

CASH FLOW STATEMENT SPREADSHEET MODELING CASE USING A PROTOTYPE SYSTEM DEVELOPMENT PROCESS

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ABSTRACT

U.S. GAAP and IFRS standards both require a cash flow statement that presents operating, investing and financing net cash flows (FASB, FAS 95; 1987; IASB, IAS 7, 1992). Although students are exposed to the cash flow statement in beginning accounting courses and then study the cash flow statement in more depth in intermediate accounting classes, they still have difficulty preparing the cash flow statement. Spreadsheet modeling is a skill that employers believe is a necessity for students to develop for their accounting careers since spreadsheets are used so extensively in the accounting and business world. This case helps students cement their understanding of the cash flow statement preparation and spreadsheet modeling skills. Using a prototype development process, students build a spreadsheet model that efficiently, consistently, and accurately utilizes proper spreadsheet modeling and validation techniques to process inputs of accrual accounting financial statements and other necessary input data into a proper cash flow statement output. The goal is to have a user friendly, robust cash flow statement spreadsheet model that can be generalized to most companies' financial data. A few accounting professionals who are former students who actually completed the assignment provided feedback for the case. The response was that the case was a valuable learning exercise to help them prepare for the profession and should be continued. One of these former students who is now an audit manager in a large local firm stated, "The project was useful and relevant. It was one of the most real life projects I worked on in school."

INTRODUCTION

Both United States Generally Accepted Accounting Principles (GAAP) and International Financial Report Standards (IFRS) require a cash flow statement providing cash flow information for operating, investing, and financing net cash flows that tie to the overall change in cash and cash equivalents on the balance sheet from one year to the next (FASB, FAS 95; 1987; IASB, IAS 7, 1992). Students often struggle to understand the relationship between the cash flow statement and the income statement and balance sheets which are accrual based financial statements. Accounting instructors and professionals typically agree that preparing a cash flow statement is one of the most challenging accounting problems for students to solve as they start their accounting careers. Accounting firms provide standard spreadsheet cash flow statement models to help their staff efficiently and accurately prepare cash flow statements as a part of required financial statement reports. This article explains a cash flow statement spreadsheet model case and feedback from six accounting professionals who completed the case as students. Each of the professionals is currently working or has worked in pub-

lic accounting. The author presented the case material to these former student professionals to help them remember the details of the assignment. The professionals were then asked to respond to several survey questions and to provide comments and suggestions for the cash flow statement spreadsheet model case.

The spreadsheet cash flow statement model case explained herein has two objectives. The first objective is to help students learn to prepare the cash flow statement using the balance sheet, statement of earnings, and other necessary data and transactions. The second objective is to help students become proficient with spreadsheets as a tool to automate and solve accounting problems or perform accounting functions in the business workplace.

Spreadsheet modeling can be an excellent learning tool for students to learn the concepts and then apply them to business and accounting problems. Borthick et al. (2006) explain that new professionals might be able to perform specific tasks earlier in their careers if they received explicit training in the knowledge structures germane to the tasks. Providing students a cash flow statement spreadsheet model that uses the knowledge structures germane

to the task should help accelerate the acquisition of expertise and provide increased efficiency and effectiveness in the cash flow statement preparation process. One of the comments of the professionals, a senior staff in a big four firm, stated about the case:

“The cash flow statement is complex. It is critical that students who pursue an accounting career, especially those seeking a CPA certification, fully obtain a strong understanding of the cash flow statement. The case does a great job breaking down both methods of the cash flow statement as well as the key components to the statements. Further, students must have the ability to apply the understanding to modern software programs. The case requires the student to think critically about the details of the case and apply the knowledge by creating an Excel template.”

The rest of the article explains where the cash flow statement spreadsheet model case is placed in the accounting curriculum and what preparation materials are given to students before completing the case. Then the case instructions and data are briefly explained. A grading rubric is provided along with error messages that instructors can use to provide feedback to students. The results of the questions posed to the professionals who completed the case as students are discussed and their comments about the case are presented in the summary, limitations, and variations section.

