Introducing The Accounting Equation
With M&M’s®

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ABSTRACT

On the first day of Principles of Accounting classes, students learn the fundamental accounting equation from which all financial accounting practice emerge. The accounting equation is the criterion by which companies are valued and by which company performance is measured. This activity simplifies assets, liabilities, and owners’ equity to the representation of M&M’s® in order to focus on overall patterns of company structure and provides further illustration using real public U.S. companies’ assets, liabilities, and owners’ equity.

Keywords: Accounting Equation, Principles of Accounting, Active Learning

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INTRODUCING THE ACCOUNTING EQUATION WITH M&M’S®

CONTEXT AND PURPOSE

The accounting equation can be presented as a rote memorization formula or as the presentation of meaningful concepts that are a manifestation of important real world relationships. The principles of accounting class can be a remote and irrelevant class or an accessible and important class that provides the basis for understanding profit and wealth. The first day of class can be a perfunctory and dull day or a challenging and interesting period in which interactive classroom activities provide insight into the main topic of the course. It all depends on the learning activities used. This article presents a first day learning activity to prepare undergraduate students for a successful experience in Principles of Accounting.

The accounting equation is so fundamental to the study of accounting that in some sense all of accounting has been taught when the accounting equation is properly conveyed. Thus, the authors position this introductory topic so that students can begin to apply higher-order thinking skills from the first day. Students are placed into a context in which they use accounting concepts as soon as they are learned, rather than a context in which students first survey vocabulary, concepts, and procedures and then use accounting only at some time in the future.

This activity is modeled on the business simulation Safe Night Out from Springer and Borthick (2004) and the case Christy’s Lemonade Stand of Cushing (1997) that emphasize the use of well-structured interactive activities and critical thinking. But even these instructional materials for principles of accounting students require a prior introduction to the accounting equation. The M&M® activity can be incorporated into any of these more extensive curricula as a first session in accounting. But this activity is not merely mimicking other ad hoc instructional materials. Accounting education research (Ravenscroft et al. 1995; Caldwell et al. 1996; Springer and Borthick 2004; Kealey et al. 2005; Springer and Borthick 2007) has documented increased learning from tasks using cooperative learning and/or higher order thinking. Thus this activity has a role in making every class period count.

The M&M® activity fits with hands-on learning in an interactive setting that prompts critical thinking. While the M&M® activity begins with basic algebraic manipulation to find a “correct” answer, the students find that a computationally “correct” answer may reflect an infeasible business model. In addition, the computationally
“correct” answers have importance as measures that describe an organic entity incorporating both risk and reward. Thus, the numerical answer is a means to an end, rather than an end in itself.

The M&M® activity takes advantage of the random nature of the contents of M&M® snack packs so that each student creates three unique cases to use in exploring the accounting equation. Furthermore, when in a small group, students have unique examples on which to base their contribution, encouraging active participation and creating positive interdependence. As a first day of class activity, it also begins building student-to-student connections that can be used in later classes to facilitate developing team skills. When the students work together, they compare and contrast three to four instances of each equation, and are likely to find the puzzling cases of negative equity and negative liabilities.

LEARNING OBJECTIVES

The M&M® activity has the following learning objectives:

- Students will be able to state the accounting equation accurately.
- Students will be able to use the accounting equation to solve for missing information about a company.
- Students will understand the meaning of negative owners’ equity.
- Students will be able to use the accounting equation to understand the capital structure of a company and the variety of uses of debt in a business.
- Students will be able to use the accounting equation to understand the business risk in companies.

THE M&M® ACTIVITY

The M&M® Activity presents the fundamental accounting equation in two phases: a hands-on activity using M&M’s® to organize discussion of the accounting equation followed by an illustration of the same accounting equation concepts using real company financial information.

The hands-on activity includes the four parts: (1) Individual student solutions using the accounting equation and M&M’s®; (2) Class discussion of solving for assets using the accounting equation; (3) Small group discussion of solving for equity and liabilities; (4) Class discussion providing a wrap-up from the small groups.

