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# Accounting for Taste: Learning by Doing in the College Classroom

**Kathlyn Bradshaw and Robert Harvey**

## Abstract

This article presents Edelson and Reiser's (2006) strategies as a framework for analyzing an instance of authentic practice in a managerial accounting course. Specifically, this article presents an analysis of a managerial accounting project design created to provide learning-by-doing via authentic practice. Students need more than to learn about a profession, such as accounting; they need to learn how to be a professional practitioner. The project design examined offers accounting students the opportunity for authentic

KATHLYN E. BRADSHAW

Kathlyn E. Bradshaw is a professor of English for Algonquin College's School of Business. She earned her doctorate in Educational Research from the University of Calgary's Werklund School of Education.

ROBERT W. HARVEY

learning practiced within a college classroom context: a small-scale manufacturing simulation which offers a real-world authentic learning experience to students.

*Key words*: learning-by-doing, authentic practice, managerial accounting, simulation

Robert W. Harvey is a Certified Professional Accountant who has provided financial consulting services to the retail and manufacturing sectors for 30 years. As a full time professor at Algonquin College, he has taught Managerial Accounting for over 25 years.

## Introduction

In this article Edelson and Reiser's (2006) design strategies are used as a framework for analyzing an instance of authentic practice in a managerial accounting course. The demands of contemporary work environments require students to "become comfortable with the complexities of ill-defined real-world problems" (Lombardi, 2007, p. 10). Before entering the job market, students need some capacity to deal with the ambiguities of professional practice. Within standardized classrooms, often lecture-based, knowledge and skills usage can be "divorced from how they would be used in real life. Instead they are contained in textbooks, and they are practiced on paper in preparation for passing exams" (Schank, Berman, & Macpherson, p. 166).

Teaching and learning methods need to guide and support students as they move out of the fully comprehensive self-contained learning environment provided within a textbook into the vagaries and uncertainties of real-world activity. Learning-by-doing has "gained attention due to rising interest in performance-based instruction" (Lee, Huh, & Reigeluth, p.182). The article focuses on learning-by-doing through authentic practice as illustrated in the examination of a managerial accounting project design. Edelson and Reiser's (2006) strategies to address pedagogical and

practical challenges of authentic practice are used to examine the design.

## Learning-by-Doing

Reese (2011) describes the relationship between theory and learning-by-doing: “theoretical principles are learned from books written by well-experienced prior practitioners; the practical experience permits implementing the principles in ways that are effective in particular cases” (p. 4). Learning-by-doing “instruction should provide an opportunity to create a relevant and sensible experience in practicing target skills” (Lee et al., 2013, p. 182). Schank et al. (1999) developed a structure for learning-by-doing (they refer to as goal-based scenarios) to “contain a rich amount of content, support interesting and complex activities, and are inherently motivating to the student” (p. 165). Learning-by-doing offers students authentic learning experiences based on action which mirrors professional practice, and considers how students "will use the skills outside of the learning environment” (Schank et al., 1999, p.166). Lombardi (2007) uses the terms learning-by-doing and authentic learning somewhat synonymously; in both cases, the learning “typically focuses on real-world, complex problems and their solutions, using role-play exercises, problem-based activities, case studies” (p. 2). This involves the “difference between learning about physics and being a physicist” (p.2). In other words, to be authentic learning students need opportunities to do more than learn about a field of study; they need to opportunities to learn how to be a practitioner within the field.

## Authentic Practice

Edelson and Reiser (2006) define authentic practice as "activities through which experts in a domain apply their understanding to achieve valued goals" (p. 352), and describe engaging students in authentic practice through "developmentally appropriate versions of the authentic practices of experts" (p. 352). In this way, authentic practice can be seen as an extension of learning-by-doing and authentic learning, specifically aimed at supporting students as they learn to participate in a particular field or profession. Authentic practices are the "keystone of many recent educational standards documents in the United States" (Sawyer, 2014, p.4) including history and science educational standards. Edelson and Reiser (2006) identify four strategies used to address pedagogical and practical challenges when designing learning to include authentic practice:

