

Applying Fundamental Managerial Accounting Concepts to GlowWeevil Inc.: Costing and Pricing Strategies for Entrepreneurial Success

Eric Brown

ebrown77@elon.edu

Love School of Business

Elon University

Caroline Sprecher

csprecher@elon.edu

Love School of Business

Elon University

Abstract: This case study introduces students to managerial accounting concepts through GlowWeevil Inc., a company that produces Weevil Eyes—glowing nighttime companions designed to comfort children and promote ecological awareness. Extending learning beyond the classroom, students participate in a hands-on activity at a Maker Hub, where they assemble Weevil Eyes and gain practical experience with a company’s production processes and cost structures. Using insights from this activity and the accompanying case, students classify costs, calculate manufacturing expenses, and conduct cost-volume-profit (CVP) analysis. They then integrate these cost insights with an evaluation of the competitive landscape to make strategic pricing and production decisions. By combining experiential learning with practical managerial accounting applications, the case fosters critical thinking, enhances problem-solving skills, and equips students for effective decision-making in professional settings. The case is suitable for Principles of Accounting, Managerial Accounting, and Cost Accounting courses at the Undergraduate level.

Keywords: *Managerial Accounting, Manufacturing Costs, Cost Behavior, CVP Analysis, Relevant Costs, Short-Term Decision Making, Active Learning*

We are grateful for the helpful comments and suggestions provided by participants of Elon University’s Faculty Writing Residency, including Israel Balderas, Anne-Marie Iselin, Jill McSweeney, and Marna Winters. We also wish to acknowledge the collaboration of Elon University’s Maker Hub and the valuable feedback from all of the Principles of Accounting students who engaged with this case.

1. The Case

1.1 Case Introduction

Ethan Ellis is not just the founder and CEO of GlowWeevil Inc. – he is a parent on a mission to make bedtime a little less scary for children everywhere. Driven by his own son's struggle with a fear of the dark, Ethan embarked on a journey to create the perfect nighttime companion, one that would soothe fears and bring a sense of security to children ages 5 to 13. Enter Weevil Eyes, meticulously crafted miniature trinkets, intricately designed to mimic tiny beetles. These comforting companions feature eyes that emit a soft, soothing glow, which becomes more intense as the ambient light diminishes, banishing the darkness and providing a sense of security for children during bedtime. Unlike traditional nightlights, they are small, lightweight, and battery-powered, making them easy for children to carry and hold. Whether it is a late-night bathroom trip, a sleepover with friends, or a weekend camping adventure, WeevilEyes provide comfort and reassurance wherever they go.

However, GlowWeevil, Inc. believes in more than just providing comforting companions for children. They are also committed to nurturing children's curiosity and fostering the development of informed, responsible global citizens from an early age. That is why each Weevil Eye comes with a special children's e-book, thoughtfully crafted to captivate young minds and teach them about the incredible world of beetles and their vital role in our ecosystem.

Ethan has developed a prototype of the WeevilEyes, arranged for manufacturing facilities, recruited a team of employees, and procured essential production equipment and raw materials for the inaugural production run. However, faced with the novelty of the product and lacking directly comparable offerings in the market, Ethan is uncertain about pricing strategies. This is where your expertise becomes invaluable.

You and your colleagues at CostCraft Solutions comprise a dynamic team of business consultants with expertise in assisting entrepreneurs in gathering, documenting, and analyzing cost information. You provide comprehensive support to your clients, helping them use this information to make informed decisions vital to the success of their ventures. Recognizing your skill and dedication to delivering actionable insights and strategic recommendations that position your clients' businesses for success in a competitive marketplace, Ethan has hired you to provide guidance on GlowWeevil, Inc.'s pricing strategies, leveraging your expertise in cost analysis and market dynamics.

When determining product pricing, several factors must be considered, including the production and period costs of the business and the competitive landscape of the industry.

1.1 Competitive Analysis

First, you conduct market research and identify Napa Valley Toys USA LLC, an esteemed American soft line and toy design company renowned for its plush toys with built-in nightlight features known as "NightBuddies", as GlowWeevil Inc.'s closest competitor. NightBuddies, designed for ages three to ten, are adorable sleep companions that emit a gentle, comforting glow

when squeezed by a child, fostering a sense of safety and security at bedtime. Notably, each NightBuddy comes equipped with an automatic three-minute shut-off feature, ensuring convenience, conserving battery life and allowing the battery to last for up to two years. To replace the battery when it inevitably dies, parents cut the plush open at the seams, use a mini screwdriver to replace the coin battery, and sew the toy back up. Napa Valley Toys USA LLC points out that this lack of easy access to the batteries is a safety feature allowing the plush toys to be used by children as young as 3 years old. Parents admire NightBuddies for their plush and huggable designs, appreciating their dual functionality as both a beloved toy and a reliable nightlight. (Shirley, 2014)

NightBuddies are available in sizes ranging from 6-inches to 15-inches to suit children of different age groups and preferences. Most NightBuddies are priced at \$19.99, with the exception of the 6-inch Sleepy Sea Life companions which are available for \$11.99 each wherever NightBuddies are sold (Shirley, 2014; Oriental Trading, n.d.).