PLACEMENT OF CASH FLOW STATEMENT SPREADSHEET MODEL CASE IN THE ACCOUNTING CURRICULUM

This cash flow statement spreadsheet model case is an assignment included in an undergraduate accounting information systems course. Before completing the assignment students complete Microsoft Excel™ training and test evaluation for beginning and intermediate features for Excel. In addition students are presented cash flow statement principles in Microsoft Powerpoint™ slides and an mp4 video, even though students already studied cash flow statements twice, once in beginning accounting and once in intermediate accounting. Further, students have been introduced to the system development life cycle (SDLC) and discussed a prototype approach to computer application development using a Powerpoint presentation. The preliminary design and specification report is tied to the systems preliminary design step. At the same time students are completing the cash flow statement assignment, they are also completing the Systems Understanding Aid (Arens, 2012) which has an Excel workbook with a state-

ment of cash flows, income statement, and balance sheet that are produced from values in the ten column year end worksheet. This case and spreadsheet model could also be included in the intermediate accounting course when studying the cash flow statement.

CASE INSTRUCTIONS AND DATA

The case instructions are presented in Appendix 1. The instructions explain that there are three company data sets which are included in Appendix 2. Students prepare the spreadsheet model using a prototype approach (Harrison, 1985). A prototype development approach is appropriate for development of smaller applications. A prototype approach starts with the process of developing the first iteration (first try) of the model. After completing the first model iteration, the model is evaluated with test data. The developer then finds errors or ways that the model is not complete or working as needed with the test data. An improved model of the first iteration is then developed and tested again. The testing includes the first test data and often includes another set of data so that the model can be tested for the ability of the model to handle a variety of situational data. This development and test process may be repeated many times until the desired model is achieved. The prototype approach for this cash flow model includes an iterative process to use formulas for different company situations and help increase accuracy of the model as well as make it more generic and applicable to different company data sets. The students use at least one company situation with the correct cash flow statement so they can have correct feedback for their spreadsheet model for at least one data set. The three company data sets for the iterative prototype models (O’Keefe, Inc. and High Tech Resources) as well as the final company data set to be handed in as the final cash flow statement spreadsheet model (Instaprint Corporation), are given to the students in a PDF file. The last data set (Instaprint Corporation) is to be handed in as a demonstration of the final model and is to be graded for cash flow numbers, as well as for the system requirement listed in the case instructions.

In addition to preparing a cash flow statement spreadsheet model, students are required to write a short preliminary design or specification report. Students are prepared for this report by a class presentation and discussion of the systems development life cycle (SDLC). The design and specification report helps students justify and then specify the business and computer benefits of the template, as well as the inputs, processes and outputs. This design and specification report helps students understand that the inputs required are an income statement, the beginning and ending balance sheet, and some other necessary transaction and accrual details.

Students are also required to develop a model that uses an input section. Any cells, other than labels, outside the input section cannot use typed in values. The sections outside the input section must use a formula, cell reference, lookup, calculation, etc. that changes automatically based on changes in data inputs. Also, the sections outside the input section must have proper protection applied so that the formulas, cell references, lookup, calculations, etc., remain valid for different company situations. Students are also required to present a graph (they can choose any type and any data from the spreadsheet), and provide built in check figures usually using “if statements” to ensure that direct and indirect methods are equal and that overall net cash flows equal the balance sheet change in cash and cash equivalents from the beginning of the year to the end of the year. Students can choose the basic layout such as single versus multiple worksheets, formula versus account/transaction change analysis.

Use of a spreadsheet modeling approach is not limited to teaching cash flow statement principles. The basic concept of modeling whether, in excel or some other way, could be presented as a model itself for applying the technique to other assignments—including assignments outside of accounting courses. Textbooks use assignments at the end of chapters to enhance levels of learning past knowledge and comprehension, to application and analysis as described in Bloom’s taxonomy (see Bloom, 1956). A spreadsheet model can be used to take learning not only to the application and analysis levels as would a textbook cash flow statement assignment, but provides students an opportunity to take learning to the synthesis and evaluation levels. Developing a spreadsheet helps students design, create, modify, and combine their knowledge and comprehension of cash flow statement principles into a useful model for future use. Using a prototype development process and requiring students to use particular excel tools to create a model to solve a complex problem such as a cash flow statement, enables students to reach Bloom’s highest level of learning by evaluating whether the model has internal validity (accuracy) and external validity (generalizability to other situations.)

GRADING RUBRIC AND FEEDBACK TO STUDENTS

The grading rubric with error messages for student feedback is included in Appendix 3. This grading rubric applies to the Instaprint Corporation. Students hand in the Instaprint Corporation cash flow statement spreadsheet model as their final iteration of the prototype development process. The Instaprint Corporation cash flow statement values are graded for accuracy. Their preliminary design report is also graded. A large part of the grade is

related to model validity, usefulness, user friendliness and how well their model might generalize to different companies. For example, if students’ formulas do not change properly when data inputs are changed, then the spreadsheet model score is reduced. Also if it is hard for a user to follow the formulas that process the accrual information into cash flow basis, the student receives fewer points. If a different company is used for the final cash flow statement case, then the specific values to operating (both direct and indirect methods), investing, and financing activities need to be changed to match the correct cash flow statement numbers for that company.

