

## **Nina's River Street Cakes: using diagrammatic problem representation for analyzing activity costs**

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### **ABSTRACT**

Shared operational costs are a point of contention in many business organizations. At the crux of the issue is the question of how to allocate these shared costs to the various profit centers or other segments of an organization in a rational, fair, and economically efficient manner. The proper approach to these cost allocations and the potential usefulness of activity-based cost allocations has been discussed extensively in the accounting and management literature and is routinely included in accounting textbooks. However, textbook problems are relatively short and simplistic, by necessity and/or design. Conversely, many of the published classroom cases are overly complicated and placed within technological environments that are confusing to students. As a result, students may not have an opportunity to properly analyze detailed data in a way that leads to insightful analysis. This paper contains an original instructional case for students to analyze cost allocations in an understandable “manufacturing” environment. The case presents a specialty cake bakery with alarming operational losses. In an environment of murky common costs and significant market price pressures, students must analyze the profitability of two very different product lines and then consider an appropriate pricing structure for the bakery. The teaching note presents a diagrammatic method of analyzing the cost allocations and cost flows. It is hypothesized that this visually based problem representation structure reduces cognitive overload for the students, thereby freeing them to conduct a more insightful analysis of the problem.

Keywords: Cost Allocations, Problem Representation, Cognitive Overload, Diagrams, Activity Based Costing

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## INTRODUCTION

This teaching case<sup>1</sup> can be used in conjunction with an activity-based costing (ABC) module in a typical undergraduate cost accounting or basic MBA accounting course. The case contains this Introduction and three additional sections. The first case section contains the Student Case that discusses a specialty cake bakery that has recently expanded and is experiencing confusion regarding its costing and an appropriate pricing structure. The second section contains discussion questions for the students. The final section contains the Teaching Notes and Suggestions for the instructor, as well as suggested diagrams and numerical solutions. The Teaching Note section also includes a short introduction to cost diagramming that the instructor can use to introduce students to a visual method of representing and analyzing cost allocations.

## SECTION 1 - NINA'S RIVER STREET CAKE CREATIONS – STUDENT CASE

### Background

Nina Johnson has always loved baking and decorating cakes. Even as a child, she experimented with different icings, frostings, and flavors for her creations. Following high school, she enrolled and graduated from a 2-year community college, where she majored in the culinary arts. As a new baker, Nina started off designing and producing simple cakes for birthdays, small family celebrations, and similar low-key events from her own personal kitchen on a part-time basis. Because of her creativity and technical skills, Nina soon gained a reputation for producing tasty, whimsical, and innovative cakes. These early cakes were relatively simple creations with one or two layers, buttercream frosting, and colorful piped buttercream designs. However, Nina had an artistic flair with color, and she created unusual and delightful works of art.

Initially, Nina wasn't sure how to price her cakes, but she knew that in the cake industry, a custom cake price is primarily determined by the number of servings it provides. Nina knew that local bakeries sold their simple bakery cakes for approximately \$3/serving. This meant that a typical ¼ sheet cake (typically a 13" x 9" x 1" rectangle, single layer) which provided 24 servings sold for \$ 72. Since her cakes were more unique and of a higher taste and artistic quality, Nina decided to price her cakes at \$4 per serving. Nina estimated that her basic ingredients cost about \$1 per serving, so she felt confident that she was making a reasonable profit operating out of her home kitchen on a part-time basis. However, faced with a growing business that outstripped the capacity of her kitchen, Nina began wondering whether she could relocate and expand her business.

Fortunately, Nina had a friend, James Contrell, who owned and operated the River Street Café in the historic Old Town shopping district in her town. This area was populated by unique artisans and craft persons, who were known for producing unique custom products (pottery, artwork, sculptures, custom clothing boutiques, etc.). Nina believed that this was the perfect location for establishing and growing her business, Nina's River Street Cake Creations (NRSCC). The Café was a popular spot with both the tourists and the locals, but it had limited

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<sup>1</sup> This is a fictitious case. All information contained herein was fabricated by the author. Any similarity contained herein to actual persons, businesses, events, etc. is purely coincidental and is the responsibility of the author. Please contact the case author directly with any concerns.

seating capacity and unused kitchen capacity. To utilize his kitchen more fully, James had begun offering gourmet take-out foods. James also suggested that Nina operate her cake business out of his Café. In return for a monthly rental fee, Nina could use the kitchen facilities and share James' office space. Additionally, she could display her cakes in his storefront window to attract cake customers. After the move, due to the increased exposure, orders for her cakes grew significantly. The first year, her simple, fanciful cakes became very popular in the up-scale Old Town community. She also began receiving requests for more complex, high-end cakes. The first year in her new location, she sold about 10 Simple Cakes each week and 1 Complex Cake every other week.

