

**Rich Houston**  
**Using a Simple Word Problem to**  
**Develop Accounting and Auditing Skills**

**ABSTRACT**

I present a simple problem that instructors can use to teach or review fundamental accounting concepts. This problem also can serve as a basis for developing students' research and class presentation skills. I have used this problem successfully in my auditing classes. I advocate the use of this seemingly simple problem to show students how accounting is used to solve problems as well as illustrate the judgment involved in accounting for certain transactions. I propose the "bellboy problem" as a means to introduce or review fundamental accounting concepts as well as a way to show students how accounting concepts can be used to solve problems.<sup>1</sup>

**THE BELLBOY PROBLEM**

There is a story about three traveling salesmen who check into a hotel and rent a room for \$60. After they go to their room, the manager, who receives a commission based on gross revenues earned while he is on duty, realizes that the room costs \$55 and that he's overcharged them. He gives \$5 to the bellboy, and directs him to give it to the three men. Not knowing how to divide the \$5 evenly, and in need for a couple of dollars for dinner, the bellboy decides to give \$1 to each of the three men and pockets the remaining \$2 for himself. Later that night the bellboy realizes that the men each paid \$19 (\$20 minus the \$1 they received from him). Consequently, because the \$57 the men paid

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<sup>1</sup> This problem has no specific author, and I have seen many versions of it. I obtained the version that I include below and have used in class from John Allen Paulos' *A Mathematician Reads the Newspaper* (1995, p. 86). I have contacted Mr. Paulos for proper attribution, and he claims that the problem is "in the public domain."

(\$19 each multiplied by three men) plus the \$2 he kept for himself makes \$59, the bellboy wonders what happened to the missing dollar.

### **Required**

1. Using accounting concepts, show the bellboy that there is not a missing dollar. As part of this requirement, prepare journal entries as well as an income statement and cash flow statement for each of the parties involved. When preparing journal entries, pay particular attention to how to account for the \$2 kept by the bellboy (i.e., what accounts are involved).
2. Is the \$2 that the bellboy kept material? Consider this question from the point of view of the bellboy, the hotel manager, and the traveling salesmen.
3. Recall that the hotel manager receives a commission based on gross revenues earned while he is on duty. Because of this incentive, compare how he should account for the \$5 refund to how he might be motivated to account for the \$5 refund. Would acting on this motivation constitute fraudulent accounting?

## **CASE LEARNING OBJECTIVES AND IMPLEMENTATION GUIDANCE**

### **Objectives**

The primary objective of this case is to allow student to use basic accounting skills (i.e., journal entries and financial statements) when problem-solving. They also will be exposed to (and perhaps introduced to the concept of materiality, which underlies many facets of accounting and auditing. In addition, they will focus on some of the basic accounting definitions (e.g., gains, revenues, liabilities) in a practical setting.

In addition, this case can serve as the basis for requiring students to complete research using commonly-used accounting electronic databases or textbooks. For example, instructors should urge students to research the definition of materiality, and be able to differentiate qualitative and quantitative materiality. Possible electronic databases include PricewaterhouseCoopers' Comperio database or the Financial Accounting Research System (FARS).

### **Implementation Guidance**

I have used this problem in both a Master's level auditing class as a way to review fundamental accounting and auditing concepts, and in the second week of the first semester of Intermediate Accounting, as a way to review journal entries and financial statement preparation, as well as to provide an introduction to the concept of materiality. I presented this problem to two sections of each of the two classes. I believe that this problem could be particularly effective if used in introductory accounting, perhaps after students are first exposed to journal entries and the basic financial statements.

In the intermediate accounting classes (each of the two sections contained approximately 30 students), I handed out the problem and was more explicit about telling the students to complete journal entries and financial statements—I did not explicitly state which financial statements they should consider. Students in this class sat at desks containing about four students per desk, and they worked in these groups.

### **Suggested Solution**

1. Using accounting concepts, show the bellboy that there is not a missing dollar. As part of this requirement, prepare journal entries as well as an income statement and

cash flow statement for each of the parties involved. When preparing journal entries, pay particular attention to how to account for the \$2 kept by the bellboy.