FEEDBACK FROM PROFESSIONALS WHO COMPLETED THE CASE AS A STUDENT

Rather than just use survey questions given to students, the author contacted six supervisor level professionals who completed the case as students. The questions answered by the professionals are shown in Appendix 4. Appendix 4 also shows the summary of the responses. The professionals are currently working in public accounting or have had experience in public accounting with a range of experience from three years to nine years. They include one partner, three manager level (public or industry) and two senior staff accountants. These professionals were contacted personally and agreed to complete the survey.

The professionals answered unanimously that the cash flow statement spreadsheet model assignment should continue to be used both for cash flow statement and spreadsheet modeling purposes. For the question about rating (scale of 1 to 10) the assignment to meet the objective related to learning cash flow principles, three professionals gave a rating of 9 and three gave a rating of 10. For the objective related to learning spreadsheet modeling, one professional gave a rating of 6, another gave a rating of 7, two gave a rating of 9, and two gave a rating of 10. The reasons given for lower rating for spreadsheet modeling stated that the spreadsheet part should include more complex spreadsheet formulas and features such as “vlookup, “sumif statements,” etc.

Three of the professionals actually referred to the assignment in their professional career, one of those to help study for the CPA exam. Three of them specifically stated that their firm provided a spreadsheet model to prepare cash flow statements.

SUMMARY, IMPROVEMENTS AND VARIATIONS

Some of the comments from the professionals provide a good summary of the cash flow statement spreadsheet

model case and suggest improvements and variations to the case. One professional stated:

“This case study is a good hands-on project. It is similar to actual cash flow worksheets that I have used in my career. If students can come into the profession with a good working knowledge of cash flow statements, they will be more valuable to the firm or company they work for.”

Another former student professional commented:

“This exercise was great in simplifying the cash flows statements. [The assignment] takes something considered to be complex to complete and prepare, then breaks the statement and processing down into pieces that are easy to understand. This assignment really helped solidify the cash flows statement to a point where going into public accounting for the first year I felt confident that I could prepare a cash flow statement.”

One of the comments was specific to limitations and improvements related to the spreadsheet objective.

“This was a great project! Keep it up. The only reason I gave a 7 [out of 10] on the financial modeling in Excel is due to the fact that I feel there could be a lot more emphasis put on using some of the more complex formulas like Vlookups and Sumif statements to fill out these statements, as I do now.”

As suggested by this professional, instructors can add any other spreadsheet features they want students to learn and apply such as vlookups, conditional formatting, what if analysis, input and output to database and accounting system programs (see Borthick et al., 2013), sorting, sub-totals, and macros etc.

Another professional suggested something to improve the objective related to the cash flow statement.

“Overall, I believe this assignment/spreadsheet is useful and functional. I would recommend setting up [the spreadsheet model] a bit differently so students can have a clearer view of the reconciliation of the year-to-year changes in the balance sheet, and where those changes end up on the cash flow statement itself. Also, it may be wise for students to have a clearer understanding of how non-cash transactions affect the cash flow and how those items are reported.”

One of the professionals provided the generic cash flow statement spreadsheet model used at his firm. This model, and others used by other firms, could be used as an example for students to use in completing this case in addition to the ones already provided. In addition to using example models obtained from firms, instructors could give students an opportunity to audit the validity of other students’ spreadsheet models (see Borthick, 1989). This

spreadsheet model could also be used to help highlight differences between US GAAP and IFRS cash flow statement guidelines (See Grant Thornton, 2012).

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**APPENDIX 1
CASH FLOW STATEMENT SPREADSHEET
MODEL CASE INSTRUCTIONS**

In this project you will apply some of the principles of system design and implementation to develop a useful cash flow statement model using an electronic spreadsheet. You must prepare a preliminary design or specification report that includes:

- General description of the system both in terms of the business problem and the system aspects.
- Identify the objectives, scope and benefits of the system (both in general what the system will do for solving the problem and what features you have or incorporated into your template. Make sure you

describe the benefits of the cash flow statement for business decision makers.