Nina's new Complex Cake clients ordered wedding cakes and specialty cakes for large corporate or private events. From a technical perspective, these Complex Cakes were also routinely multi-tiered and required more complicated structural supports. Some of these high-end cakes were quite exotic. For example, one wedding cake used 14 ct. gold decorating powder, while another was over 5 layers tall and required complicated electrical lighting components. Nina recognized that the gold dust and electrical components cakes carried an extra \$1,000 of supply and component cost. However, she believed that these spectacular cakes served as excellent advertising for her artistry. Due to the size and structural intricacy of the Complex Cakes, Nina personally delivered and set up each one at the client's event venue. Due to the high prices of the Complex Cakes, these clients normally wanted to meet for an extended consultation and flavor tastings before finalizing an order. During these cake consultations, customers also had to be educated and guided regarding the many options available to them.<sup>2</sup>

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<sup>2</sup> For example, a customer must decide whether they want a rolled fondant or buttercream frosting for their cake. Buttercream frosting is produced from a whipped and spreadable combination of fat (usually butter) and sugar. In terms of texture, buttercream is fluffier than fondant and usually has a rich buttery sweet flavor. It is the standard base frosting/finish for bakery cakes. Buttercream can be piped into shapes and holds its form well. However, buttercream is heat sensitive due to its high fat content. This could cause an obvious problem in warm venues (such as outside summer weddings.) Rolled fondant is a soft, super-sweet, flexible, malleable paste that is generally made from corn syrup, sugar, water, and glycerin. The rolled fondant gives a porcelain, finished, and elegant look to a cake. Fondant can also be shaped into 3-dimensional decorative elements for the cake (bells, people, flowers, animals, etc.). Fondant is more expensive than buttercream, and working with fondant can be technically challenging. However, fondant is not heat sensitive and it will hold up well to higher (summer) temperatures and creative shapes. Therefore, fondant is a common choice for high end cakes. However, buttercream is generally regarded as tastier than fondant. Both buttercream and fondant can be colored and flavored, as desired.

When she began to receive and fill orders for the Complex Cakes, Nina also priced these cakes at \$4 per serving. She knew that since the Complex Cakes were usually much larger, they would be sold at a higher total price per cake. In fact, her average cake price for a Complex Cakes was three times higher than for a Simple Cake (\$480 vs. \$160). Nina viewed this higher average cake sales price as a very positive aspect of the business growth provided by the Complex Cake line.

Nina greatly enjoyed the artistic challenges involved in creating her masterpieces, but she was finding it difficult to keep up with the total demand for her cakes. She had significantly increased the number of hours that she dedicated to the business, and she had hired part-time help on an as-needed hourly basis. She found herself pulled in many different directions – meeting with clients, baking, decorating, ordering supplies, delivering, and setting up cakes. However, her current finances did not justify hiring additional skilled bakers. As an alternative, Nina wondered if she should concentrate on and expand the higher priced Complex Cake product line. To do this, she might have to begin declining orders for Simple Cakes, so that she would have the time to continue to expand her higher priced Complex Cake product line. Nina was unsure how to approach this decision. She began by reviewing the Income Statement that her accountant had just finished for 2019, as indicated in Case Exhibit 1 (Appendix). The accountant had “boxed” several numbers on Case Exhibit 1 to catch Nina’s attention. Nina is alarmed to realize that, although her revenue grew last year as expected, her expected profits had not materialized. In fact, the business had experienced a \$10,000 loss for the year. Nina found this information confusing since she had believed that her high volume of sales and the establishment of the high-priced Complex Cakes would cover the increased cost of her new location. The Income Statement showed that the Complex Cake line showed a net profit of \$1.54 (38.4%) per serving, while the Simple Cake line showed a worrisome loss of \$.75 (-18.7%) per serving.

### **Analysis**

Nina realizes that she must make some changes for her business to survive. She is open to considering changes in prices, as well as possible cost containment measures. While on her annual 2-week vacation, she considers her options. She first considers the price increase necessary to at least break-even next year in the Simple Cake line. An average Simple Cake currently shows about a \$30 loss. Nina believes that she cannot remain competitive if she increases the average price of her Simple Cakes from \$160 to \$190. The \$30 increase would represent an 18.75% increase on her Simple Cake average price (an increase from \$4.00 to \$4.75 per serving.) This finding seems to support her intuitive decision to begin declining orders for Simple Cakes in order to accept more Complex Cake orders. However, the Simple Cakes comprise the bulk of her current business, and Nina believes that the Simple Cakes are already priced appropriately (as evidenced by the growth of her Simple Cake orders).