- *Situate authentic practices in meaningful contexts.* To provide students with a sense of purpose and to help them understand the rationale for authentic practices, the practices must be integrated into a curriculum that is motivated by goals that are meaningful to the learner.
- *Reduce the complexity of authentic practices.* The practices used by highly trained professionals are typically complicated and unfamiliar to nonexperts. To reduce the cognitive load required to master authentic practices, learning environments should scaffold students by reducing the complexity of the practices, while retaining the key elements.
- *Make implicit elements of authentic practice explicit.* During years of training, professionals internalize elements of practice and are able to execute those elements rapidly. But if these elements remain implicit, students can never gain

access to them. Learning environments should make the implicit elements of authentic practice explicit, so that they can be examined, discussed, and mastered.

- *Sequence learning activities according to a developmental progression.* To allow students to develop the skills and knowledge to successfully engage in authentic practices, learning environments should sequence activities so that they bridge from students' prior knowledge, abilities and experiences to the authentic practices. (p. 336)

Similarly, Herrington and Oliver (2000) used an authentic practice instructional design framework used to examine a multimedia program. Edelson and Reiser's (2006) strategies, also used to examine two multimedia programs, support a "systematic design that attends the challenges of authentic activities through a research-driven, iterative process" (p.351). Their strategies were thus used to analyse an instance of authentic practice presented in this article.

A conceptual critique of authentic learning points to how "reliance on traditional instruction is not simply a choice made by individual faculty – students often prefer it" (Lombardi, 2007, p.10). Lombardi (2007) also points to a significant restriction to applying authentic learning in that implementation can be problematic: "Certain experiments are too dangerous, difficult or expensive to conduct in the classroom; many are simply impossible to perform" (p.2). The relevance and applicability of such critiques are dependent on the learning context. Edelson and Reiser's (2006) strategies remain relevant criteria for evaluating designed authentic practice activities within specific contexts, in this instance a college-level

managerial accounting course.

## Managerial Accounting

Accounting standards indicate that an accountant must develop an understanding of manufacturing and non-manufacturing overhead in order to assess manufacturing costs faced by an organization. As part of an accredited accounting program in the province of Ontario, Canada, the Managerial Accounting course described in this article adheres to the Ontario Ministry of Training, Colleges, and Universities' (MTCU) "approved program standard for Business Administration – Accounting program of instruction leading to an Ontario College Advanced Diploma delivered by Ontario Colleges of Applied Arts and Technology" (MTCU, 2014, para. 1). Determining the costs of items such as products and services is thus a key element of managerial accounting (Mowen, Hansen, Heitger, Gekas, & McConomy, 2012, p. 30) and so equally key elements of managerial accounting courses. Manufacturing overhead, an indirect cost, involves a wide variety of items which "cannot be traced to the cost object of interest" (Mowen et al., 2012, p. 37). It is one of the most difficult concepts for students of managerial accounting to fully grasp. The aim of the Managerial Accounting course is to contribute to student learning in relation to these standards, in turn built upon professional practice.

In addition to provincial standards, the Managerial Accounting course objectives align with "skills-based competencies needed by all students entering the accounting profession" (AICPA, 2015). Competencies such as these "support and integrate the attainment of other broad management and more specialized

accounting competencies and prepare students for lifelong careers" (Lawson et al., 2014, p. 300). Within the three overarching areas identified by the AICPA (2015) the Managerial Accounting course addresses specific competency goals:

- Personal Competencies: problem solving and decision making
- Functional Competencies: measurement
- Broad Business Perspective: strategic and critical thinking

Along with these core competencies, the course also aims to address quantitative methods of mathematics.

In the course, students explore the background, goals and methods of managerial accounting such as product costing, manufacturing statements, job order costing, and activity-based costing. In addition, students apply decision-making tools, including cost-volume-profit analysis and contribution analysis. During the course, current business quality and ethical standards applied throughout real-world and case-based tasks and assignments. Within Managerial Accounting an authentic learning activity need would relate to costing manufacturing overhead.