Identify system Requirements:

- Inputs and source of data (Financial statements. Make sure you have a data section in your spreadsheet)
- Processes: (Converting accrual financial data into cash basis)
- Outputs: (Useable, easy to read cash flow statement)

You should design the system so that a user could easily follow the computations of how the inputs are converted into the output values. Your spreadsheet model should have an input section in which you can type in the input data. Any cells, other than labels, outside the input section cannot use typed in values. The sections outside the input section must use some type of formula, cell reference, lookup, calculation, etc., that changes automatically based on changes in data inputs. The template should be very user friendly so that formulas are easy to follow rather than just a collection of cell references. Labels should be used to help identify how cash flow statement formulas are used. Since we are using an electronic spreadsheet, the detailed requirements are somewhat built into the system. For example, you really do not need to specify how many digits, etc., there will be in each column.

1. Prepare a prototype computerized cash flow statement spreadsheet model for O’Keefe Inc. and/or High Tech Resources cases found in the cash flow data PDF file. The solutions for these are provided to you so you will have a complete example to help you check your prototype spreadsheet for accuracy. Your template should use formulas as much as possible, so the template can be used for other cases. Your template should include the Balance Sheet for two years (and the changes), the Income Statement, and other details as the inputs. The cash flow statement should include cash flows from operating activities using the direct method and the indirect method (show both), cash flows from investing activities, cash flows from financing activities, schedule of noncash investing and financing activities, and the net increase (decrease) subtotals for each activity area as well as the grand total for net increase or decrease in cash.

Your spreadsheet prototype model should also include a built in way to check whether or not

the indirect and direct methods for cash from operations are equal. You should also have a built in method for checking whether the cash flow total amount is equal to the change in cash and cash equivalents on the balance sheet. Finally your spreadsheet should include some kind of graph and also protection on the cash flow formulas and cash flow statement cells, but not on the data input cells. (It is easiest if you put protection on last.)

2. Once you have prepared the template for O’Keefe Inc. or High Tech Resources, or both, use the template to complete the cash flow statement for Instaprint Corporation (data included in the cash flow data PDF file). If you have made a good template or model from prototype companies’ data, completing the Instaprint Corporation problem should not take very long. However expect some fine tuning to some of the formulas.
3. Using the online course system, hand in your work by attaching your Instaprint Corporation cash flow statement spreadsheet model and your preliminary design report files electronically. Name the files with your last name and first initial followed by an underscore and CF for “cash flow.”

ASSIGNMENT GRADING		
Points Possible	Earned	Item
20		Preliminary Design Report
10		Instaprint Corporation Spreadsheet Is it done? Are the numbers correct?
10		Operating Activities (Direct Method)
10		Indirect Method (Reconciliation of Net Income to Cash from operating Activities)
10		Financing and Investing Activities
40		Generalizability to other cases, usefulness, user friendliness, readability of cash flow statement, protection, graph, check figures.
100		Total

Instaprint Corporation Income Statement For the Year Ending 2012		Use Instaprint as the Company on your Final Cash Flow Statement Spreadsheet Model	
Income Statement			
	2012		
Sales	2,902,000		
Cost of goods sold	(1,662,000)		
Gross profit	1,240,000		
Operating Expenses	(968,000)		
Operating income	272,000		
Other revenues and expenses:			
Interest income	20,000		
Gain on Sale of Land	30,000		
Interest expense	(34,000)		
Income before income taxes	288,000		
Provision for income taxes	(118,000)		
Net income	170,000		
Instaprint Corporation Comparative Balance Sheets December 31, 2012 and 2011			
	2012	2011	
Assets			
Current Assets:			
Cash	530,000	192,000	
Marketable securities	-	-	
Accounts receivable (Net)	606,000	578,000	
Inventories	792,000	822,000	
Interest receivable	-	-	
Prepaid expenses	108,000	152,000	
Total current assets	2,036,000	1,744,000	
Land, buildings, and equipment	1,606,000	1,500,000	
Accumulated depreciation	(852,000)	(756,000)	
Total fixed assets	754,000	744,000	
Patents	100,000	-	
Total assets	2,890,000	2,488,000	
Liabilities and stockholders' equity			
Liabilities:			
Current Liabilities:			
Accounts payable	342,000	382,000	
Income taxes payable	-	-	
Interest payable	-	-	
Accrued liabilities	112,000	70,000	
Short-term notes payable	146,000	200,000	
Unearned revenue	-	-	
Total current liabilities	600,000	652,000	
Long-term debt	248,000	-	
Total liabilities	848,000	652,000	
Stockholders' equity:			
Common Stock and paid-in capital	410,000	310,000	
Retained earnings	1,632,000	1,526,000	
Treasury Stock	-	-	
Total stockholders' equity	2,042,000	1,836,000	
Total liabilities and stockholders' equity	2,890,000	2,488,000	
Additional Information			
Depreciation Expense for the year	96,000		
Cash dividends declared and paid during the year	64,000		
Land Acquired ten years ago: Initial Cost	20,000		
Land Acquired ten years ago: Sold During the year	50,000		
Equipment purchase during the year	126,000		
A patent was acquired in exchange of common stock	100,000		