Nina is also confused about her expenses. Nina knows that her expenses have been growing during the last year, but so has revenue. She begins wondering if she is “missing something” in her financials. In an attempt to answer her questions, Nina’s accountant prepares a Cost Flow Diagram, as indicated in Case Exhibit 2 (Appendix). The Exhibit was created to help her understand the cost flows and allocations to the two product lines. Surprisingly, the Diagram indicates that Complex Cakes cost less per serving to produce than Simple Cakes

(\$2.46 vs. \$4.75). This seems counter-intuitive to Nina since the Complex Cakes require more labor and expensive ingredients and materials than the Simple Cakes.

After reviewing the data, Nina decides that she needs to better understand the factors driving the increased costs that her business has been experiencing. The payroll and overhead costs seem like a “black hole” to her. From Case Exhibits 1 and 2 (Appendix) Nina also notices that the average cost of her ingredients has grown from \$1.00 to \$1.32 per serving during the past year, and this catches her attention. She knows that her basic ingredients (flour, eggs, sugar, etc.) have not increased significantly in price, so she believes that the cost increases must have come from the more expensive ingredients in her Complex Cakes. Nina realizes that her current Income Statement may not give useful information about why or how the costs vary between the Simple Cakes and the Complex Cakes.

Nina works with her accountant, and together they consider whether there might be a more meaningful way to group and analyze her cost data. Nina’s accountant suggests that Nina could consider the use of activity-based costing (ABC) in order to further analyze the financial and operational data by product line. They collect the following information.

- **Ingredients Cost.** By reviewing the payments to her vendors, Nina is able to separate out the costs related to her common ingredients for all cakes (flour, eggs, etc.) from those related only to her Complex Cakes. For example, Nina never uses fondant as the primary finish on her Simple Cakes. Also, certain fillings and flavors (e.g., liqueurs and specialty creams) were only used for the Complex Cakes. Lastly, the cost for pillars and other structural supports for the multi-tiered Complex Cakes were identified. Common Ingredients Cost: \$23,500. Complex Specialty Ingredients Cost: \$ 6,860.
- **Payroll and Overhead Costs.** These two costs currently account for a total of \$72,000 of Nina’s bakery costs. The payroll costs include Nina’s salary, as well as her occasional part-time workers’ pay. The bakery’s general overhead costs include the other costs of running the bakery. Included are the rent, equipment depreciation expense, consumable minor baking supplies (e.g., parchment paper, various pan sprays, and toothpicks), cleaning supplies, as well as the costs associated with delivering the cakes, and general bakery supplies.

Nina feels that she has little insight into how to analyze these general costs. Nina’s accountant suggests that Nina analyze what she and the part-time workers are actually doing. He asks, “what activities are consuming your day? What activities are consuming your other resources? How can you measure these activities objectively?” To answer the questions, Nina keeps track of the activities in the bakery for two weeks. As a result, she is able to identify four main activities that consume their time and other resources:

1. Consulting Activity
2. Mixing & Baking Activity
3. Decorating Activity
4. Delivery & Set-Up Activity

The accountant and she then review all the accounting transactions in the Payroll and Overhead Costs ledger accounts. They review Time Sheets, Payroll Records, Accounts

Payable, General Ledger, and Customer billing records. When actual historical data is not available, they use their best judgment on how much of a resource is consumed by each activity. For example, Nina knows that approximately  $\frac{1}{4}$  of their rental space is used for Mixing and Baking,  $\frac{1}{2}$  is used for Decorating, and  $\frac{1}{4}$  is used for Consulting. The rental costs are accordingly split among the activities. In this manner, they are able to roughly divide the Payroll and Overhead costs among the four activities. Nina also reviews the four activities and chooses a practical way of measuring the occurrence of each activity (the cost driver). She lists the activities, cost drivers, and her best estimates of their usage last year. This data is included as Case Exhibit 3 (Appendix).

Nina's accountant takes this information and tells her that he will prepare some additional financial analyses for her to review. Nina is looking forward to receiving the revised numbers. She has some important decisions to make for her bakery regarding product line expansion, deletion, and pricing. She knows that the bakery cannot continue on its current financial path.

