Journal of Forensic & Investigative Accounting
Vol. 5, Issue 1, January - June, 2013

Effects of Alternative Short-Session Training Methods on Fraud Detection:

A Performance and Efficiency Assessment

W. Eric Lee
Vairam Arunachalam
Dennis Schmidt*

I. INTRODUCTION

Despite the enactment of regulatory reforms (e.g., the Sarbanes-Oxley Act of 2002), fraud schemes continue to proliferate. A recent report by the Association of Certified Fraud Examiners (ACFE, 2012) compiled data from 1,388 cases of occupational fraud that occurred worldwide in 2010-11. Survey participants estimated that the typical organization loses five percent of its annual revenue to fraud. Applied to the 2011 Gross World Product, this translates to a staggering $3.5 trillion in fraud losses. The report also stresses the importance of preventive and detective anti-fraud controls to mitigate these losses.

Because fraud is such a problem, fraud detection has taken on increasing prominence in the accounting profession over the last decade. For example, Statement on Auditing Standards (SAS) No. 99, *Consideration of Fraud in a Financial Statement Audit* (AICPA, 2002), expands the responsibility for fraud detection by auditors. In addition, the Public Company Accounting Oversight Board (PCAOB) has addressed the issues of fraud detection by auditors (PCAOB, 2004, 2007) and auditors' responsibilities for identifying fraud risks (PCAOB, 2010).

*The authors are, respectively, Assistant Professor at University of Northern Iowa, Professor at University of Missouri, and Professor at University of Northern Iowa.

Because of the importance of fraud detection in the accounting profession, practicing accountants and accounting students should receive some training in this area. A typical training method for practicing accountants, especially those early in their career, is to take one or more fraud-related continuing professional education (CPE) courses. The duration of these courses is often measured in hours, not days. Regarding accounting students, Rezaee et al. (2004) note that schools can incorporate forensic accounting education (which includes fraud examination) into their curriculum by integrating forensic accounting topics through existing accounting and auditing courses or by offering a stand-alone forensic accounting course. Carpenter et al. (2011) provide empirical evidence of the benefits of a stand-alone forensic accounting course on fraud-related judgments. Unfortunately, only a minority of schools have such a course (Rezaee et al., 2004; Aliabadi et al., 2011), and they typically offer it as an optional course. Thus, many accounting students get their only exposure to fraud detection techniques in auditing or other accounting courses, assuming these courses even cover the topic. Because fraud detection is not the primary concern of these courses, any coverage of the topic is generally of very short duration.

Given the time-constrained nature of fraud-related CPE courses and the very limited coverage of fraud detection techniques that many accounting students receive, it is important to investigate the effects of alternative short-session training methods on fraud detection. A review of the literature in accounting education reveals a lack of studies investigating the performance effectiveness and efficiency of different methods of content delivery in the field of fraud detection. The primary purpose of this study is to provide such an investigation.

We believe that this study makes three important contributions to the fraud education literature. First, it helps to fill the gap in the literature in terms of how to deliver short-session

fraud detection training effectively to upcoming accounting graduates as well as novice accountants. Second, it identifies two fraud-related case studies that educators may find useful when choosing or developing training materials. Third, it helps accounting educators decide which approach to use when designing a short-session fraud detection training module based on their instructional objectives and time constraints.

Specifically, this study reports the results of a short-session experiment that employed two widely used training methods: lecture and experiential. The experiential method involved a hands-on, interactive case analysis. We assess the relative performance effectiveness of the two training methods with respect to both fraud cue identification and fraud cue justification. In this study, fraud cue identification involved the participants discovering fraud items that we seeded into the accounting records of a fictional organization. After discovery, the participants provided reasons or explanations (i.e., justifications) of how the fraud was committed. We also conduct efficiency tests to determine if type of training method affects the amount of effort or time invested to complete a task, relative to performance. Efficiency is gauged by whether an individual expends lower effort and/or less time than might be expected based on performance. In addition, we compare the performance and efficiency results of the two experimental groups with results from a control group who received no training.

We find that with one exception (the experiential approach for identification performance) both training methods increase performance and efficiency compared to no training. For fraud cue identification, we observe moderately better results for lecture training over experiential training for both performance and efficiency, although the differences are not significant. For fraud cue justification, we find significant support for experiential training over lecture training regarding both performance and efficiency. We recommend that educators

consider the merits of both training methods when designing a short-session fraud detection module. Lecture training may be a slightly better approach to improve fraud cue identification skills, while experiential training is most likely the better way to enhance fraud cue justification abilities. Which method or methods to use will depend on the primary focus of the training and time constraints.