The hands-on activity begins by providing students an M&M® snack pack and a handout titled Introducing the Accounting Equation with M&M’s® (see Appendix). Students are directed to sort the M&Ms® by color into the similarly colored circles on the handout. They then record the number M&M’s® in each colored circle and solve for the missing information in each equation. This initial task promotes immediate success and some fun. The most common instructor help needed by students is to caution students to be accurate about the sign of the numbers involved and to reassure students that “0” can be used when a snack pack includes only five of the six colors, as occasionally occurs.

The M&M® activity continues with a review by the whole class of the most straight-forward accounting equation example: solving for assets when liabilities and owners’ equity are known. Typical instructor-led discussion includes the following questions:

- Can this equation describe a business’s financial position? Support your decision.
- Describe the risk of a business with your sample financial position.

Follow-up questions include:

- How many students have more liabilities than owners’ equity in your Square-Blue-Red Equation? Is this possible? Is this desirable? How does a company get more liabilities than owners’ equity?
- How many students have more owners’ equity than liabilities? Is this possible? Is this desirable? How does a company get more owners’ equity than liabilities?
Student responses create a list of different M&M\textsuperscript{\textregistered}-based capital structures, all of which are feasible. From these examples, students begin to understand that companies can have any combination of liabilities and owners’ equity funding their assets. More sophisticated students may point out liabilities from environmental or legal contingencies or pension agreements that also result in companies having large liability burdens, apart from debt. The instructor can provide additional insight about the relationship between capital structure and company’s strategic choices. Students readily understand that liabilities require future cash outflows and thus increase financial risk. However instructors can also explain that more liabilities may be a company choice consistent with its underlying business strategy rather than simply a sign of poor performance. On the equity side, instructors can discuss that equity comes from earnings or investment by owners. Thus, when equity is smaller than liabilities, the company may be unprofitable and/or unable to raise equity from owners.

Once the students are familiar with one instance of using the accounting equation, they are directed to discuss the remaining two (solving for liabilities and solving for equities) in small groups of three to four students. The groups discuss the following questions:

- Can each equation describe a business’s financial position? Support your decision.
- Describe the risk of a business with your specific financial position.

Commonly, students ask for confirmation of negative equity and/or negative “liability” amounts that a group member reports to the group. The author recommends encouraging the students to consider the implications of these results without giving definitive answers. When the groups have had time to share their individual results, the instructor again leads a whole class discussion.

When groups report on their solving for owners’ equity, students realize that negative owners’ equity is certainly possible. Typical instructor-led class questions are the following:

- How many students have examples with positive owners’ equity? Is this possible? Is this desirable? When does a company have positive owners’ equity?
- How many students have examples of negative owners’ equity? Is this possible? Is this desirable? When does a company have negative owners’ equity?

Students often assume that negative equity as a sign of both poor performance and high risk. While negative equity is clearly undesirable, instructors can explain to students that businesses can operate with negative equity, and rapidly growing, innovative companies may be valued despite their negative equity. Furthermore, positive owners’ equity can result from either contributions by owners or profitable operations. So companies that are otherwise unprofitable can still have positive equity given sufficient contribution by owners, as when a company is first founded.

In the last accounting equation example, students report on their use of the accounting equation to solve for liabilities. Students realize that, although one can create a scenario in which that is negative liabilities mathematically, this cannot be an actual business situation. Typical instructor-led discussion questions are the following:

- How many students have examples with negative liabilities? Is this possible? Is this desirable? When does a company have negative liabilities?
- How many students have examples with positive liabilities? Is this possible? Is this desirable? When does a company have positive liabilities?

Instructors can explain to students that negative liabilities would only occur if a company overpaid its creditors. But even then, overpaid liabilities would result in an asset – money owed to the company – rather than a negative liability. In addition, instructors can help students understand that some level of liabilities are unavoidable for any company because of normal business-to-business, business-to-employee, and business-to-customer transactions in which goods or services are obtained before paying for them. Accounts payable to suppliers, the receipt of payment before providing services to customers, as in the airline industry, or longer-term compensated
absences payable (vacation pay) or pension payable may exist even when a company has never borrowed any money.