## SECTION 2 - DISCUSSION QUESTIONS

1. Summarize the current financial issues that Nina is facing. What are the key data points in the Case and Case Exhibits 1 and 2?
2. Review the Exhibit 2 Cost Flow Diagram of Nina's current cost allocation system.
  - a. What is meant by the following terms: Cost Pool, Cost Objective, Cost Driver, and Cost Allocation?
  - b. How are the Cost Allocation Rates calculated?
  - c. Explain the potential benefits of a Cost Flow Diagram.
3. Prepare a Cost Flow Diagram for the new ABC allocation system, using the information in Exhibit 3.
  - a. What are the ABC allocation rates?
  - b. Compare and contrast your ABC costs with the Exhibit 2 costs for the two product lines.
  - c. What is the ABC cost per serving and per cake for the Simple Cake line and for the Complex Cake line? Is "per serving" or "per cake" a more useful unit of measurement?
4. Prepare an Income Statement using the ABC cost information. Consider and comment upon the relative profitability of the two product lines.
5. Based on the ABC Cost Flow Diagram and the ABC Income Statement, what product line and/or pricing changes should Nina consider for her product lines? What insights and/or suggestions can you share with Nina?

## SECTION 3 - TEACHING NOTES AND SUGGESTIONS

The Case can be covered during two short classes (50 minute). Before the first class, the instructor can ask students to read a basic textbook chapter on ABC costing, and this Case (including Case Exhibits 1, 2, and 3). The instructor can also assign Discussion Questions 1 and 2 for the students to prepare before the first class session.

## First Class Session

Question 1 serves as a good “warm-up” to begin the discussion. Students generally have no difficulty compiling a list of issues that the instructor can put on the board. The instructor can vigorously encourage them to cite data from the case and exhibits during the discussion. For example, if a student states that Nina is unprofitable, the instructor can ask them “how unprofitable?” Unprofitable on both product lines or just one product line? Pedagogically, the goal is to set the stage for detailed data-driven analytical discussion.

Question 2 allows the professor to present an analytical structure to help students properly de-construct the data. The instructor can explain that Cost Flow Diagrams visually present the data in a simplified manner to aid in the analysis and understanding of cost accounting data. These diagrams can be especially useful when multiple cost allocation methods are generating complex and conflicting information. Definitions and cost terminology can be addressed in a simple, practical, and concrete manner when introducing students to using these diagrams. More detailed and technical definitions can be found in any standard cost accounting text. Students generally struggle with giving an intuitive definition of the required cost terms. The instructor can push them to reach an understanding of the meanings of the terms, rather than simply repeating textbook definitions. The instructor can lead them through the following intuitive definitions, while referring to Case Exhibit 2.

**Cost Pool:** A meaningful grouping (pooling) of related expenses for the entire year for the company. In Case Exhibit 2, the Cost Pools are “Ingredient Costs,” “Payroll Costs,” and “Overhead Costs.” The numbers in each pool represent the Total Costs in that Pool for the entire year. This is a good opportunity to explain to students that how we choose to pool our costs helps determine the direction and depth of our analysis. The instructor can suggest to the students that the case is challenging them to consider other, more useful, ways of pooling the company’s costs for analysis and allocation.

**Cost Objective:** The item for which one is trying to determine the cost. For example, a product line, a company division, a batch of products, or a single product unit.

**Cost Driver (aka Allocation Base):** The factor that causes a change in the total cost of an activity or cost pool. For example, the cost driver “# of servings” causes changes in the cost pool Total Ingredient Cost. Accordingly, the more servings that are produced, the higher the Total Ingredient Cost that is incurred. Graphically, in a 2-dimensional plot, one could view the Y axis as the Total Ingredient Cost (dependent variable) and the X axis as the Cost Driver “# of servings” (independent variable). When the quantitative measurement of the cost driver is used as the denominator in an allocation rate calculation, the cost driver is known as an allocation base.

**Cost Allocation:** The process of sharing common costs across multiple cost objectives. For example, the Consulting Office is used for consulting on both Simple Cakes and Complex. Therefore, the cost (rent, etc.) for the office should be shared between the two product lines in order to determine the *separate relative profitability* of each product line. Cost allocation problems focus on how to divide and group costs into meaningful cost pools and then determining an appropriate and measurable cost driver for each cost pool.

The first class can end with a discussion of the mechanics and advantages of a cost allocation diagram. The discussion will prepare the students for diagramming the ABC cost flow system

for the next class. The list of benefits of diagramming includes, but is not limited to, the following points:

1. Diagramming forces one to distinguish cost objectives from cost pools. (Surprisingly, many students have trouble with this task.)
2. Diagramming forces one to balance the total costs and the total allocated costs. For example, the total costs on the left side must equal the total of the product line costs on the right side.
3. Diagramming gives one a single overview of all the cost pools, allocations, and their inter-relationships for future analysis.
4. Condensing the information into a single visual aid can reduce the complexity of the system and reduce the cognitive overload for most users. Readings on cognitive overload and problem representation are included in the Reference section of this case.