### **Journal Entries**

#### ***Hotel:***

Cash	60	
Guest revenues		60

Received from guests upon registration.

Guest revenues	5	
Cash		5

Refund of overpayment.

#### ***Bellboy:***

Cash	5	
Payable to customers		5

Receive \$5 to distribute to customers.

Payable to customers	5	
Cash		3
Gain on undistributed refund		2

Pay customers \$5 and keep remaining \$2.

#### ***Guests (aggregated across the three guests):***

Hotel expense	60	
Cash		60

To pay for room upon registration.

Cash	3	
Hotel expense		3

Receipt of \$3 refund of overpayment.

To prove that the problem “balances,” students could take a cash flow statement or an income statement view. The key is to group the hotel and bellboy separately from the three salesmen. Because the problem is phrased in terms of missing \$1 of cash (i.e., \$59 vs. \$60), the cash flow statement is a logical place to start.

Cash flow statement view: The hotel receives \$55 cash while the bellboy receives \$2 cash, for a total of \$57. The customers spend a total of \$57 cash. Therefore, the

problem balances; the guests spend \$57, with \$55 going to the hotel and \$2 to the bellboy.

Income statement view. The hotel has revenue of \$55 and the bellboy has revenue of \$2; together, the hotel and its employee have \$57 in revenue. Conversely, after the refund, the salesmen have \$57 in hotel expense. Consequently, the problem works; the hotel people have \$57 of revenue while the customers have \$57 of expenses.

Some students might record the \$2 kept by the bellboy as a liability and some will record it as income. The instructor can raise the question of whether the \$2 kept by the bellboy should be classified as a gain, revenue, or a liability. Does it depend on his intentions (i.e., whether he intends to keep it or seek help in dividing it). To solve the problem, encourage the students to consult the FASB's definitions of gains, revenue, and liabilities. SFAC No. 6 defines, gains, revenues, and liabilities as follows:

**Liabilities.** Probable future sacrifices of economic benefits arising from present obligations of a particular entity to transfer assets or provide services to other entities in the future as a result of past transactions or events.

**Revenues.** Inflows or other enhancements of assets of an entity or settlement of its liabilities (or a combination of both) during a period from delivering or producing goods, rendering services, or other activities that constitute the entity's ongoing major or central operations.

**Gains.** Increases in equity (net assets) from peripheral or incidental transactions of an entity and from all other transactions and other events and circumstances

affecting the entity during a period except those that result from revenues or investments by owners.

Given these definitions, it seems most reasonable for the bellboy to call the \$2 a gain. The bellboy likely has no intention of paying back the \$2 and the \$2 kept does not constitute his “ongoing major or central operations.”

2. Is the \$2 that the bellboy kept material? Consider this question from the point of view of the bellboy, the hotel manager, and the traveling salesman.

First, the instructor should ensure that students understand the definition of materiality. That is, an item is material when it is large enough to matter to a user. This question is also useful because there is no one right answer. The answer depends on each party’s point of view. The students or instructor can refer to any or all of the following views of materiality as support for the response. The following section, which can be used as a basis for discussing materiality, is obtained from the SEC’s Staff Accounting Bulletin (SAB) No. 99, *Materiality*:

The FASB’s Statement of Financial Accounting Concepts No. 2, “Qualitative Characteristics of Accounting Information,” defines materiality as follows:

Materiality is the magnitude of an omission or misstatement of accounting information that, in the light of surrounding circumstances, makes it probable that the judgment of a reasonable person relying on the information would have been changed or influenced by the omission or misstatement.

This formulation in the accounting literature is in substance identical to the formulation used by the courts in interpreting the federal securities laws. The Supreme Court has held that a fact is material if there is –

A substantial likelihood that the fact would have been viewed by the reasonable investor as having significantly altered the "total mix" of information made available.

The FASB rejected a formulaic approach to discharging "the onerous duty of making materiality decisions" in favor of an approach that takes into account all the relevant considerations. In so doing, it made clear that –

Magnitude by itself, without regard to the nature of the item and the circumstances in which the judgment has to be made, will not generally be a sufficient basis for a materiality judgment.