After completing the handout *Introducing the Accounting Equation with M&M’s®,* students eat their M&M’s®, and the second phase of the M&M® Activity is begun. Three different sets of company financial information are used to relate the actual financial structures of real companies to the patterns that the students have found using M&M’s®: (1) A comparison of Delta Airlines, Southwest Airlines, and AMR, the parent company of American Airlines; (2) A comparison of the changing leverage of Amazon.com through time; and (3) A comparison of the capital structure of Microsoft through time.

The first set of information using real companies compares airlines, since this industry includes companies that differ in their use of leverage. Instructors use the following questions to encourage students to identify the difference in performance and risk among Southwest Airlines, Delta Airlines, and AMR.

- Do all airlines have the same relationship of liabilities and assets?
- Which airline has negative owners’ equity?
- How can all three airlines continue to provide air flight services to customers?
- Which airline is the riskiest financially?

![Figure 1: Accounting Equation for Selected Airlines in 2008](image)

Students should be able to read the presence of negative equity for American Airlines, the small amount of positive equity of Delta Airlines, and the much more balanced profile of Southwest Airlines based on the assets and liabilities provided. American Airlines is an example of a company with negative equity that continues to operate. However, in this case, students are likely to know that American Airlines has had financial distress and that Delta emerged from bankruptcy in 2006. The additional information about Net Income in Table 1 can be used by instructors to give students additional information to explain the common downturn, but different paths of Delta, American Airlines, and Southwest Airlines post 9/11.

The second set used is a comparison of financial information for a single company through time to encourage students to identify the differences in performance and risk as a company develops and grows. In Figure 2, Amazon.com provides a familiar example to illustrate this point. Instructors use the following questions:
How does this company’s relationship of assets to liabilities change through time?

What do you think accounts for this change?

Figure 2: Accounting Equation for Amazon.com 1997 to 2008

The cross-temporal comparison of Amazon.com presents a company whose owners’ equity changed from positive to negative to positive during the period 1997 to 2008. While most students recognize airlines as a struggling industry, many are surprised that Amazon.com had a similar highly levered capital structure in the recent past. In contrast to the airline industry’s declining assets and growing losses, Amazon.com’s rapid expansion cost Amazon.com more to provide its services than customers paid. Its large increase in debt in 2000 funded years of growth while losses continued, and it couldn’t fund its business from operations alone. Only in 2003 did Amazon.com become profitable and begin reducing its deficit.

Finally financial information from Microsoft is provided to demonstrate the more typical structure of a successful company that contrasts with Amazon.com. Instructor-led discussion uses the following questions:

- How different are Amazon.com and Microsoft over the same period of time?
- What do you think accounts for the difference?
- Which company is riskier financially?
Figure 3: The Accounting Equation and Microsoft 1997 to 2008

Figure 3 provides an example of a company with few liabilities. In contrast to Amazon.com over the same time period, Microsoft is already a dominant company in its field by 1997 and is highly profitable throughout the period. Microsoft has low risk because it can fund its business from its operations alone.

IMPLEMENTATION GUIDANCE

This activity has been used in the first Principles of Financial Accounting course for undergraduate students on the first day of class. The authors’ implementation has included both small classes of 25 to 30 and moderate size classes of 50 to 60. However, this activity can be adapted to classes of any size. Small groups can be based on proximity, and the instructor must monitor the students to be sure each student has a small group. Large classes with fixed seating can have students share with a single partner instead of sharing with a larger group, preserving some of the student-to-student interaction. Even in a small class, only a portion of the students share during the large group discussions, but every student has a chance to participate in the student-to-student interaction.

This activity requires an introductory lecture presenting the accounting equation and providing definitions and examples of assets, liabilities, and owners’ equity. It can take any form comfortable to the instructor and can be very brief indeed, since further elucidation can occur during the M&M® activity. The emphasis in this activity is not on identifying particular assets or liabilities, but on having a broad understanding of the categories. The placement of the handouts and M&Ms® on desks before class begins builds some positive anticipation for the activity and saves time. The author also prepares nametags that are distributed when roll is taken in order to facilitate instructor-to-student and student-to-student communication.