Questions 3, 4, and 5 should be assigned at the end of this session, in preparation for the second class session.

### Second Class Session

Question 3 asks the students to produce the ABC diagram, as presented in Teaching Note Exhibit 4 (Appendix). Generally, students will struggle with conceptualizing the ABC cost diagram. Although they have been presented with an example and discussed the diagram, it is still difficult for many students. The instructor can suggest that “if a student cannot draw an allocation system, the student may not understand the cost allocation system.” An inability to graphically represent the cost allocation system generally reflects a student’s lack of understanding of that system.

The instructor should stress the usefulness of cost information based on activities cost pools (Delivery and Set-Up Costs), rather than general cost pools (Payroll Costs or Overhead Costs). For example, the ABC system shows that it costs Nina about \$120 to deliver a cake. Nina can now consider how she wants to price delivery of her cakes – should the cost be included in a per serving price or separated out on a per cake basis? Additionally, is there a way to reduce the cost of delivering each cake?

The discussion of whether to use “per serving” or “per cake” measurements is a good opportunity to refine student analytical thinking. The instructor should remind students that cost drivers can be viewed as being different dimensions or levels of production: (a) unit or volume level, (b) batch level, (c) product line level, and (d) facility level. In this respect, the number of servings of cake is a unit or volume level driver and each individual cake is a batch of servings. This analogy helps students conceptualize the use of servings or cakes as the appropriate cost driver for different activity or cost pools. In some settings, the cost per cake (cost of a batch of servings) be may a useful measurement; in other situations, the number of servings (total units or volume) may be a more useful measurement. For example, the total number of servings can be viewed as an appropriate driver for determining total cake ingredient costs. Similarly, the total number of cakes delivered may be a more appropriate driver for determining the cost of delivering the cakes.

Students will readily focus on the revised Average Cost Per Serving for the Simple Cakes (\$3.91) and for the Complex Cakes (\$8.05). When pricing cakes at \$4 per serving, the Simple Cakes are slightly profitable, while the Complex Cakes are generating very large losses. This is the opposite of what was shown by the old cost allocation system. The instructor can remind

students that the old system counter-intuitively indicated that Simple Cakes were more expensive per serving than Complex Cakes. The instructor can also point out that this is a classic case of how a traditional cost allocation system can distort the relative profitability of cost objectives. In this case, a high-volume simple cost objective (Simple Cakes) subsidizes a low volume complex cost objective (Complex Cakes).

Questions 4 and 5 require students to use the ABC cost diagram information to produce the ABC Income Statement, as presented in Teaching Note Exhibit 5 (Appendix). The stage is now set for discussions of possible pricing strategies and their possible impact on Nina's future sales. Students will frequently recommend separate prices for Simple vs. Complex Cakes. This is a change that is superficially obvious to them. The interesting part of the discussion, however, is pushing students to consider the impact that raising prices might have on each product line.

1) Raising Price Per Serving on Simple Cakes.

- a) The degree of price sensitivity is a crucial issue here. If the price is raised, say 5%, to \$4.20 per serving, the profit per serving would be \$.29 (7.25% of the selling price). Students should recognize that a \$.20 price increase will probably not cause all Simple Cake customers to flee from Nina's Bakery. In fact, this could be one method of controlling the demand for Simple Cakes, while not having to explicitly turn down Simple Cake orders. The most price sensitive clients would simply stop placing orders. This could allow Nina the time to expand her Complex Cake line. Obviously, Nina will have to carefully consider the degree to which most of her Simple Cake clients are price sensitive before implementing any increase.

