceived the task as somewhat difficult.[1] Please see Appendix D for a summary of the demographic information

## Statistical Results

Separate dependent variables were created from the subtraction of the initial knowledge and experience scores from the perceived level of XBRL knowledge and experience scores at the end of the course (henceforth "Know Difference" and "Exp Difference", respectively). On seven-point Likert scales (1 = none, 4 = somewhat, 7 = very), students were asked their previous knowledge of and experience with XBRL, as well as their perceived level of knowledge and experience at the end of the course. The class that used the Excel tool had a mean XBRL knowledge score of 1.35 (low) before the course, 4.48 (somewhat) after the course and a mean XBRL experience score of 1.35 before the course, 4.3 after the course. The other class that used only paper-based annual report information had a mean XBRL knowledge score of 1.24 before the course, 4.48 after and a mean XBRL experience score of 1.18 before the course, 2.82 after.

All statistical results with one exception are displayed in Appendix E. That exception is the MANCOVA testing all possible covariates (from Appendix D, but not including task difficulty). The MANCOVA did not add sufficient new knowledge to require presentation. However, its results indicated only undergraduate degree (henceforth "Undergrad") and work experience (henceforth "Work") were at least marginally significant at an alpha of 0.10. Therefore, they were the only two covariates used in a second MANCOVA. The results of the second MANCOVA provided high levels of statistical significance for the independent variable and two covariates.[2] Specifically, "Group"

had a $F$-Statistic of 14.69 ($p$-value < 0.01), "Undergrad" had a $F$-Statistic of 3.73 ($p$-value = 0.03), and "Work" had a $F$-Statistic of 5.19 ($p$-value < 0.01). Additionally, the power of the test appeared sufficient (0.99 for "Group").

ANCOVA results did not reveal any significant knowledge gains between classes ($F$-statistic = 0.23, $p$ = 0.63); however, there was a significant difference between XBRL experience gains ($F$-statistic = 12.88, $p$ < 0.01). Thus, statistically, the students on average did not perceive any knowledge gains by using XBRL instead of paper, but they did perceive to be more experienced having used the technology.

## Qualitative Support for Hands–On XBRL Instruction

The majority of comments made by the students seemed to indicate strong support for using XBRL in a financial analysis task (please see Appendix F). Specifically, those that used the Excel tool perceived the XBRL information provided in as "useful" and helping to create a "better understanding." In contrast, those that used the paper-based format suggested using XBRL in a "hands-on" fashion while contending the paper-based annual reports were hard to make company comparisons with. These results help to add credence to the current move in the accounting profession from paper reporting to electronic reporting.

## Conclusions

In summary, many students did not have any knowledge or experience with XBRL before the course. After teaching the major concepts and benefits of XBRL for approximately two weeks, the students perceived themselves as being somewhat knowledgeable and experienced (on average). Positive student comments and statistically significant perceived experiential gains support a hands-on approach to teaching XBRL to graduate business students.