The use of M&M® snack packs preserves the perception of randomness of the examples created, but incurs a cost of about 12¢ per student. A smaller cost can be obtained by buying M&M’s® in bulk and creating snack pack equivalents, but this is less costly only if labor is free. In addition students may suspect that the homemade packs are rigged to create a particular result, which limits the students’ critical thinking.
The handout in the Appendix has been designed to take advantage of the known overall percentages of the six traditional M&M® colors. The M&M® website at http://us.mms.com/us/about/products/milkchocolate/ (Mars, Inc. 2007) discloses the following distribution: Brown 13%; Yellow 14%; Red 13%; Blue 24%; Orange 20%; Green 16%. Thus the colors used in the accounting equations are planned to achieve a higher proportion of particular results. The arrangement on the handout in Appendix has the following characteristics:

- When solving for assets, the equation is biased toward more liabilities that equity.
- When solving for equity, the equation is biased toward negative equity.
- When solving for liabilities, the equation is biased toward “negative” liabilities.

The handout can be adjusted for other results. It should be noted, however, that since each pack includes approximately 22 M&M’s®, the examples produced are widely diverse, and there is no guarantee that a small group will have an example of negative equity or “negative” liability. During the large group wrap up, however, all students will have exposure to these outcomes.

The three charts included as Figures 1, 2, and 3 provide comparisons using companies that parallel the learning objectives of this activity. Table 1 provides the underlying data used in creating the charts as well as the companies’ net income, which may be useful in explaining to students the change of equity through time. While the choice of the airline industry, Amazon.com, and Microsoft are likely to continue to be useful illustrations for at least the next several years, instructors can easily substitute other companies. The summary presentation on the accounting equation and real companies can be postponed to the next class or omitted from the M&M® activity entirely, depending on the time available.

Finally, in a multimedia classroom, the M&M activity can be enhanced by using PowerPoint slides to list the instructions at each step in the activity and provide a smooth transition to the Figures 1, 2, and 3 showing the accounting equations for real U.S. public companies. While these charts can be distributed through handouts, PowerPoint focuses student attention during the discussion.

**STUDENT FEEDBACK AND LEARNING**

Students who participated in the M&M® activity were surveyed for their perceptions of this activity and their learning from this activity, along with other in-class activities, after the end of the semester. The students had strong positive perceptions of the M&M® activity as fun and enhancing their learning but attributed little relationship-building among classmates to this activity. They appreciated having a concrete example of an accounting concept. (see Table 2).

Because the assessment of the learning objectives associated with this activity occurred after the end of the semester, it necessarily is a course-level, rather than activity-level assessment. However, I include it here as cautionary information for this activity (see Table 2). Two statements addressed the accounting equation objectively. Students all understood that liabilities can be more than owners’ equity, not uncommon among all of the examples of real companies and textbook examples that they worked with during the semester. However, 16% of the students did not remember at the end of the semester that there can be companies with negative owners’ equity. Given that classroom examples and textbooks avoided the complexity of studying companies with negative owners’ equity, the exposure on the first day of class, even with M&M’s®, did not make a lasting impression for everyone.¹

The expected answers on the remaining two related assessment questions were disagreement that there is one preferred pattern for assets, liabilities and owners’ equity for all companies and agreement that business risk increases as liabilities increase. However, further reflection posits that the statements may be closer to theses to be supported than objective statements. Students who supported one pattern for all companies may be basing their answer on the big picture preference for positive owners’ equity for all companies; students who disagree that business risk increases as liabilities increase may be looking at the differences in liabilities based on industry or strategy as more important than differences giving rise to additional financial risk. The nature of the M&M® Activity encourages thinking outside of the box, and the diversity of assessment responses may be one result.

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CONCLUSION

This article provides a hands-on learning activity that prompts students to move from rote learning of the accounting equation to critical thinking about the balance of liabilities and equity in the capital structure of a company. By solving the fundamental accounting equation for assets, liabilities, and equity based on the contents of an M&M® snack pack, students see the variety of patterns of financial information that companies may have and the constraints on those patterns. Using the same accounting equation concepts thereafter with real companies demonstrates the relevance of the accounting equation for understanding the business world around them.