2) Changing Pricing Strategy on Complex Cakes

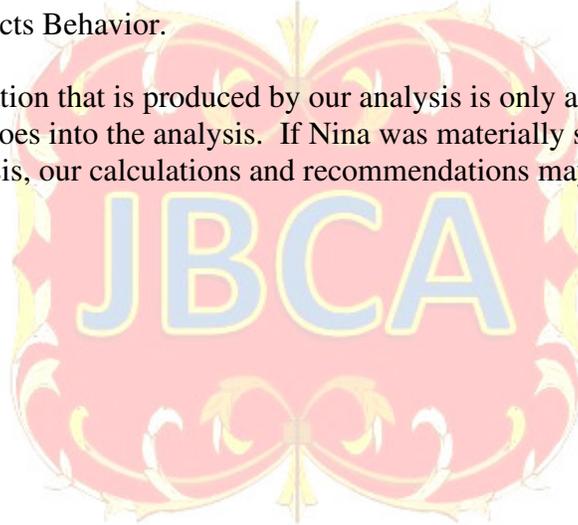
- a) Students will recognize that the specialty ingredients alone used in the Complex Cakes (\$2.287 per serving) justify a higher price per serving, even ignoring other factors. Some students will note that there could be multiple pricing levels for the Complex Cakes. Why, for example, should the gold dust finish or the electronic components in the 5 tier Complex Cake be averaged across all Complex Cakes? Perhaps Complex Cakes could be priced as "Starting at \$ X per serving, plus the cost of unusual decorations or structures." As a side note, this may also depress Complex Cake orders, as the high end finishes such as "gold dust" will be explicitly and separately priced.
- b) Charging for delivery and set up on a per cake basis. Some students will suggest that it may be useful to separate out the delivery and set up charges at a separate "per cake" price. They may also suggest that the delivery charges should be based on an estimate of the estimated amount of delivery and set up time that will be required rather than per cake. The instructor should strongly encourage this type of thinking, as it validates that the students are considering the activities involved in producing the cakes – not just generic cost pools.
- c) Teaching Note Exhibit 6 (Appendix) presents the calculations for using the ABC Pricing Structure for an average Complex Cake with a 10% mark up on cost. The instructor can relate the Exhibit 6 Average Cost Per Serving (\$8.053) back to Exhibit 4 Complex Cake Per Serving Cost (\$8.053). The instructor can encourage students to generate their own suggestions for a pricing structure, and the class can discuss the relative advantages and

disadvantages of their suggestions. In each case, the instructor can push them to discuss the possible impact of the pricing change on external demand, Nina's internal resource consumption, and the resulting profitability changes.

### 3) Concluding Comments

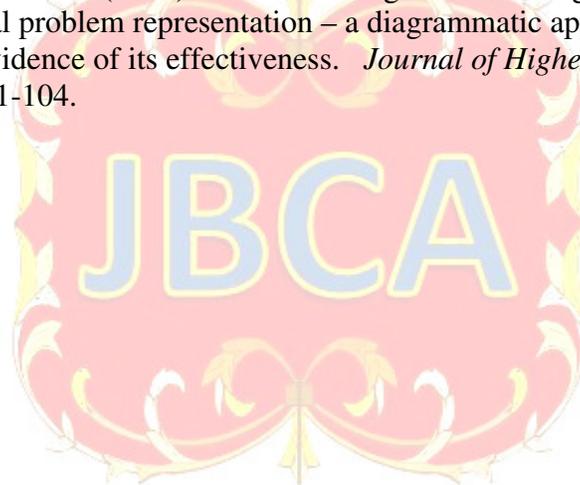
When drawing the discussion to a close, the instructor can emphasize the following points.

- a) No business can serve every client – businesses must discover and define their own niche. Pricing is only one of the elements that define that space. (The instructor can remind them of the four P's of Marketing: Product, Price, Promotion, and Place).
- b) There may be indirect future positive effects on the cost side for the bakery. For example, as she becomes more aware of the costs of her activities, Nina may be motivated to seek out ways to reduce the cost of Delivering the Cakes or Mixing and Baking the cakes. The instructor can remind the students of a basic tenet of management: Measurement affects Behavior.
- c) The ABC information that is produced by our analysis is only as "good" as the information that goes into the analysis. If Nina was materially sloppy or inaccurate with her activity analysis, our calculations and recommendations may be significantly flawed.



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**APPENDIX**

Case Exhibit 1  
 Nina's River Street Cake Creations  
 Income Statement with Per Cake and Per Serving Information  
 For the Year Ending December 31, 2019

	Bakery Total			Simple Cakes			Complex Cakes		
	Bakery Total	Per Cake	Per Serving	Amount	Per Cake	Per Serving	Amount	Per Cake	Per Serving
# cakes	525	1		500	1		25	1	
# servings	23,000		1	20,000		1	3,000		1
Average Servings Per Cake	43.8			40.0			120.0		
Total Revenue*	\$ 92,000	\$ 175.24	\$ 4.00	\$ 80,000	\$ 160.00	\$ 4.00	\$ 12,000	\$ 480.00	\$ 4.00
Total Ingredients Cost*	\$ 30,360	\$ 57.83	\$ 1.32	\$ 26,400	\$ 52.80	\$ 1.32	\$ 3,960	\$ 158.40	\$ 1.32
Total Payroll**	\$ 42,000	\$ 80.00	\$ 1.83	\$ 40,000	\$ 80.00	\$ 2.00	\$ 2,000	\$ 80.00	\$ 0.67
Overhead **	\$ 30,000	\$ 57.14	\$ 1.30	\$ 28,571	\$ 57.14	\$ 1.43	\$ 1,429	\$ 57.14	\$ 0.48
Subtotal - Costs	\$ 102,360	\$ 194.97	\$ 4.45	\$ 94,971	\$ 189.94	\$ 4.75	\$ 7,389	\$ 295.54	\$ 2.46
Net Profit	\$ (10,360)	\$ (19.73)	\$ (0.45)	\$ (14,971)	\$ (29.94)	\$ (0.75)	\$ 4,611	\$ 184.46	\$ 1.54