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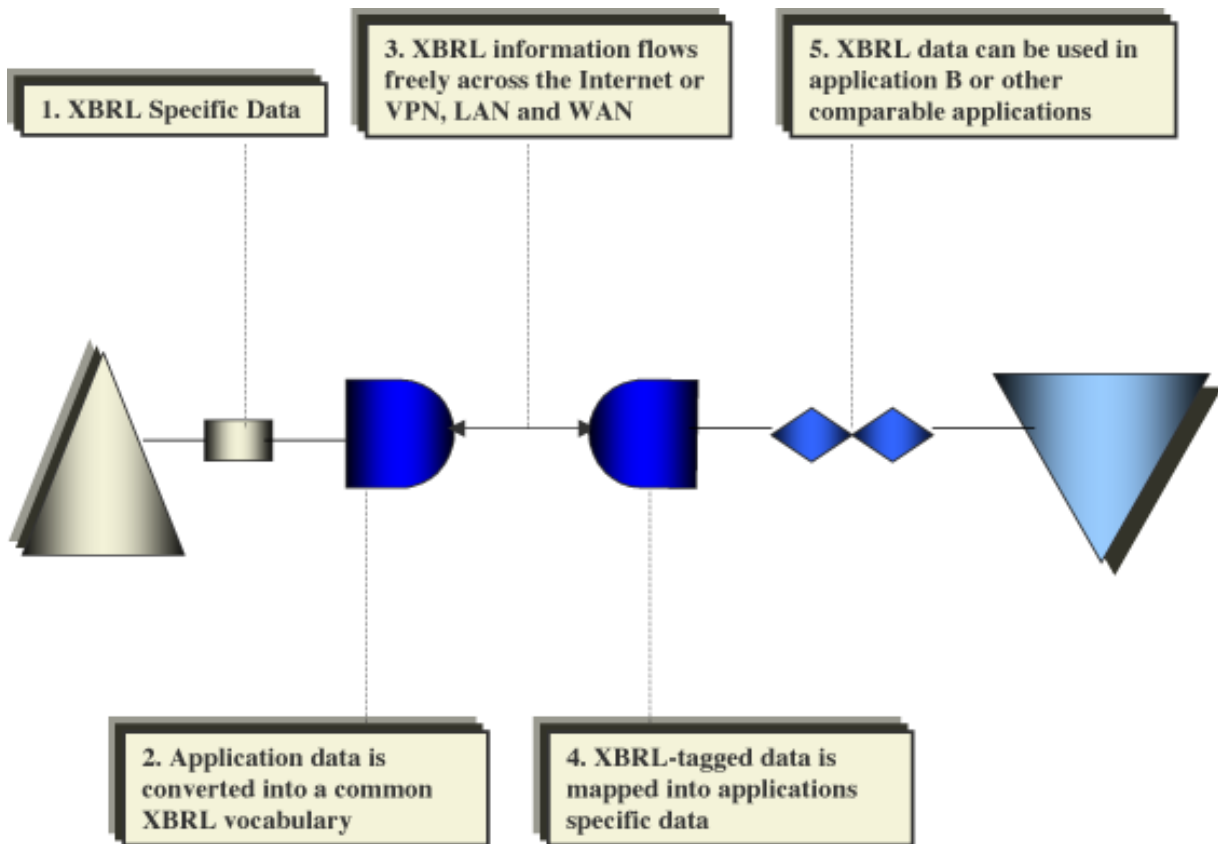
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Dr. Pinsker has been a doctoral fellow and has presented research at several regional conferences. He is an academic member of XBRL-US, as well as a member of the AIS, financial reporting, accounting behavioral in organizations, and emerging technologies sections of the American Accounting Association.

**1. XBRL Specific Data**

**3. XBRL information flows freely across the Internet or VPN, LAN and WAN**

**5. XBRL data can be used in application B or other comparable applications**

**2. Application data is converted into a common XBRL vocabulary**

**4. XBRL-tagged data is mapped into applications specific data**

Adapted from Hoffman and Strand (2001)

The purpose of this problem is to have you do a comprehensive analysis of two companies, given the information distributed to you and your knowledge of the course content. Assume you are a manager for a medium-sized U.S. public company. Your company has been somewhat profitable for the past few years, but foresees a need for a greater amount of cash in the future. Instead of investing in low-interest, but safe government bonds, your boss has decided to invest in the stock market. Over time, the average returns from the stock market have far exceeded many other types of investments. Your boss has decided that the investment should be in the semiconductor/technology area and after extensive research, has narrowed the choices to two companies: Applied Micro Circuits Corporation (AMCC) and Maxim Integrated Products, Inc. (MXIM). Both companies are publicly traded on the NASDAQ stock exchange.

You are to ONLY use information for the fiscal years ending 2000 and 2001 for your analysis. In essence then, you are to pretend that 2002 has not happened yet, and cannot use any information from that year (including general economic information). You are only allowed to use the information provided to you, except that if you want to track the stock price/volume over the two years, you may either go to the companies' websites or go to quote.yahoo.com. Additionally, you are not allowed to use any information that is crossed out in your handouts (some of you won't have this).

Required:

1) Using the Excel Analyzer program (which is posted under "Course Materials" in BlackBoard), analyze both companies' performance in the years 2000 and 2001. You should use any applicable ratios and footnotes to answer this part. Cite any concerns or positives you notice over these two years. In short, repeat what you did in your group case studies, but in a more comprehensive manner (i.e., don't just look at liabilities, cash flows, etc. on an individual basis, combine them all together in one analysis).

2) Analyze both companies' prospects for 2002 and beyond. Relating to chapter 16, state any assumptions you have in key financial and nonfinancial areas and describe any patterns you see in those areas. For example, if you believe Maxim's COGS as a percentage of sales is going to decrease, state that and tell me why. Precise numbers or projections are not required.

3) In your position as a manager, which company would you invest your company's funds in and why?