APPENDIX 3 CASH FLOW STATEMENT CASE GRADING RUBRIC AND ERROR MESSAGES	
Design report errors (20 points)	
No Preliminary design report handed in as required by the assignment. -20	
Why is a cash flow statement important to a business decision maker? -2	
What is the purpose for computerizing the cash flow statement preparation? -2	
Missing input, processing, output explanation up to -6	
Template validity, usefulness and friendliness and generalizeability (40 points)	
You have typed in values where a formula or cell reference should be. (Take off 1 point for each typed in value outside input section)	
No built in formula for checking whether indirect method equals the direct method. -4	
No built in formula for checking whether total cash flow equals change in cash and cash equivalents during the year on the balance sheet. -4	
Your formulas could be more comprehensive so that this template would be useful to a wider range of entities. (take off up to 8 points)	
Would be more user friendly if the formulas were properly labeled and documented. -4	
No protection set on the appropriate cells in the work sheet. -4	
No graph used in the worksheet -4	
Direct Method (10 points)	
Cash Received from Customers (up to 3 points off)	
Cash Received from Interest -1	
Cash Paid for Inventories (up to 2 points off)	
Cash Paid for Operating Expenses (up to 2 points off)	
Cash Paid for Interest -1	
Cash Paid for Income Taxes not correct -1	
Indirect method (10 points)	
Depreciation exp of 96,000 should be added in indirect method -2	
Gain on sale of fixed asset should be \$30,000 subtracted on indirect method. -1	
AR increase of \$28,000 should be subtracted on indirect method. -1	
Prepaid expenses decrease of \$44,000 should be added on indirect method -1	
Inventories decrease of \$30,000 should be added on indirect method. -1	
AP decrease of \$40,000 should be subtracted on indirect method. -1	
Accrued liabilities increase of \$42,000 should be added on indirect method. -1	
Investing Section and Financing Sections (20 points)	
Missing \$50,000 cash in on sale of land in investing section. -4	
Missing cash out for \$126,000 for purchase of equipment in investing section. -4	
Missing long term debt issued for \$248,000 in financing section. -4	
Missing Cash out from payment of Dividends for \$64,000 -4	
Sale of patent for stock should be in the schedule of noncash financing and investing activities. -4	

APPENDIX 4
QUESTIONS SENT TO FORMER STUDENTS WHO ARE WORKING IN ACCOUNTING PROFESSION

Cash Flow Statement Spreadsheet Model Case

I have attached the assignment instructions in a MS Word™ file, company case data PDF file, cash flow statement concepts Powerpoint file, and an example of a completed cash flow statement spreadsheet model for a specific company

Please answer the questions about the cash flow excel case assignment. The objectives of the assignment are:

1. Help students learn to prepare the cash flow statement using the balance sheet, statement of earnings, and necessary specific transactions
 2. Help students become proficient with spreadsheets to help them automate and solve accounting problems or perform accounting functions in the business workplace.
- On a scale of 1 to 10 (10 being the strongest) do you believe this cash flow spreadsheet case meets objective 1? (Average response was 9.5)
 - On a scale of 1 to 10 (10 being the strongest) do you believe this cash flow spreadsheet case meets objective 2? (Average response was 8.5)
 - Since completing this case in class, have you ever referred to the spreadsheet in any way (i.e. help you with a cash flow statement or help you put together a spreadsheet model or perform a spreadsheet function)? Yes ___ or No ___ (3 Yes and 3 No)
 - Should this case continue to be used to help students learn spreadsheet modeling? Yes ___ or No ___ (6 yes)
 - Should this case continue to be used to help students learn cash flow statement concepts and application? Yes ___ or No ___ (6 Yes)
 - What type of entity do you work for? (please mark the appropriate entity type)
 - Public accounting ____
 - Industry, Corporation ____
 - Governmental entity ____
 - Other ____

Please write any comments you have about this case (strengths, weaknesses, suggestions).