GlowWeevil Inc.'s Weevil Eyes offer a variety of distinctive features and benefits that set them apart from Napa Valley Toys USA LLC's NightBuddies. First, Weevil Eyes boast dynamic glow technology, which adjusts to the ambient light levels in the room. In contrast to NightBuddies' constant glow level activated by squeezing, Weevil Eyes activate automatically in response to low light conditions and remain illuminated throughout the night. This ensures that children have a consistent source of gentle illumination, offering reassurance and comfort, especially if they wake up during the night. By alleviating feelings of disorientation or fear associated with darkness, Weevil Eyes promote a more peaceful sleep environment.

Moreover, Weevil Eyes' automatic activation eliminates the need for manual intervention, unlike NightBuddies' requirement for repetitive squeezing every three minutes. This non-intrusive lighting solution supports healthy sleep patterns by allowing children to drift off to sleep naturally without interruptions.

Additionally, Weevil Eyes offer easy battery replacement functionality that prioritizes user convenience. Unlike NightBuddies' cumbersome process involving cutting open the stuffed animal and resewing it, Weevil Eyes provide a hassle-free solution. With simple access to the battery compartment, replacing batteries in Weevil Eyes is quick and straightforward, making it a practical and sustainable long-term option for families.

Finally, distinguishing itself further from NightBuddies and other sleep aid products, Weevil Eyes targets an older demographic of children, typically aged five to thirteen, providing them with both a comforting sleep companion and an educational experience. With each purchase of Weevil Eyes, children receive an educational children's e-book suitable for ages five and up. This e-book acts as a valuable learning tool, imparting insights into the vital role beetles play in the ecosystem and empowering children to become informed stewards of the environment, ensuring the protection of ecosystems for future generations.

In summary, GlowWeevil Inc. positions Weevil Eyes as a superior alternative to NightBuddies by emphasizing its dynamic glow technology, user convenience, non-intrusive lighting solutions, and educational features.

1.2 GlowWeevil Inc. Cost Information

Next, you set about gathering information on GlowWeevil's relevant costs. Ethan informs you that he has secured manufacturing space at the Maker Hub, a co-working space, for a monthly rent of \$1,200. As it is a co-working space, the cost of utilities has been factored into the rent and will not be billed separately.

Additionally, Ethan has hired an experienced manufacturing supervisor to oversee production of the Weevil Eyes at a monthly rate of \$4,640. The manufacturing supervisor will be charged with team management, production planning, quality control, setting and enforcing safety protocols, training production workers, troubleshooting issues that arise during production, and inventory management among other things. He will work a standard 40-hour workweek. Ethan has also employed ninety electrical engineering students at Elon University, a local, small, private university, as part-time, as-needed production interns. They will clock-in and clock-out with the manufacturing supervisor at the beginning and end of each shift and will be paid \$8/hour for their work. It takes each intern approximately 15 minutes to produce one Weevil Eye.

Ethan also provides you with invoices detailing the purchases of the raw materials and production equipment. Pertinent information from these invoices can be viewed in Tables 1 and 2. As the children's e-book will be delivered virtually after purchase, the cost of this to the company is negligible. Ethan anticipates that all manufacturing equipment has a useful life of 2 years with consistent use. He believes that each solder roll will be enough to solder 50 Weevil Eyes.

Finally, Ethan tells you he plans to handle sales, customer service and administrative functions himself. He will take a monthly salary of \$2,500 until the business gets off the ground. He has outsourced website design and maintenance to a freelance web designer on a retainer basis for a fixed monthly fee of \$1,000 per month. Ethan has also hired a third-year marketing major at Elon University as a marketing intern. This intern will be responsible for attracting and retaining customers by creating and implementing an effective marketing strategy. The intern will work 40 hours a month at a rate of \$16/hour. She has been given a monthly advertising budget of \$500. Finally, Ethan has hired an accountant to help maintain financial records and comply with tax and reporting obligations. The CPA charges \$250/hour and Ethan expects that they will perform 10 hours of work per month for GlowWeevil.

1.3 WeevilEyes Production

Next, you ask Ethan to walk you through the Weevil Eye production process. Ethan, happy to help, arranges for you to get hands-on experience by visiting the Maker Hub, GlowWeevil Inc.'s

manufacturing space, the following week. His manufacturing supervisor will meet you there and walk you through the process of creating your very own Weevil Eye.