4) Please fill out the attached survey. Although not required, it will help me understand what you thought about this problem and learning about XBRL. Your responses should help me better organize my future XBRL lectures, benefiting future classes.

Please take the next few minutes to circle or fill in the answers to the following questions.

## Part 1: Demographic Items

Gender:          Male              Female

Age:              _____

What degree are you seeking?          _____

What college was your undergraduate degree in (please circle only one)?

   Business    Philosophy      History          Education          Engineering
   Other

Including classes in which you are currently enrolled, how many college accounting courses have you taken?  _____

How many years of work experience do you have?      _____

If your answer to the last question (above) is greater than zero, what is your primary area of work experience (please circle only one)?

Accounting  Finance  Economics  Marketing  Management  Computers  Other

**Please go on to the next page**

## Part 2: Source on Information

I was asked to analyze a company using XBRL-based company information on the computer.  (1 = strongly disagree, 4 = not sure, 7 = strongly agree)

        1       2       3       4       5       6       7

I was asked to analyze a company using company information on paper. (1 = strongly disagree, 4 = not sure, 7 = strongly agree)

        **1       2       3       4       5       6       7**


## Part 3: Ability, Knowledge, and Task Items

### Ability

I believe that I am quite good at analyzing publicly traded companies.
(1 = strongly disagree, 4 = not sure, 7 = strongly agree)

        1       2       3       4       5       6       7

I am very capable of analyzing companies. (1 = strongly disagree, 4 = not sure, 7 = strongly agree)

        1       2       3       4       5       6       7

How would you rate your ability to analyze companies? (1 = very poor, 4 = about average, 7 = very good)

        1       2       3       4       5       6       7


**Please go on to the next page**

**Analysis Knowledge and Experience**

How would you rate your overall XBRL knowledge before this course? (1 = not very knowledgeable, 4 = somewhat knowledgeable, 7 = very knowledgeable)

|     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|
| 1   | 2   | 3   | 4   | 5   | 6   | 7   |

How would you rate your experience with XBRL before this course? (1 = very inexperienced, 4 = average experience, 7 = very experienced)

|     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|
| 1   | 2   | 3   | 4   | 5   | 6   | 7   |

How would you rate your overall knowledge with XBRL after this course? (1 = not very knowledgeable, 4 = somewhat knowledgeable, 7 = very knowledgeable)

|     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|
| 1   | 2   | 3   | 4   | 5   | 6   | 7   |

How would you rate your experience with XBRL after this course? (1 = very inexperienced, 4 = average experience, 7 = very experienced)

|     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|
| 1   | 2   | 3   | 4   | 5   | 6   | 7   |

**Difficulty of Analysis Task**

Overall, how would you rate the difficulty of company analysis task you had to do? (1 = not difficult, 4 = somewhat difficult, 7 = extremely difficult).

|     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|
| 1   | 2   | 3   | 4   | 5   | 6   | 7   |

I thought that the task (analyzing a company) was very easy.
(1 = strongly disagree, 4 = not sure, 7 = strongly agree)

|     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|
| 1   | 2   | 3   | 4   | 5   | 6   | 7   |

**Please go on to the next page**

Please use the rest of this page to write any comments you have about XBRL.

Thank you for filling out this questionnaire.

For all of the information below, assume a sample size of 40, unless otherwise noted.

*Gender*:    38 out of 40 students reported (95%): 18 females (47.4%) and 20 males 52.6%).

*Degree*:    37 out of 40 students (92.5%) were seeking MBA degrees. The other 3 students were seeking various other graduate degrees.

Accounting
*Courses*:    18 out of 40 students (45%) were taking their very first accounting course. 16 students (40%) were taking at least their third accounting course.

Undergraduate
*Degree*:    20 students (50%) received their undergraduate degree from a college of business and 20 students (50%) received their undergraduate degree from non-business colleges.

*Work*
*Experience*:    34 out of 40 students (85%) had at least 2 years work experience with 13 (32.5%) having exactly 2 years.

*Primary*
*Work*:    28 out of 37 students (75.7%) had primary work experience outside of accounting, finance, and computers. 3 students did not report.

*Task*
*Difficulty*:    2 measures of task difficulty were measured and summed where 2 = easy, 8 = somewhat difficult, and 14 = difficult. 3 out of 40 students (7.5%) had scores of 3 or 4 and another 3 had scores of 13 or 14. The mean score was 9.4 with a median of 9, indicating that most students fell outside of the extremes of the scale and perceived the financial analysis task as somewhat difficult.