Accounting textbooks consulted for, or used in, this Managerial Accounting course provide the teacher and students with concepts, quizzes, review questions, examples, cases, reflection and discussion points, and so on. Textbooks also include tasks aimed at providing students activities which approximate real-world managerial accounting practices, for instance a "multi-chapter case" (Braun, Tiez, & Piper, 2013), or a research project to investigate the job costing and risk of a large

Canadian manufacturer (Garrison, Noreen, Brewer, Chelsey, Carroll, Webb, & Libby, 2012). What textbook content, activities and tasks often have in common is that they are self-contained; textbooks typically provide all the information students might need to perform tasks in the textbook. In most textbooks, students are often not presented with challenges encountered in the business world such as determining how to distinguish the amount of labour that should be treated as indirect labour or included in the costs of raw materials. Once they have achieved sufficient facility with concepts from the textbook, the next step would be to challenge managerial accounting students with tasks which offer the "complex, real-world settings to which the students are bound" (The Pathways Commission, 2012).

## The Great Cookie Contest (GCC) Project Design

As a first semester, first-year course, the curriculum of Managerial Accounting was designed to begin with an overview and introduction, including basic managerial concepts, and then followed (in weeks four and five). The placement of the GCC Project was designed purposefully to act as transition, or scaffold, to more advanced concepts. The GCC Project was designed to take place during weeks four and five (approximately one-third of the way through the course). In this way, the GCC Project was set to immediately precede the mid-term, and thus operate as a practical authentic practice for reviewing key concepts and skills. The specific placement of the GCC project was also designed to ensure the activities undertaken continued to resonate. For instance, the topic covered in weeks six to eight — cost-volume profit analysis — aligned entirely with the kinds of activities included in the GCC Project design. During weeks ten

through fifteen, the course focused on job-order costing, activity based costing, as well as absorption and variable costing, also building on concepts and skills gained in the first weeks of the course. The comprehensive final exam made it essential that students have a high level of fluency with all course content.

The GCC Project was designed to offer first-year managerial accounting students the experience of hands-on application of foundational concepts. The aim of the designed project was to provide students with the opportunity in a real world context to identify and estimate the cost of their products, focusing primarily on manufacturing overhead. An overarching goal for the GCC Project design, beyond studying concepts and skills related to managerial accounting, was to make students think and act as manufacturers while applying managerial accounting practices. The focus of the design of the project was to provide students with the means for identifying items that comprise manufacturing overhead. In addition, the GCC Project design involved offering opportunities for students to perform analytical procedures on costs by applying a markup to calculate selling price.

## Authentic Practice in the GCC Project Design

This section applies Edelson and Reiser's (2006) strategies for authentic-practice as framework for analyzing a specific accounting project design within a college classroom setting. The discussion of the GCC Project design centres around three components of authentic practice: *analyzing and interpreting the manufacturing context*, *identifying direct and indirect costs*, and *reflection and extension*. While the three

components intertwine, there are distinctions.

## Analyzing and Interpreting the Manufacturing Context

The first authentic practice of the GCC Project design involved the manufacturing context. Along with other key components of the course, the GCC Project was designed to be introduced during the first class. Then two or three classes beforehand, complete details about the GCC Project were provided. This design allowed students time for repeated practice and reflection to understand the rationale behind the project, as well as ask questions to clarify what it is they need to do. The GCC Project was designed to be completed individually, with students select the type of cookie they themselves will manufacture (i.e. bake at least one dozen cookies).

The GCC Project design required each student to first identify and record all aspects of their cookie manufacturing. This meant students had to keep track of the items they had purchased, in addition to the time they put into their own production of cookies. The project-based (Blumenfeld et al., 1991) approach of the GCC thus helped set the authentic practice in a meaningful context.

## Identifying Direct and Indirect Costs

The second authentic practice built into the GCC Project design was the identification of costs. The concepts and skills students needed to accomplish the GCC Project related to costing manufacture overhead. An accountant's cost analysis process starts by identifying and calculating overhead. The first part of the GCC Project was designed to involve lessons which covered three elements of product cost. The first element

involved the costs for direct materials, or in other words “materials that are a part of the final product and can be directly traced to the goods being produced” (Mowen et al., 2012, p. 36). The second costing element is direct labour. As their names indicate, direct material and direct labor costs are directly traceable to the products being manufactured. It is important to note that because students in the GCC were manufacturing only one product, there was no focus in the GCC Project design on the various methods of allocating overhead to multiple products using appropriate cost drivers.