The remainder of the paper is organized as follows. Section II reviews the literature and develops our hypotheses. Section III describes the research methods. Section IV presents the results. Section V discusses the implications of our findings to accounting educators and provides suggestions for future research.

II. LITERATURE REVIEW AND HYPOTHESES

In this study, the lecture training method provides a means of imparting information to the participants. Thus, it follows more of a sensate (rule-based) thinking route. Conversely, the experiential case-analysis method provides participants with a more hands-on experience in using their diagnostic reasoning skills. This is more consistent with an intuitive (unstructured) thinking route (Geary and Rooney, 1993).

Kurfiss (1989) put forth a two-stage model that essentially prompts participants to move from an idea identification phase to an idea justification phase. As posited, the identification phase seeks patterns and formulates hypotheses, while the justification phase integrates all available information to rationalize one's identified patterns. One would therefore arrive at an optimal conclusion by integrating all available information that can be convincingly justified. We emulated this two-stage model in the current study by first asking participants to identify any

fraud cues they discovered. Next, we asked them to provide reasons or explanations of how the fraud was perpetrated.

In terms of the different modes of learning, Bloom's (1953) original doctrines posited that knowledge (being the state of knowing something through acquiring facts and principles) could be more aptly communicated through lecture training, while that for problem-solving skills (being the ability to use one's knowledge to perform a task and hence more problem-solving in nature) could be better achieved through experiential learning. Several accounting-related studies have also advocated using an experiential case-analysis approach to develop an in-depth understanding of theoretical issues in a practical context, thereby allowing one to establish convincing rationalizations (e.g., Ballatine et al., 2008; Boyce et al., 2001). Based on the above, we hypothesize the following:

H1: Individuals perform better in fraud cue identification with lecture training than experiential training.

H2: Individuals perform better in fraud cue justification with experiential training than lecture training.

In the realm of training efficacy and its relation to task performance, Paas (1992) contended that mental load and effort are crucial issues to consider, beyond just analyzing performance gains. Typical ways to measure efficiency include mental effort expended and time taken to complete a task. Researchers often gauge mental effort using a self-reported rating scale (Moray, 1979). Learners' behavior is deemed more efficient if they invest lower effort and/or less time than might be expected based on performance. Well-designed training should increase the efficiency of learners' information processing, so that they can accomplish similar tasks with fewer resources (effort and time) after adequate training.

In delineating efficiency into the knowledge application domains of identification and justification, Bloom (1953) posited that lecture is more efficient for developing knowledge about a topic (instrumental to the identification process), while experiential learning is more efficient for developing abilities and skills which are problem-solving in nature (essential for the justification process). Thus, with regard to assessment of efficiency relative to performance, we hypothesize the following:

H3: Individuals are more efficient in fraud cue identification with lecture training than experiential training.

H4: Individuals are more efficient in fraud cue justification with experiential training than lecture training.

III. RESEARCH METHODS

Participants and Groups

Participants were 66 upper-level accounting students who were enrolled in either an auditing or a forensic accounting course at a Midwest public university. By class level, 49 were graduate accounting students, and 17 were senior accounting students. Regarding gender, there were 32 males and 34 females. Demographic data regarding the participants and the experimental groups appear in Table 1.

[Insert Table 1 here]

Participation in the experiment was voluntary. To encourage participation, students received monetary and extra course credit incentives. We conducted the experiment outside regular class periods. Several session times were available, and students signed up for a session that fit their schedule. When signing up, they did not know to which group they would belong.

This process resulted in 25 students in the experiential training group, 20 in the lecture training group, and 21 in the control group.

Because of the complexity and knowledge requirements of the evaluative task, it was essential to ascertain *a priori* that participants had adequate accounting and auditing knowledge (acquired through a combination of prior courses taken and related work or internship experiences). As upper-level students, all had completed several courses related to financial accounting. Participants in the forensic accounting course had previously completed at least one auditing course. We conducted the experiment late in the semester, so students in the auditing course also had sufficient exposure to auditing concepts prior to completing the task. Fifty-two of the 66 students (79 percent) had prior accounting-related work experience, primarily through internships.

Experimental Design and Procedures

Prior to the experiment, we conducted a pilot study with a separate group of 31 accounting graduate students. After receiving feedback from the students and in consultation with an international public accounting firm, the experimenter made several research design modifications in the areas of duration, wording, and testing appropriateness.