Motivated by the need for precise cost analysis, you enthusiastically accept his offer, resolved to gain firsthand insight into the manufacturing process. You schedule a training session with GlowWeevil Inc.'s Manufacturing Supervisor (e.g. a Maker Lab consultant) and discuss the need to meticulously note the components involved in the production of each Weevil Eye. During your time at the Maker Hub, you plan to track and categorize costs into distinct categories, including product costs, period costs, direct materials, direct labor, manufacturing overhead, fixed costs, and variable costs. You stress the significance of accurately capturing all expenses, including those easily overlooked, to ensure a comprehensive understanding of total production expenses, setting the stage for informed decision-making regarding pricing and profitability.

1.4 Case Questions

After reviewing the information Ethan provided on GlowWeevil, Inc.'s production process and costs, evaluating the competitive landscape, and getting hands on experience manufacturing a Weevil Eye, you begin documenting and analyzing this information to provide strategic insights into pricing and production strategies by answering the following questions:

1. Create a list of all the costs GlowWeevil Inc. has or will incur in producing the Weevil Eyes. Classify each of these costs as a product cost or a period cost.
2. Classify each of the identified product costs as direct materials, direct labor, or manufacturing overhead costs. Further classify each manufacturing overhead cost as an indirect labor, indirect material, or other indirect cost.
3. Calculate the total manufacturing cost per unit, and the total manufacturing cost for one month.
(Assume GlowWeevil produces 2,000 units in one month when answering this question.)
4. Use the cost-plus method to develop a pricing recommendation for GlowWeevil, leveraging your analysis of the competitive landscape to determine an appropriate markup percentage. Prepare a concise, professional report that details your pricing recommendation and provides a well-supported justification for your proposed strategy.

You share your recommendations with Ethan, who is thoroughly impressed with your analysis. While he is receptive to your pricing suggestions, he is also keen on recovering his investment. He inquires about the number of Weevil Eyes he needs to sell at your recommended price point to break even. To answer this question, you will require data on the fixed, mixed, and variable costs associated with the product.

5. Classify each of the costs you identified in part one of the assignment as variable or fixed.

6. If Ethan follows your pricing recommendation, how many units must GlowWeevil Inc. sell to break even? What level of sales (in dollars) must GlowWeevil achieve to break even?
7. After conducting some market research, you expect that GlowWeevil, Inc. will be able to sell 3,500 Weevil Eyes in the first year. At this level of sales, what will the company's Margin of Safety be?
8. Create a graph showing estimated sales, costs, and profit within the range of 0 to 10,000 units. Indicate the breakeven point on this graph. (*Hint: this is CVP analysis in graph form*)

You present this analysis to Ethan who feels much more comfortable with your pricing recommendations with the additional insight. He agrees to adopt your recommendation and begins production the following month. A year later, you receive a follow-up email from Ethan. Your pricing recommendations were spot on, and GlowWeevil, Inc.'s business has taken off. Ethan is now faced with a few additional business decisions that he'd like your insight on.

9. Ethan is considering producing the Weevil Eye PCB board in-house rather than buying it. Producing the PCB board in-house would incur unit costs of \$0.50 for direct materials, \$0.75 for direct labor, and \$0.25 in incremental overhead costs. Should GlowWeevil, Inc. continue to buy the PCB boards or should they make the boards instead? Explain your reasoning.
10. GlowWeevil, Inc. currently has 10,000 Weevil Eyes in finished goods inventory. They have the option to sell these Weevil Eyes at your recommended price or process them further by adding a remote-control feature, which would allow users to turn the Weevil Eye light on and off from a distance. The additional processing would cost \$50,000, and the upgraded Weevil Eyes could be sold for \$30 each. Should GlowWeevil, Inc. sell the Weevil Eyes as they are, or invest in further processing? Explain your reasoning.

2. Teaching Notes

2.1 Overview

This case study, designed for undergraduate students in introductory accounting or managerial accounting courses, assigns students the role of business consultants for GlowWeevil Inc., a company that produces and sells Weevil Eyes, portable nightlights shaped like tiny beetles. By reading the case and actively participating in the manufacturing process at a maker space, a collaborative workspace with tools, supplies, and creative support, students gain insights into the company's manufacturing processes, costs, and competitive environment (Kennedy et al., 2021). Using this experience and classroom concepts, students perform cost and pricing analysis for GlowWeevil Inc., classifying and calculating manufacturing costs, offering pricing recommendations based on these costs and market conditions, and conducting other managerial accounting analyses.