In addition, students can consider that the SEC concluded that exclusive reliance on quantitative approaches to assess materiality (e.g., percentages, numbers, or formulas) is not acceptable. The SEC emphasized that even very small misstatements may be material when qualitative factors are considered. SAB No. 99 goes on to describe qualitative materiality as follows: "As used in the accounting literature and in this SAB, 'qualitative' materiality refers to the surrounding circumstances that inform an investor's evaluation of financial statement entries."

To the hotel, the \$2 kept by the bellboy is not material in the sense that \$2 of lost revenue likely does not affect the hotel's financial statements. However, if the hotel is

concerned that the guests will find out about the stolen \$2 and therefore not stay again at the hotel, then it is material.

To the bellboy, the \$2 may not be material if he only kept it because he could not figure out how to divide the \$5 equally. However, because the bellboy needs the \$2 to get dinner, it is material in the sense that it is important to him.

Of course, the customers must be aware of the \$2 kept by the bellboy for the amount to be potentially material. To the customers, the \$2 is not material in the sense that they each will be able to be reimbursed for their out-of-pocket expenses; therefore, they will simply receive a larger reimbursement. It would be material if they chose to turn in the original \$60 room rate for reimbursement and then learned that instead of pocketing the \$1 reimbursement, they could have pocketed \$1.67. The amount also would be material if the guests decide that they no longer will stay at a hotel at which they were cheated.

3. Recall that the hotel manager receives a commission based on gross revenues earned while he is on duty. Because of this incentive, compare how he should account for the \$5 refund to how he might be motivated to account for the \$5 refund. Would acting on this motivation constitute fraudulent accounting?

The hotel should properly account for the \$5 reimbursement as a reduction of revenue. However, if the manager is motivated to maximize revenues (and therefore his commission), he could have recorded the reimbursement as follows:

Bellboy expense	5	
Cash		5

While the debit could have been to an expense other than “bellboy expense,” the point is that, by not reducing revenue, the manager is inflating his commission. In addition, hotel revenues are overstated by \$5 and, if the \$5 is classified as something other than cost of services, then gross profit also is overstated. While the amount may not be material to users of the hotel’s financial statements, the point is that some key figures (e.g., total revenues, gross profit) may be misstated.

Does this act constitute fraudulent accounting? Fraud is defined as actions taken with the knowledge and intent to deceive. Because the manager intends to deceive his employer, the action constitutes fraud. The instructor also can point out that, even though the amount involved is merely some fraction of the \$5 (i.e., his commission rate), the point is that the employee cheated the employer, which could cause him to lose his job. That is, fraud often is considered material regardless of the dollar amount involved; therefore, this provides an example of qualitative materiality.

In terms of categorizing fraud, the students should be aware that the bellboy’s theft constitutes misappropriation of assets. Because the hotel and salesmen properly account for the transaction based on what they perceive has occurred, there is no indication that fraudulent financial reporting has taken place. According to the fraud triangle, there are three necessary conditions for fraud to occur: pressure/incentive, opportunity, and rationalization (see SAS No. 99: *Consideration of Fraud in a Financial Statement Audit* for a discussion of the fraud triangle). In the case of the bellboy, students can assert that the bellboy must have decided to commit fraud because he has a pressure / incentive (e.g., need money for dinner), an opportunity (he has the \$5 in hand and the customers are unaware of the proper refund), and

rationalization (the bellboy thought that, because he could not divide five by three, he could keep the extra \$2 or that the extra \$2 might compensate him for receiving an unfairly low wage).

The manager, conversely, has both an incentive ( a bonus based on gross revenue) and opportunity (the customers were unaware of the overcharge) to commit fraud (i.e., not refund the \$5 overcharge and record it as revenue), but apparently did not conclude (i.e., rationalize) that it was acceptable to keep the \$5 overcharge.

### **Additional Discussion Topic**

Students also can be asked to identify problems with the hotel's control system that allowed the bellboy to get away with keeping the \$2. For example, why were the salesmen charged the incorrect amount? Why didn't the manager call them and say that the bellboy was on the way with the \$5 refund? Why were the salesmen not given a new receipt? Why did the system allow the customers to be charged the incorrect rate, and why did the manager not know of the error immediately?