In the actual study, the experimenter first detailed the purpose of the study and handed out the consent forms for participants to complete. Students in the experiential and lecture groups then participated in a two-stage experiment. In the first stage, they received experiential training or lecture training respectively, with either format lasting about 45 minutes. In the second stage, both groups completed a final evaluative task. The control group received no training and proceeded straight to the final evaluative task. Participants took 25-75 minutes to complete the final task.

The first-stage training task of the experiential group used a case study titled *TruGloss Shanghai JV: Investigating Fraud in an International Joint Venture* (Ballou et al., 2004). This case involved a qualitative narration of a large, U.S.-based, publicly traded company with international operations, using a combination of qualitative and contextual information deemed important in fraud detection studies (Grove and Cook, 2004). Using an abridged version of the original case study, participants were asked to analyze and assess the operating conditions, as well as to identify factors relating to documentation, internal controls, and analytic anomalies that could possibly increase susceptibility to fraudulent activities at the joint venture. As part of the task, participants were required to list and elaborate in an answer sheet the possible fraud cues this case entailed. The experimenter followed this by going through a set list of discussion questions in an interactive setting, soliciting participants' viewpoints in the process. Areas discussed included plausible fraud scenarios, susceptible areas, remedies, cues to look for, possible perpetrators, and their modus operandi. The experimenter moderated the entire discussion and concluded by highlighting the most pertinent issues.

In the first-stage training task of the lecture group, participants sat through a classroom lecture, with the experimenter presenting the earlier *TruGloss Shanghai JV* case as an illustration in a PowerPoint (i.e., lecture) format. The experimenter then imparted relevant points to the participants by narrating and highlighting the same issues emphasized in the earlier experiential training format. This helped to ensure that any subsequent performance differences would be driven by the format of the training, not by the content.

In the second stage, both training groups (and the control group) used an evaluative case study. The task here was an abridged version of the *Tallahassee BeanCounters* case study

(Durtschi, 2003).[1] We chose this case and the previous training case of *TruGloss Shanghai JV* for their resemblance to real-life work situations often encountered by accountants, while also making sure the participants could complete the experiment within a reasonable time.

In adherence to the importance of both quantitative and qualitative factors, the evaluative case began with a qualitative, narrative description of the organizational structure of a minor league baseball team (named Tallahassee BeanCounters, or TBC), covering its business plan and personnel organizational chart. Due to time constraints, only a selected number of quantitative financial statement areas with related notes followed, within which we seeded five frauds. For completeness, the seeded frauds encompassed the two broad areas of fraudulent financial reporting and misappropriation of assets. The embedded fraud cues were different from those in the first-stage task. From a rudimentary viewpoint, seeding frauds directly in the statements of this case study aimed at challenging participants to identify as well as to explain the underlying interconnections and reasons for any misstatements.

As part of their task, we asked the participants to identify the seeded fraud cues. We also elicited a further justification by the participants of possible reasons or explanations of how perpetrators committed and hid the frauds. For example, suppose a participant noted that a certain item in a purchase order did not tally with that in the corresponding equipment invoice or shipping slip. Upon discovery, the participant would write down the anomaly in the identification column of the answer sheet. The participant would then proceed to state the reasons or explanations for such an anomaly under the justification column. Possible rationales could include a bill-and-hold strategy by the vendor, collusion between the vendor and the receiving/purchasing manager, and other reasons. The participant would repeat this process for

[1] See Dee and Durtschi (2010) for an updated version of this case.

other fraud cues discovered. This two-prong evaluative procedure took approximately 25-75 minutes to complete (note: only three students, in all conditions combined, finished their evaluative tasks after the 60-minute mark). We made an effort to administer the task within a reasonable time frame to avoid fatigue- and boredom-related complications and time pressure constraints on the participants. This helped to ensure that the participants' answers were not mere guesses, and that they had sufficient time to justify their claims.

Post-Experiment Questionnaire

At the end of the two-stage experiment, all participants completed a debriefing questionnaire. This questionnaire mainly served to collect relevant personal background information such as class level, total work experience (in months), accounting-related work experience (in months), number of auditing classes taken, number of fraud-related classes taken, and cumulative GPA. We used these items as control variables in our analysis of covariance models. In addition, the questionnaire asked the participants to provide their perception on the amount of effort they used to complete the second-stage TBC evaluative task, in line with the modified rating scale used by Bratfisch et al. (1972) for measuring perceived task difficulty. Overall, the total time taken for the entire experiment was around one-and-a-quarter to two hours.