The third costing element is manufacturing overhead which “includes all the costs incurred in the factory other than the costs of direct materials and direct labor. In other words,...all indirect manufacturing costs” (Braun et al., 2012, p. 71). Indirect costs in manufacturing overhead have three components: indirect materials, indirect labour, and other indirect manufacturing costs (Braun et al., 2012; Mowen et al. 2012). Manufacturing overhead costs must be divided up and allocated to each unit produced. How these costs are assigned to products has an impact on the measurement of an individual product's profitability. While costs such as direct material and direct labor could be easy for students to identify, they tended to find identifying indirect costs of manufacturing overhead more challenging.

The GCC Project design included a costing sheet provided to students so they can itemize and calculate all three costing elements and thus the cost of manufacturing one dozen cookies (Table 1). In addition, the GCC Project design allowed for prompts to be provided in the table as needed, for instance in Table 1 labour costs have been included.

Table1. The Great Cookie Contest costing sheet

| **Raw Materials** | | |
|---|---|---|
| Ingredients | Quantity | Cost |
| | | $ |
| | Total Raw Materials | $ |
| | | |
| **Direct Labour** | | |
| | hours @$12.00/hour= | $ |
| | | |
| **Manufacturing Overhead** | | |
| | | $ |
| | | $ |
| | Total Manufacturing Overhead | $ |
| Total Cost | | |
| Number of Dozens Produced | | |
| Cost Per Dozen | | |

The GCC Project design thus ensured students were provided with a tool, in the form of the costing sheet (Table 1), to support “sequencing learning activities according to a developmental progression” (Edelson & Reiser, 2006, p. 338).

## Reflecting and Extending

The third authentic practiced included in the GCC

Project design was reflection, a metacognitive practice to support the other two components of authentic practice. In reflection, students may be removed “from the immediacy of the experience and whatever personal challenge it might have been at the time and review it with the leisure of not having to act on it in real time. The learner can start to view the experience from other perspectives” (Boud, Keogh, & Walker, 1996, p. 43). The GCC Project design included engaging the class as a whole in an open discussion to reflect on their costing approaches and results. One of the key questions asked at this stage of the GCC Project design was for students to identify at least one manufacturing overhead item. Typically students (on their own) identified at most half a dozen items, such as cleaning supplies and fuel or electricity for the oven. The reflective component of the GCC Project design offered the students to collectively identify upwards of 14 items, particularly less obvious costs such as oven depreciation and cleaning labour. The aim of reflection in the GCC Project design thus was to ensure each student has completed their costing sheet to the best of their ability, to reflect on their results, as well as has an opportunity to review and adjust their calculations as needed.

Also designed into the GCC Project discussion was the price-point of the cookies. The cookies the students baked tended to range in cost from $0.50 to $2.00 per cookie. When the students considered setting the selling price based on a 100% markup, the discussion quickly shifted to questions related to whether anyone would spend that much for a cookie. This in turn led to considerations of economies of scale in order for the cookie making to be cost effective. Sometimes issues related to marketing approaches, for instance how to

make a $7.00 cookie marketable, also arose during the discussions. In this way the GCC Project design allowed students to extend their thinking beyond accounting to include other aspects of manufacturing.

## Contest as Authentic Practice

An additional component that served as an instance of authentic practice in the GCC Project design, although outside of the purview of account, was the baking contest itself. It is of importance to note at this time that the GCC Project, and thus the contest, directly influenced final marks only in terms of student facility with the skills and concepts as demonstrated during tests and exams. During the contest, students brought to class a minimum of twelve of their cookies. Volunteer judges from a variety of areas in the college (administration, faculty, managers, and so on) judged the cookies in a blind taste test. A prize (most often an honourarium in the form of a gift card) was awarded for the winning cookie in each class. The students engages themselves fully in this competitive yet risk-free and fun activity. In addition, this feature of the GCC Project added both context and an aspect of reality to the concept of manufacturing overhead by having the students involved in the manufacturing process from conception to consumption.