2.2 Motivation

A large, robust body of empirical research demonstrates that active learning techniques, or techniques designed to engage students in the process of learning through activities or discussion in class as opposed to passively listening to an expert, are more effective than expository approaches where the instructor imparts knowledge to passive learners (Bonwell & Eison, 1991; Freeman et al., 2014; Prince, 2004; Theobald et al., 2020). For example, Freeman et al. 2014 conducts a meta-analysis of 225 studies comparing “constructivist versus exposition-centered course design” in science, technology, engineering, and mathematics (STEM) disciplines. They find that students in traditional lectures were 1.5 times more likely to fail than students in courses with active learning. Similarly, Theobald et al. (2020) performs a meta-analysis of over 40 studies examining the effect of active learning on the performance of underrepresented students in STEM fields. They find that, on average, active learning reduces achievement gaps in examination scores between underrepresented students and their overrepresented classmates by 33% relative to traditional lecturing classrooms and narrows gaps in passing rates by 45%. Additionally, several accounting studies have examined the effect of active learning on the learning process and outcomes. For instance, Riley and Ward (2017) examines the effect of active versus passive learning methods in accounting information systems students and finds that students engaged in active learning performed better and reported greater satisfaction than those engaged in passive lecture. Similarly, Tsay et al. (2023) redesigned an introductory financial accounting class taught primarily for non-majors to include more metacognitive and active learning activities. They found that these pedagogical changes increased both student learning and student retention.

Jordan and Samuels (2020) argue that given the practice-oriented nature of accounting, experiential learning may be a particularly effective active learning technique to employ in accounting classes. Experiential learning is the process by which individuals learn by doing and reflecting on the experience (D. A. Kolb, 1984). Experiential learning encompasses cases, simulations, real-world projects, externships, internships, participation in student clubs (such as Beta Alpha Psi), and even working a job (Jordan & Samuels, 2020). Prior research has found that experiential learning methods energize students and increase their enjoyment of and participation in class (Dabbour, 1997; J. R. Kendrick, 1996; D. A. Kolb, 1984; Lawson, 1995; McCarthy & Anderson, 2000; O'Hara & Shaffer, 1995; Stice, 1987), increase the depth of students' understanding particularly with respect to complex concepts (Alkafaji & Gleason,

2019; Cornell et al., 2013; D. A. Kolb, 1984), increase their retention (Cornell et al., 2013; Stice, 1987), and increase their problem-solving abilities (Kern, 2002).

Recognizing the positive impact of active learning techniques such as experiential learning on student success, the Pathways Commission, a commission created by the American Accounting Association (AAA) and the American Institute of Certified Public Accountants (AICPA) to develop recommendations for educational pathways to engage and retain the strongest possible community of students, academics, practitioners, and other knowledgeable leaders in the practice and study of accounting, has pushed accounting programs to embrace more complex real-world settings to convey the dynamic nature of decision-making in the accounting profession (Behn et al., 2012).

Additionally, it is imperative that accounting students graduate with a solid understanding of cost behavior. In a survey, Nas Ahadiat asked 1,000 accounting practitioners to rate the importance of 86 management accounting topics to a successful career in a staff accounting position on a five-point Likert scale. In this survey, Cost-Volume-Profit (CVP) Analysis and break-even analysis were ranked 12th and 15th respectively (Ahadiat, 2008). The American Institute of Certified Public Accountants (AICPA) has also recognized the importance of these skills in the 2024 CPA exam evolution. Going forward, students sitting for the Business Analysis and Reporting Disciplinary Section of the CPA exam will be required to “calculate fixed, variable, and mixed costs” and “prepare and interpret the results of planning techniques including...breakeven analysis.” (American Institute of Public Accountants, 2022). This case study harnesses the proven efficacy of experiential learning to increase accounting students’ knowledge and understanding of these important cost classification concepts and CVP analysis. The case joins a group of accounting case studies that use ‘hands-on’ conceptual models to facilitate learning of complex cost accounting topics. Learning by making is a modern take on older theories of constructionism and constructivism. Constructivism posits that individuals learn by adding the knowledge they interact with to their prior experiences. (Alanzi, 2016). Constructionism expands on this concept by arguing that this learning happens especially in a context in which the learner is constructing a “public entity”, or something that can be shared publicly like a physical object (Papert & Harel, 1991). The first documented use of ‘hands-on’ conceptual models in the cost accounting literature were Burns and Mills (1997), Lightbody (1997), and Lovata (1986). Lovata (1986) has students create pennants in class to help students understand cost flows in manufacturing and other cost concepts. Burns and Mills (1997) gives students the opportunity to practice product costing while building product prototypes with LEGOs. Lightbody (1997) asks students to manufacture paper rabbits to learn and practice cost flow and cost allocation concepts, although Lightbody notes that the case could also be used to allow students to practice determining the nature of costs, cost control concepts, and decision-making using cost information. Since then, other cases have required students to build paper and wooden airplanes to explore cost classification and control concepts (Hintz & Fedoryshyn, 2008; Reginato & Cornacchione, 2021), asked students to make wooden furniture to practice manufacturing cost flow and cost allocation concepts (Greenberg & Schneider, 2010), used Fisher Price Rock-N-Stack toys to introduce students to inventory cost flow methods (Chi, 2021; Kern, 2002), and had students create paper hats and chains to practice cost classification and cost allocation concepts (Vinciguerra & Lafond, 2015).