\* Estimated based on average # of servings per cake.

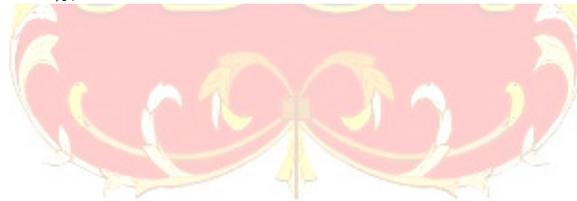
\*\* Allocated based upon number of cakes per product line.



Case Exhibit 2  
 Cost Flow Diagram of Nina’s River Street Cake Creations  
 Current Accounting System  
 For the Year Ending December 31, 2019

	Cost Pools	Rate Calculations	Cost Objectives							
			Simple Cakes		Complex Cakes					
	<table border="1"> <tr><td>Ingredient Costs</td></tr> <tr><td>\$ 30,360</td></tr> <tr><td>\$ 23,000</td></tr> <tr><td>servings</td></tr> </table>	Ingredient Costs	\$ 30,360	\$ 23,000	servings	= \$ 1.320 /serving →	20,000 servings	\$ 26,400	3,000 servings	\$ 3,960
Ingredient Costs										
\$ 30,360										
\$ 23,000										
servings										
	<table border="1"> <tr><td>Payroll Costs</td></tr> <tr><td>\$ 42,000</td></tr> <tr><td>525 cakes</td></tr> </table>	Payroll Costs	\$ 42,000	525 cakes	= \$80.000 /cake →	500 cakes	\$ 40,000	25 cakes	\$ 2,000	
Payroll Costs										
\$ 42,000										
525 cakes										
	<table border="1"> <tr><td>Overhead Costs</td></tr> <tr><td>\$ 30,000</td></tr> <tr><td>525 cakes</td></tr> </table>	Overhead Costs	\$ 30,000	525 cakes	= \$ 57.14 /cake →	500 cakes	\$ 28,571	25 cakes	\$ 1,429	
Overhead Costs										
\$ 30,000										
525 cakes										
Total Costs	\$ 102,360			\$ 94,971	\$ 7,389					
				\$ 102,360						
Average Cost Per Cake*	\$ 194.97			\$ 189.94	\$ 295.54					
Average Cost Per Serving	\$ 4.45			\$ 4.75	\$ 2.46					

\* Average Cost Per Cake = Weighted Average of Average Cost Per Simple Cake and Average Cost Per Complex Cake  
 \$194.97 approx. = [500 (\$189.94) + 25 (\$295.54)] / 525 cakes



Case Exhibit 3  
 Nina's River Street Cake Creations  
 Activity Based Cost Information  
 For the Year Ending December 31, 2019

Activity	Payroll Costs	Overhead Costs	Totals	Activity Cost Driver
Consulting	\$ 4,168	\$ 1,832	\$ 6,000	# of Consulting Sessions
Mixing & Baking	\$ 10,260	\$ 7,740	\$ 18,000	# of Servings in Cake
Decorating	\$ 25,649	\$ 19,351	\$ 45,000	# Decorating Minutes
Delivery & Set-Up	\$ 1,924	\$ 1,076	\$ 3,000	# of Deliveries
^Total	\$ 42,000	\$ 30,000	\$ 72,000	

Activity Cost Driver	Simple Cakes	Complex Cakes
# of Consulting Sessions*	500	150
# of Servings in Cake	20,000	3,000
# Decorating Minutes	30,000	6,000
# of Deliveries	-	25

\*Each Consulting Session is 15 minutes or less.  
 Each Simple Cake requires 1 consulting session.  
 Each Complex Cake requires 6 consulting sessions.