AUTHOR INFORMATION

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The author is willing to share the student feedback data used in this article.

REFERENCES


ENDNOTES

1 The required text used with the M&M® activity is *Financial Accounting*, 5th edition by Weygandt, Kieso, and Kimmel. This text included no negative owners’ equity among its 48 examples that include the balance sheet value of owners’ equity in illustrative and real companies.
Table 1: Accounting Equation Data plus Net Income for Selected Companies 1997 to 2008

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<td>$54,842</td>
<td>$64,912</td>
<td>$74,825</td>
<td>$48,115</td>
<td>$40,104</td>
<td>$31,097</td>
<td>$36,286</td>
</tr>
<tr>
<td>Net Income</td>
<td>$3,454</td>
<td>$4,490</td>
<td>$7,785</td>
<td>$9,421</td>
<td>$7,346</td>
<td>$5,355</td>
<td>$7,531</td>
<td>$8,168</td>
<td>$12,254</td>
<td>$12,599</td>
<td>$14,065</td>
<td>$17,681</td>
</tr>
</tbody>
</table>
Table 2: Student Feedback on Learning Objectives of M&M® Activity

<table>
<thead>
<tr>
<th>Feedback</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>No Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owners’ equity can be negative for companies when liabilities are greater than assets.</td>
<td>35.71%</td>
<td>47.62%</td>
<td>4.76%</td>
<td>11.90%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Liabilities are always less than owners’ equity.</td>
<td>0.00%</td>
<td>0.00%</td>
<td>38.10%</td>
<td>61.90%</td>
<td>0.00%</td>
</tr>
<tr>
<td>There is one preferred pattern for assets, liabilities and owners’ equity for all companies.</td>
<td>23.81%</td>
<td>11.90%</td>
<td>7.14%</td>
<td>4.76%</td>
<td>52.38%</td>
</tr>
<tr>
<td>Business risk increases as liabilities increase.</td>
<td>35.71%</td>
<td>33.33%</td>
<td>30.95%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

APPENDIX

Handout for Students

Introducing the Accounting Equation with M&M’s®

\[
\text{ASSETS} = \text{LIABILITIES} + \text{OWNERS’ EQUITY}
\]

\[
\text{Brown} = \text{Orange} + \text{White}
\]

\[
\text{Yellow} = \text{Green} + \text{Blue}
\]
SURVEY OF STUDENTS

For Reviewers Use

Do you remember completing the activity on the sheet below in Principles of Accounting BUS 1310?

Perception Questions

<table>
<thead>
<tr>
<th>Perception Question</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>No Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>The activity enhanced my understanding of the accounting equation.</td>
<td>11.90%</td>
<td>88.10%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>The activity enhanced my ability to use the accounting equation to find missing company information.</td>
<td>35.71%</td>
<td>64.29%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>The activity enhanced my understanding of the relationship of assets, liabilities and owners’ equity in businesses.</td>
<td>0.00%</td>
<td>100.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>The activity enhanced my understanding of business risk.</td>
<td>30.95%</td>
<td>59.52%</td>
<td>9.52%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>This activity helped me meet students in the class.</td>
<td>0.00%</td>
<td>11.90%</td>
<td>88.10%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>This activity helped me feel positive towards accounting.</td>
<td>0.00%</td>
<td>71.43%</td>
<td>28.57%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>This activity helped me feel positive towards the accounting class.</td>
<td>0.00%</td>
<td>66.67%</td>
<td>33.33%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>This activity was fun.</td>
<td>40.48%</td>
<td>59.52%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

a. What aspects of the activity provided you with the greatest learning about the accounting equation?
b. What aspects of the activity provided you with little incremental learning about the accounting equation?
c. How would you recommend changing the activity to enhance the learning of the accounting equation?

Learning Objective Questions

<table>
<thead>
<tr>
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<th>35.71%</th>
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