Our case contributes to this literature by giving undergraduate principles of accounting and managerial accounting students hands-on practice classifying costs, pricing a product, and performing cost-volume-profit (CVP) analysis. Several recent published case studies target a similar group of students and aim to accomplish similar learning objectives. Lafond et al. (2017) requires managerial accounting students to visit a soup kitchen, learn about their operations and help prepare a meal before using the not-for-profits actual cost data to perform CVP analysis on their operations. Lafond and Wentzel (2022) has students gather data to determine the viability of opening a sandwich shop in the student union by preparing peanut butter and jelly sandwiches. The students are then asked to classify and determine product costs and use this data to price the sandwiches and perform CVP analysis. Boyd and Pitre (2020) requires teams of students to select a product to design and produce. These teams of students then had to determine costs and a selling price for their product and perform basic CVP analysis on their product. Finally, Arnold & Fekula (2010) asks teams of students to produce bags of candy. These teams must then identify and classify costs associated with the bags of candy and calculate product costs per bag.

A distinguishing feature of our case is the use of a maker space to incorporate learning through making. Hands-on learning in a collaborative manufacturing space (e.g., Makerspaces, Maker Hubs, FabLabs) offers several advantages over traditional classroom-based hands-on learning. First, a Maker's Hub replicates real-world manufacturing and entrepreneurial environments, creating a more authentic and dynamic learning experience than a controlled classroom setting. Research consistently shows that students learn more effectively through authentic experiences, where they apply concepts in real-world contexts rather than in abstract or simulated settings (Lombardi, 2007). Additionally, unlike traditional classroom settings, where hands-on activities are often limited to small-scale projects with basic materials, maker spaces provide access to industry-grade tools and materials, such as 3D printers, CNC machines, and laser cutters. This allows students to explore more advanced cost accounting concepts beyond direct materials and labor. For instance, working with expensive, long-term assets naturally introduces topics like depreciation, fixed cost allocation, and capital investment decisions, concepts that are difficult to replicate in a classroom environment where materials are often disposable and low-cost.

By harnessing these benefits of hands-on learning in a collaborative manufacturing space, our case enhances students' ability to learn cost accounting methods and equips them with the knowledge and skills necessary to analyze production costs effectively and make informed managerial decisions, preparing them for the complexities of decision-making in professional settings.

2.3 Learning Objectives

Our case study is designed to meet the following learning objectives (LOs), with the corresponding case questions in parentheses:

1. LO1: Apply managerial accounting concepts useful in classifying costs. (Questions 1, 2, 5)
2. LO2: Calculate total manufacturing costs per unit and per month. (Question 3)
3. LO3: Taking cost information and the competitive landscape into account, propose a reasonable sales price for a product (Question 4)

4. LO4: Apply cost-volume-profit analysis concepts including breakeven and margin of safety analyses (Questions 6, 7, 8)
5. LO5: Identify and use relevant costs and benefits to make informed short-term decisions. (Questions 9, 10)
6. LO6: Practice communicating insights through data visualization (Question 8)
7. LO7: Identify important information and prioritize data that is critical for decision-making (Questions 1, 2, 3, 4, 5, 6, 7, 8)

2.4 Implementation Guidance

We recommend using this case to support managerial accounting instruction in the following courses:

- Principles of Accounting
- Undergraduate Cost Accounting
- Undergraduate Managerial Accounting

The case covers key managerial accounting concepts, including manufacturing costs, cost behavior, cost-volume-profit (CVP) analysis, and relevant costs for decision-making. We recommend that instructors assign relevant questions as each topic is introduced. For example, Questions 1–3 focus on manufacturing cost concepts, so students should complete them after covering the relevant topics in class but before moving on to the next unit.

To enhance understanding, scaffolding the assignment with in-class group work can be highly effective. For example, before students begin the first four questions covering manufacturing cost and pricing concepts, instructors might introduce a practical, relatable example inspired by Professors Jim and Kay Stice: How much does your meal at your favorite restaurant actually cost? As a class, students can identify the direct materials, direct labor, and manufacturing overhead involved in preparing and serving a meal. Then, they can calculate the manufacturing cost as a percentage of the sales price, providing a natural transition to discussing how businesses must consider all costs when setting prices to remain profitable. Walking through an example like this, whether as a whole class, in small groups, or both, helps students practice applying managerial accounting vocabulary to a real business scenario before tackling the GlowWeevil Case. We have found this approach particularly effective in boosting students' confidence and their ability to navigate ambiguous situations.

Similarly, Questions 5–8 cover cost classification and CVP concepts. We recommend introducing this set of questions after these topics have been covered in class. As they tend to be more straightforward than the first four questions, examples of CVP calculations and in-class practice problems should prepare students to apply CVP concepts in this section of the case. However, instructors may still find it helpful to preface student work with a brief discussion of key points. In particular, we've found it beneficial to remind students that both product and period costs are included in break-even analysis. To help guide their thinking, instructors can ask questions such as:

- If you were running a business, what costs would you need to cover just to stay open, even before making a single sale?