Teaching Note Exhibit 4  
 Cost Flow Diagram of the ABC System

		Cost Pools		Rate Calculations		Cost Objectives							
						Simple Cakes			Complex Cakes				
						Total	Per Serving		Total	Per Serving			
Ingredients	\$ 30,360	Common Ingredients	\$ 23,500	=	\$ 1.022 / serving	20,000	\$ 20,435	\$ 1.022	3,000	\$ 3,065	\$ 1.022		
			23,000			Servings		Servings		Servings			
		Specialty Ingredients	\$ 6,860	=	\$ 2.287 / serving	0	\$ -	\$ -	3,000	\$ 6,860	\$ 2.287		
			\$ 3,000			Servings		Servings		Servings			
Total Payroll & Overhead Costs	\$ 72,000	Consulting	\$ 6,000	=	\$ 9.231 / Session	500	\$ 4,615	\$ 0.231	150	\$ 1,385	\$ 0.462		
			650			Consulting Sessions		Consulting Sessions		Consulting Sessions			
		Mixing & Baking	\$ 18,000			=	\$ 0.783 / Serving	20,000	\$ 15,652	\$ 0.783	3,000	\$ 2,348	\$ 0.783
			23,000					Servings		Servings		Servings	
Decorating	\$ 45,000	=	\$ 1.250 / Dec. Min.	30,000	\$ 37,500	\$ 1.875	6,000	\$ 7,500	\$ 2.500				
	36,000			Decorating Minutes		Decorating Minutes		Decorating Minutes					
Delivery & Set-Up	\$ 3,000	=	\$ 120.000 / Delivery	-	\$ -	\$ -	25	\$ 3,000	\$ 1.000				
	25			Deliveries		Deliveries		Deliveries					
Total Costs	\$ 102,360	\$ 102,360				\$ 78,202	\$ 3.910	\$ 24,158	\$ 8.053				
						\$ 102,360							
Average Cost Per Cake (500 Complex Cakes, 25 Simple Cakes)						\$ 156.40			\$ 966.31				

Teaching Note Exhibit 5  
 Income Statement with Activity Based Cost Information  
 For the Year Ending December 31, 2019

	Bakery Total		Simple Cakes		Complex Cakes	
	Bakery Total		Amount	Per Serving	Amount	Per Serving
# cakes	525		500		25	
# servings	23,000		20,000		3,000	
Total Revenue	\$ 92,000		\$ 80,000	\$ 4.00	\$ 12,000	\$ 4.00
Basic Ingredients	\$ 23,500		20,435	\$ 1.02	\$ 3,065	\$ 1.02
Additional Complex Ingredients	\$ 6,860				\$ 6,860	\$ 2.29
Total Ingredients	\$ 30,360		\$ 20,435	\$ 1.02	\$ 9,925	\$ 3.31
Activity Based Costs:						
Consulting	\$ 6,000		\$ 4,615	\$ 0.23	\$ 1,385	\$ 0.46
Mixing & Baking	\$ 18,000		\$ 15,652	\$ 0.78	\$ 2,348	\$ 0.78
Decorating	\$ 45,000		\$ 37,500	\$ 1.88	\$ 7,500	\$ 2.50
Delivery & Set-Up	\$ 3,000		\$ -	\$ -	\$ 3,000	\$ 1.00
Total ABC Costs	\$ 72,000		\$ 57,768	\$ 2.89	\$ 14,232	\$ 4.74
Total Costs	\$ 102,360		\$ 78,202	\$ 3.91	\$ 24,158	\$ 8.05
Net Profit	\$ (10,360)		\$ 1,798	\$ 0.09	\$ (12,158)	\$ (4.05)
Net Profit Per Cake	\$ (19.73)		\$ 3.60		\$ (486.31)	

## Teaching Note Exhibit 6

## ABC Cost and Price

## Average Complex Cake

For the Year Ending December 31, 2019

					<u>Cost</u>
Common Ingredients	120 servings	@ \$	1.022	per serving	\$ 122.61
Specialty Ingredients	120 servings	@ \$	2.287	per serving	\$ 274.40
Mixing and Baking	120 servings	@ \$	0.783	per serving	\$ 93.91
Consultations	6 sessions	@ \$	9.231	per session	\$ 55.38
Decorating	240 dec. min.	@ \$	1.250	per dec. min	\$ 300.00
Delivery & Set Up	1 delivery	@ \$	120.000	per delivery	\$ 120.00
Average Complex Cake Cost					\$ 966.31
10% Mark-Up					<u>\$ 96.63</u>
Price for Average Complex Cake					\$ 1,062.94
Average Cost Per Perving for this Cake					\$ 8.053
Average Price Per Serving for this Cake					\$ 8.858