Analyses and Measures

We conducted a multiple analysis of covariance with two dependent variables representing fraud cue identification and justification scores. We judged participants in the final TBC case in terms of their overall accuracy as compared to a solution guide outlined by the originating author (Durtschi, 2003). Subject to modifications tailored to the final abridged version, this guide covered issues such as oversight/separation of duties, cash skimming, ghost

employees, vendor collusion, and billing/payment discrepancies. We used a content analysis procedure based on each participant's response, a coding approach commonly adopted in both psychology (e.g., Chi et al., 1994) and accounting research (e.g., Tan, 1995; Phillips, 1999; Tan et al., 2002). The number of fraud cues correctly identified and the number of valid justifications provided served as the dependent variable measures. Our analysis of covariance models also included the demographic and background variables provided by the participants in the post-experiment questionnaire, two efficiency measures (time and effort), and two efficiency by training method interaction terms. For the efficiency variables, the experimenter measured the time taken to complete the task in minutes for each participant using a time clock. In the post-experiment questionnaire, participants provided their perception on the amount of effort they used to complete the task on a scale of 1 (minimum) to 5 (maximum).

We also conducted follow-up statistical tests to determine if there were any significant between-group differences among the experiential, lecture, and control groups regarding task performance and efficiency scores. We used Scheffe procedures to adjust for multiple comparisons and experiment-wise error rates. Finally, we assessed efficiency, relative to performance, through standardized z-scores.

IV. RESULTS

Table 2 reports the results of a multiple analysis of covariance. Training method is marginally significant for fraud cue identification (Panel A). It is highly significant for fraud cue justification (Panel B). None of the control variables (class level, gender, work experience, accounting work experience, fraud classes, auditing classes, and GPA) is significant for either identification or justification. Effort is marginally significant for identification and is significant

for justification. Time is significant for both identification and justification. No efficiency by training method interaction term is significant. A detailed analysis of these results follows.

[Insert Table 2 here]

Task Performance

Table 3 displays the task performance results for both fraud cue identification (Panel A) and justification (Panel B). For identification, the mean number of fraud cues identified is 3.320 for the experiential group, 3.575 for the lecture group, and 3.095 for the control group. Although the experiential group has a higher mean score than the control group, the difference is not significant ($p = 0.312$). The lecture group, however, has a significantly higher mean score than the control group ($p < 0.01$). In summary, both methods of training tend to improve performance compared to no training for the control group, but only the lecture training does so significantly. When comparing performance between the experiential and lecture groups, hypothesis H1 posits that individuals will perform better in fraud cue identification with lecture training than experiential training. The results do not support this hypothesis. Although the mean score for the lecture group is moderately higher (3.575 vs. 3.320), this difference is not significant ($p = 0.222$).

[Insert Table 3 here]

Regarding fraud cue justification, the mean number of valid reasons provided is 9.800 for the experiential group, 7.750 for the lecture group, and 5.900 for the control group. Participants in both the experiential and lecture groups provide significantly more rationales than those in the control group ($p < 0.01$). These results indicate the benefits of training versus no training with respect to justification. When comparing performance between the experiential and lecture groups, hypothesis H2 predicts that individuals will perform better in fraud cue justification with experiential training than lecture training. The results strongly support this hypothesis. The mean

score of 9.800 for the experiential group is significantly higher than the 7.750 score for the lecture group ($p < 0.01$).

Efficiency Testing

With respect to efficiency, we analyzed both effort and time. The analysis of covariance results shown in Table 2, which control for the different training methods, indicate that effort is marginally significant for identification and is significant for justification. Time is significant for both identification and justification.

Regarding between-group comparisons, Table 4 reports the raw efficiency score results in terms of both effort expended (Panel A) and time taken (Panel B) for the three groups. Participants self-rated the amount of effort they used on a 1 (minimum) to 5 (maximum) scale. The experimenter measured each participant's time taken to complete the final task in minutes.

[Insert Table 4 here]

For effort expended, the mean score is 3.84 for the experiential group, 3.80 for the lecture group, and 4.10 for the control group. These scores are fairly close to each other, and only the control vs. lecture comparison is even marginally significant. For time taken, the mean time in minutes is 36.36 for the experiential group, 37.25 for the lecture group, and 44.29 for the control group. Participants in the control group, who received no training, took significantly longer to complete the final task than participants in both of the trained groups ($p < 0.01$). There is no significant difference between the experiential and lecture groups ($p = 0.773$).