- If your product costs \$20 to make and you sell it for \$50, does that mean you're making a \$30 profit on every unit? Why or why not?

Encouraging students to think through these questions before diving into the calculations can help them understand the logic behind CVP analysis, rather than just memorizing formulas.

To align with typical managerial accounting course structures, we have arranged the questions in the order they are most commonly taught. However, Question 4 covers pricing concepts, which are usually introduced alongside relevant costs for decision-making (e.g., Questions 9–10). While pricing is traditionally taught later, students should have enough foundational knowledge after learning about manufacturing costs to engage with these concepts earlier. As a result, we recommend that instructors move up their discussion of pricing concepts to align with the manufacturing cost concepts in this case.

Ideally, instructors should accompany students to the maker space during a regular class period, scheduling the visit immediately after covering manufacturing cost concepts, introducing the case, and completing the in-class group activity. However, logistical constraints, such as maker space capacity limits or restricted hours, may make this difficult. If an in-class visit is not possible, we recommend asking students to schedule their own visit within the week following the introduction of the case. While this may delay the completion of Questions 1–3 by a week, it ensures that students fully understand manufacturing costs before experiencing the production process firsthand.

Check with your local makerspace prior to visiting to ensure you adhere to any policies and procedures they may have. For example, our local Maker's Hub requires students to complete an online training prior to visiting the Maker's Hub in person. As part of this training, students watched a variety of LinkedIn Learning Videos about [Electronics Foundations](#) (Stone, 2021), the [Basics of Soldering](#), and [Soldering PCBs](#) (de Vinck, 2020). While LinkedIn Learning Subscriptions are provided by many Universities to their students for free, LinkedIn Learning also offers a one-month free trial period making it accessible to everyone. We recommend having your student read the [detailed instructions](#) on the Weevil Eye production process provided by SparkFun Electronics to familiarize themselves with the assembly process and necessary components prior to visiting the makerspace (SparkFun Electronics, n.d.).

We also recommend assigning this case as a group project, as it is particularly well-suited for collaborative learning. The questions build sequentially, requiring students to complete earlier sections before moving forward. This structure discourages the common "divide and conquer" approach, ensuring that all students engage with each step of the problem-solving process rather than working in isolation. Additionally, applying new concepts and vocabulary in an ambiguous scenario can be intimidating for some students. Group work provides peer support, helping students build confidence in navigating uncertainty while reinforcing managerial accounting concepts through discussion and collaboration.

Allocating in-class time for students to work on the case allows them to ask questions, clarify uncertainties, and engage in discussions with the instructor, often leading to deeper learning and greater comfort with the assignment. In our experience, this structured time in class eases

concerns about tackling a new type of assignment while fostering more meaningful engagement with the material.

After students have completed and submitted their work, a brief debrief session can help them draw connections between classroom concepts and real-world business decision-making. This discussion does not need to be lengthy, but we recommend emphasizing the following key points:

- Cost components sometimes require estimation and judgement. In this case students are given the estimated amount of time needed to create one WeevilEyes, which in turn directly affects direct labor cost per unit. How might businesses determine this in the real world?
- Pricing decisions involve multiple inputs. In this case, the manufacturing cost per unit, period costs, and competitor pricing were the primary factors considered. However, in a real business setting, many additional elements, such as market analysis, customer conjoint analysis, and demand forecasting, influence pricing strategy. Emphasizing these broader considerations reinforces that cost information is just one piece of a larger decision-making process, where businesses must integrate multiple data points to make informed and strategic pricing decisions.
- Businesses project profitability under various assumptions. In this case, students calculate breakeven points and expected profits using a few given assumptions, but in the real-world businesses model multiple scenarios with a wider range of variables. While Excel remains the most common tool for financial modeling, other modes of data analysis are increasing in popularity.

Debriefing the case allows students to reflect on their analysis, recognize the complexities of real-world cost estimation and pricing, and consider how accounting data informs business strategy.

Finally, we provided our students with an answer template to help them organize their responses. Since classifying and organizing costs is an unfamiliar concept for many students, this template serves as a helpful starting point, guiding them through the process and reinforcing key learning objectives. This answer template is available on request.

2.5 Efficacy

This case was tested at an AACSB-accredited private university in the United States. It was implemented in Principles of Accounting classes in Spring 2024, Fall 2024, and Spring 2025. Across the three semesters, seven sections of approximately 30 students each completed the case. Most of these students were in their second year of study, and all were business majors or minors, though the majority were pursuing concentrations outside of accounting. After completing the case, students in the Fall of 2024 provided feedback via a survey administered to indirectly assess the effectiveness of the case in learning objective realization and identify areas for improvement. The survey consisted of seven Likert Scale questions related to case efficacy, nine Likert Scale questions related to case learning objectives, and a series of open-ended

questions asking students to identify what they liked about the case, what could be improved about the case, and any other feedback they would like to share.