### MANCOVA Results

| Variable | F-statistic | Hypothesis DF | Error DF | Sig. | Power |
|---|---|---|---|---|---|
| Group | 14.69 | 2.00 | 35.00 | <0.01 | 0.99 |
| Undergrad | 3.73 | 2.00 | 35.00 | 0.03 | 0.64 |
| Work | 5.19 | 2.00 | 35.00 | 0.01 | 0.80 |
| Intercept | 85.91 | 2.00 | 35.00 | <0.01 | 1.00 |

### ANCOVA Results

**Dependent Variable: Know Difference**

| Variable | F-statistic | DF | Type III Sum of Squares | Sig. | Power |
|---|---|---|---|---|---|
| Group | 0.23 | 1.00 | 0.25 | 0.63 | 0.08 |
| Undergrad | 0.63 | 1.00 | 0.67 | 0.43 | 0.12 |
| Work | 8.40 | 1.00 | 8.97 | <0.01 | 0.81 |
| Intercept | 176.71 | 1.00 | 188.87 | <0.01 | 1.00 |
| Model | 3.00 | 3.00 | 9.62 | 0.04 | 0.66 |

**Dependent Variable: Exp Difference**

| Variable | F-statistic | DF | Type III Sum of Squares | Sig. | Power |
|---|---|---|---|---|---|
| Group | 12.88 | 1.00 | 18.30 | <0.01 | 0.94 |
| Undergrad | 1.83 | 1.00 | 2.59 | 0.19 | 0.26 |
| Work | 0.88 | 1.00 | 1.25 | 0.36 | 0.15 |
| Intercept | 84.97 | 1.00 | 120.73 | <0.01 | 1.00 |
| Model | 5.27 | 3.00 | 22.45 | <0.01 | 0.90 |

The assumptions for both MANCOVA and ANCOVA were also checked. Since the data did not involve time series, independence can be assumed. Although there are no formal checks of multivariate normality, multiple forms of examining univariate normality are regularly used. Stem-and-leaf plots, as well as histograms did not reveal any significant deviations of univariate normality. Finally, neither the Box's M (*F-statistic* = 1.75, $p$ = 0.15) nor the Levene's tests (*F-statistic* = 0.81, $p$ = 0.37 (Know Difference); *F-statistic* = 0.35, $p$ = 0.56 (Exp Difference)) indicated any unequal variances.

 1 Additional testing did not result in any statistical significance between classes in terms of perceived task difficulty. Thus, using XBRL was not statistically more difficult than using paper-based information for the task.
 2 It should be noted that SPSS 11.0 was used and Pillai's Trace, Wilk's Lambda, Hotelling's Trace, and Roy's Largest Root had the exact same results.mechanical properties is explained and if possible equipments used to measure them are shown to the students. To obtain an excellent grasp on the mechanical properties it is important to demonstrate the measurements necessary to calculate the properties. In several cases the raw data measured from the laboratory were presented to the students and they were asked to calculate the mechanical properties in small groups.

The following table lists student feedback regarding XBRL and/or their projects.

| Class (description from Appendix D) | Comment |
|---|---|
| XBRL | I thought the information provided by XBRL was useful… |
| XBRL | XBRL annual report is better than the paper based in the way that it helps analyst visualize the trend much better & easier than plain number does. |
| XBRL | I believe that using XBRL is a great idea… |
| XBRL | Compared to other Internet resources which could be functioned as XBRL, it has more emphasis on financial reports and ratio comparisons.  Especially the ratio part in XBRL is more useful. |
| XBRL | Through searching and combining many numbers and ratios, I was able to use the XBRL information to come up with a better understanding of what happened during these two years at Maxim. |
| Paper | Having worked in the IT industry, I would suggest some sort of homework assignment or hands-on in-class project in the future. Hands-on experience is the most effective way to teach IT principles (or so I'm told), and requiring students to actually do something with XBRL will give them a better experience than just a lecture. |
| Paper | XBRL is a useful tool when analyzing a company's financial situation. Besides, XBRL saves the time to solve the difference of basis of fiscal year.  Some companies report their annual reports from January, while others are from the end of the year.  Paper annual reports are hard to solve this problem when comparing two companies. |
| Paper | It is a very interesting system – which will probably be very beneficial to international firms.  It will also be interesting to see how long it will take many industries to adopt the system. |