## GCC Project Implementation Challenges and Solutions

Within the area of the learning, one problem can arise. During the post GCC discussion, some students, or even classes, struggled more than others with identifying manufacturing overhead costs. This phenomenon was relevant as an authentic learning as real-life decision making, where there may not be one right or wrong answer per se, but rather many depending on the

context. Authentic learning “exposes the messiness of real-life decision making” (Lombardi, 2007, p.10). The solution to this problem, was for the teacher or facilitator of the discussion to be ready with prompts and examples ready to guide them tends to help students identify these items more readily.

Three administrative problems arose with the contest itself. First, cookies were not always a familiar or regular part of a student’s life. On occasion students opted to create items other than cookies, most notably Chinese dumplings. Second, because the product was food, food allergies were at times an issue, specifically nut allergies. To date, the one instance where food allergies were a concern was resolved quickly by a class-wide ban on any nut products in any of the cookies baked. Third, students (particularly those in residence) do not always have access to ovens. These students would have been invited to explore no-bake options for cookies or squares, or to team up with a classmate who does have access to an oven. Financial and time demands on students have yet to be raised as an area of concern. GCC related costs to the students were minimal and the time required is comparable to other projects and assignments in the course.

## GCC Project Design Implications and Future Directions

The analysis of the GCC Project design offers insights into authentic practice to support complexities of teaching and learning concepts difficult for students to grasp. Instructional “methods have been devised that support learning by doing” (Lee et al., 2013, p.183). The analysis in this article offers details of a specific instance of one of those methods, project-based learning,

implemented within a standardized face-to-face classroom. Teachers and instructional designers interested in authentic practice within standardized classroom settings would find this example and analysis of relevance.

Student evaluation of the GCC itself has involved direct feedback during class. Evaluations by the students indicate that the project was relevant to the class as the GCC allowed them a risk-free opportunity to experience the difficulty of identifying manufacturing costs in an authentic simulation. Future research would involve questionnaires for faculty and students wherein they would be asked to consider the GCC Project and design as instance of authentic practice. In addition, future research could involve evaluating student skills and knowledge both pre- and post-GCC.

## Conclusion

An instance of learning-by-doing, in the form of authentic practice, is documented in this article as one approach towards bridging the gap between student learning about accounting and functioning as an accounting practitioner. The more students are exposed to "authentic disciplinary communities, the better prepared they will be" (Lombardi, 2007, p. 10). The Managerial Accounting course illustrated in this article was designed to accomplish a specific set of industry and educational objectives, the AICPA Core Competencies listed on the left side of Table 2 (below).

Table2. AICPA Core Competencies and the GCC

| **AICPA Core Competencies** | **GCC Student Activity** |
| --- | --- |

| | | |
|---|---|---|
| Personal | Problem solving & decision making | Student find resources to identify manufacturing overhead items |
| Functional | Measurement | Student calculate the cost of their product |
| Broad Business Perspective | Strategic & critical thinking | Student identify product costs within a unique environment<br>the ability to link data, acknowledge, and insight together from various disciplines to provide information for decision-making |

Note: Adapt from “Core Competency Framework & Educational Competency Assessment” by the AICPA (2015)

The GCC Project design measured against AICPA core competencies (listed in the right column of Table 2) demonstrates the project design’s relevance in relation to the field of accounting. The GCC Project design also upholds Edelson and Reiser’s (2006) four strategies for authentic practice:

- situates authentic practices in meaningful contexts;
- reduces the complexity of authentic practices;
- makes implicit elements of authentic practice explicit;
- and sequences learning activities according to a developmental progression. (p. 336)

Specifically, the GCC Project was designed to offer authentic practice to allow knowledge gained in the first weeks of class to transition to more advanced concepts presented during the second half of the course. The GCC Project design involved a Cost Analysis tool reduces the complexity by scaffolding authentic practices. The project design also required students to identify less obvious items related to manufacturing overhead. In this way the GCC Project design ensured students authentically practiced knowledge and skills by applying them in a real-world manufacturing context.

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