Tables 3-6 summarize the results from this survey in the Fall of 2024. Table 3 shows student responses related to the overall effectiveness of the case. This part of the survey used a 5-point Likert scale, asking students to indicate their level of agreement on a scale of “Strongly Disagree” to “Strongly Agree” with a series of statements related to case effectiveness. A total of 46 students responded. The mean response for all questions was greater than 3.9, with median scores of 4 (“Agree”) out of 5 or greater. Students found the case to be enjoyable, interesting, and a positive learning experience (Question 1: Median 4, Average 4.04). Students also reported that the case was challenging and required using critical thinking skills (Question 3: Median 4, Average 4.22). Responses to other questions indicate that students perceived the case to be clear (Question 4: Median: 4, Average: 4.02), an appropriate level of difficulty (Question 5: Median 4, Average 4.13), realistic (Question 2: Median 4, Average: 3.96), and valuable (Question 6: Median 4, Average 4.15). Overall, students would recommend this case as a learning tool in future introductory accounting classes (Question 7: Median 4: Average 3.98)

Table 4 shows student responses related to how well the case helped them learn and apply various managerial accounting principles. Students again responded to statements using a 5-point Likert scale with 1 representing “strongly disagree” and 5 representing “strongly agree.” The average for all questions is greater than 3.75, with all questions having a median score of 4 (“Agree”) out of 5. Overall, the survey results show that the case helped students improve their understanding of cost accounting concepts – especially cost classification (Questions 1-5).

Students also provided qualitative feedback regarding their thoughts and perceptions of the case. Table 5 lists several positive and constructive comments made by students and Table 6 lists some of the negative and critical comments students made. In general, students enjoyed the hands-on aspects of the case making comments like *“I thought the hands on part of the study was fun!”* and *“I liked how everything came together and was interactive.”* They also appreciated the real-world application of accounting knowledge noting *“Hands on and felt real! Lots of accounting work feels wishy washy but this one was grounded in reality.”* and *“I enjoyed that it really felt like a real life experience. Since it is a product on the market, I liked being able to analyze data that felt real and work with a group to do so.”* Some students, however, found the case to be too long and difficult. They expressed concerns like *“The only problem my group ran into was knowing where to start,”* and *“My group had to ask a lot of clarifying questions when doing the case.”* For many of these students, this case is one of their first case-based assignments and one of their first group projects at the college level, factors that may be contributing to this negative feedback. Despite these comments, we were encouraged that most students thought the case was appropriate for their class level, even if they found it difficult to complete (Table 3, Question 5).

Shown in Table 7, student scores on the case questions provide direct evidence of the case’s effectiveness, particularly in achieving learning objectives related to classifying costs (LO1), applying cost-volume-profit analysis (LO4), identifying and using relevant costs and benefits in short-term decision-making (LO5), communicating insights through data visualization (LO6), and identifying and prioritizing critical data for decision-making (LO7). However, some groups struggled with questions related to Learning Objectives 2 and 3.

When we looked more closely at Question 4, which in alignment with Learning Objective 3 asks students to propose a reasonable sales price for a product based on cost information and the competitive landscape, we noticed two common issues. First, some students were setting prices without using the proven methods we covered in class, like the cost-plus approach. Second, they often didn't explain why they chose a particular markup percentage. To help with this, we made two changes. We reworded Question 4 to clearly ask students to use the cost-plus method when setting their price, and we added an in-class discussion about how to decide on a small, medium, or large markup and how to justify it.

Some student groups also struggled with Learning Objective 2, calculating total manufacturing costs, as assessed in Question 3. Again, small adjustments to the case helped clarify expectations. For example, the original version did not specify the average time it took interns to manufacture a Weevil Eye. We had hoped students would estimate this based on their own experience, but this proved too difficult for an introductory-level course. We revised the case to provide a standard estimate.

Additionally, we clarified terminology in multiple places. For instance, Table 1 initially listed the cost per component as "Cost per Unit," which some students misinterpreted as the cost per completed product. We updated the language to remove this ambiguity. Finally, we introduced an answer template to help students better organize their thinking and responses.

Taken together, the student survey responses, original student performance data, and the targeted case revisions give us confidence that the case is well-designed and effectively supports learning across the intended objectives.

3. Conclusion

Students benefit from learning through making, even in disciplines that tend to be traditionally content-focused. The Glow Weevil case allows accounting students to gain hands on experience with the materials and tools that management accountants usually only label in spreadsheet calculations. By making something, students who participate in this case experience a tangible representation of managerial accounting concepts, solidifying their learning and application of managerial accounting principles.

Solution Availability

Suggested solutions to this case can be obtained by contacting the authors. The solutions provide a suggested approach to answering each question.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work in this paper.

Declaration of generative AI and AI-assisted technologies in the writing process.

During the preparation of this work the authors used ChatGPT to assist with copyediting and to improve the readability of the manuscript. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

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Tables

Table 1: Invoice Information for Components of WeevilEyes

Component	Photo	Number Purchased	Total Cost	Cost Per Component
Weevil Eye PCB		100	\$125	\$1.25
Red Diffused 5mm LEDs		300	\$24	\$0.16
47k Ohm Resistor		250	\$15	\$0.06
220 Ohm Resistor		150	\$9	\$0.12
Transistor		150	\$6	\$0.04
Miniature Photocell		75	\$5.25	\$0.07
Coin Cell Battery Holder		220	\$72.6	\$0.33
20 mm Coin Cell Battery		160	\$48	\$0.30

Solder		5 rolls	\$55	\$0.22
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Table 2: Invoice Information for Tools used in WeevilEyes Production

Tool	Photo	Number Purchased	Total Cost	Cost per Tool
Soldering Gun		7	\$1,050	\$150
Soldering Tip Cleaner		7	\$350	\$50
Wire Cutters		7	\$490	\$70
Helping Hands		7	\$1,400	\$200
Solder Exhaust Fan		7	\$2,100	\$300
Safety Glasses		7	\$125	\$17.86

Table 3: Student Survey Responses for Case Efficacy

Question	Count	Median	Average
1 Overall, I found the case to be enjoyable, interesting, and a positive learning experience.	46	4	4.04
2 Overall, I found the case to be realistic and increase my exposure to real-life situations.	46	4	3.96
3 This case and the related questions were challenging and required me to use critical thinking skills.	46	5	4.22
4 I found the instructions of the case study to be clear and understandable.	46	4	4.02
5 This case study was the appropriate level of difficulty for an introductory accounting course.	46	4	4.13
6 I believe the skills I learned from this case study will be useful to me in my future career and/or graduate school.	46	4	4.15
7 I would recommend this case as a learning tool in future introductory accounting classes.	46	4	3.98

Table 4: Student Survey Responses for Case Learning Objectives

Question:	Count	Median	Average
“As a result of this case study, my ability to...”			
1 Understand and distinguish between product costs improved. (LO1)	46	4	4.09
2 Understand and distinguish between direct and indirect costs improved. (LO1)	46	4	4.28
3 Understand and identify manufacturing costs, including direct materials, direct labor, and manufacturing overhead costs, improved. (LO2)	46	4	4.20
4 Understand and identify variable and fixed costs improved. (LO4)	46	4	4.20
5 Calculate total manufacturing costs improved. (LO2, LO7)	46	4	4.00
6 Propose a reasonable sales price for a product, taking cost information and the competitive landscape into account, improved. (LO3, LO5, LO7)	46	4	4.07
7 Apply Cost-Volume-Profit concepts to conduct margin of safety analysis improved. (LO4)	46	4	3.80
8 Communicate insights through data visualizations improved. (LO6, LO7)	46	4	3.76
9 Identify important information and prioritize data that is critical for decision-making improved. (LO7)	46	4	4.22

Table 5: Student Survey Responses – Positive Feedback

<i>I enjoyed building the project in the maker hub so I got a further insight on how the experiment works</i>
<i>Building the bug was fun and sorting the different costs was fun as well.</i>
<i>Hands on and felt real! Lots of accounting work feels wishy washy but this one was grounded in reality.</i>
<i>[The case is] very direct in what it's asking</i>
<i>I thought the hands on part of the study was fun!</i>
<i>I liked how everything came together and it was interactive</i>
<i>I liked that it was a real world issue.</i>
<i>[I liked] how we got to see the impact of accounting in a somewhat real world sense through our work.</i>
<i>I liked doing it in a group and starting from the beginning of identifying period vs product costs.</i>
<i>I enjoyed that it really felt like a real life experience. Since it is a product on the market, I liked being able to analyze data that felt real and work with a group to do so.</i>
<i>I liked how we could apply something we did to the class as a real world example.</i>

Table 6: Student Survey Responses – Critical Feedback

<i>Personally, the hardest part was identifying the product and period costs as many of the following steps came in result of it.</i>
<i>Some of the questions were definitely tricky.</i>
<i>The only problem my group ran into was knowing where to start, and how to direct ourselves to be on a path where the whole project would start panning out.</i>
<i>There were a few questions that I feel didn't give enough information to solve them. My group had to ask a lot of clarifying questions when doing the case.</i>
<i>I thought it was hard to understand what you were supposed to be doing in each step with what numbers because the case was long. we spent a lot of time just figuring out what we were supposed to be doing.</i>
<i>If there was less problems I feel like it would have been more manageable</i>
<i>The periods of time for fixed costs were unclear in that I was not sure If I should be calculating fixed costs for a month or a year for the questions without a specific period.</i>

Table 7: Recorded Case Study Scores

Learning Objective	Related Questions	Fall 2024 Average Score on Related Questions (% of 100)
1	1, 2, 5	81.58%
2	3	76.67%
3	4	62.11%
4	6, 7	82.24%
5	9, 10	93.95%
6	8	82.78%
7	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	82.08%