The above between-group comparisons do not compare efficiency scores relative to performance. To accomplish this, we converted time, effort, and performance measures to

standardized z-scores (Gopher and Braune, 1984) and analyzed them.[2] In Figures 1 and 2, the respective lines AB and CD, intercepting at (0, 0), are each assumed to indicate an efficiency of 0, consistent with the application methodology of Paas and Van Merrienboer (1993). Shifts to the upper left of the coordinate system indicate an increase in efficiency (i.e., higher performance in relation to less invested time or effort), and shifts to the lower right indicate a decrease in efficiency (i.e., lower performance in relation to more invested time or effort).

[Insert Figure 1 here]

In Figure 1, which measures identification, it is clear that a shift toward the upper left quadrant is evident when moving from the control group to either of the two training groups, confirming an efficiency boost related to training. For the between-group comparisons, we use the average of the participants' effort and time z-scores as the efficiency measure. Even though the lecture group yields a higher efficiency gain than the experiential group, there is overall no significant difference in efficiency gains between the two methods ($p = 0.13$). As hypothesis H3 postulates that individuals will become more efficient in fraud cue identification with lecture training than experiential training, H3 is not supported.

[Insert Figure 2 here]

In Figure 2, which measures justification, it is again clear that a shift toward the upper left quadrant is evident when moving from the control group to either of the two training groups, confirming an efficiency boost related to training. The difference this time, however, is that the experiential group yields a significantly higher efficiency gain than the lecture group ($p < 0.01$).

[2] In Figures 1 and 2, an individual z-score is calculated first for each participant, by $z = (r – M) / SD$, where r = individual effort, time, or performance score, M = Grand Mean of all participants across conditions, and SD = Standard Deviation of all participants across conditions. The mean z-score for each domain is then calculated by averaging all z-scores for effort, time, and performance for each of the three groups.

As hypothesis H4 postulates that individuals will become more efficient in fraud cue justification with experiential training than lecture training, H4 receives strong support.

V. CONCLUSION

With respect to overall task performance, we find that either training method, lecture or experiential, generally increases performance compared to no training. In three of the four experimental conditions, the difference is significant. Thus, there is definite merit in training individuals on fraud detection, even if the training is of short duration. Regarding identification performance, we find slightly better results for lecture training over experiential training, but no significant difference between the two methods. For justification performance, we find significant support for experiential training over lecture training.

Our analysis of efficiency measures relative to performance finds that either training method provides an efficiency boost relative to no training. Therefore, there is a decided benefit in fraud detection training, even if the training is in a short session. With respect to fraud cue identification efficiency relative to performance, we find moderately better results for lecture training over experiential training, but no significant difference between the two methods. Regarding fraud cue justification efficiency relative to performance, we find significant support for experiential training over lecture training.

In conclusion, we find that either training approach, lecture or experiential, has merit. So which approach should a CPE instructor or accounting professor take? That depends on the educator's instructional objectives and time constraints. Based on our findings, if the primary focus of a short training session is on fraud cue identification, we recommend a lecture approach. Despite the fact that lecture identification performance and efficiency results are not significantly

different from the experiential results, they are moderately better in magnitude and are close to being statistically significant for efficiency. Furthermore, the lecture identification performance results are significantly better than those of the control group, whereas there is no significant difference between the experiential and control groups on that measure. On the other hand, if the primary focus of a short training session is on fraud cue justification, we recommend an experiential, case-analysis approach. We predict that both justification performance results and efficiency results will be significantly higher than if a lecture approach is used.

If an educator has enough time in a short-session fraud detection training module for both methods, we recommend a lecture first, which should primarily improve fraud cue identification skills, followed by an interactive case analysis, which should mainly enhance fraud cue justification abilities. This two-prong, lecture-before-case approach has shown to be an effective training sequence, especially in the short run, in an accounting education context (Phillips and Vaidyanathan, 2004).

If an educator wants to focus equally on identification and justification and only has enough time in a short training session to employ one method, we recommend an experiential approach. Although fraud cue identification performance and efficiency results for this method lag behind those of the lecture method in our study, the differences are not statistically significant. In contrast, the experiential method demonstrates a significant performance and efficiency edge over the lecture method in the realm of fraud cue justification. From a cost-benefit perspective, we deem the experiential training method to be the best single approach.

Future research efforts could explore whether findings of this study will generalize to instruction of concepts in other areas of accounting, such as tax or auditing. Researchers could also explore the effectiveness of alternative training methods on employees with regard to issues

like whistle-blowing and other red-flag reporting mechanisms. Additional potential research areas may include investigating the efficacy of other short-session pedagogical methods, effects of alternative instructional methods for longer training sessions, and fraud detection performance and efficiency in the context of group decision-making.

Table 1
Demographic Data
(N=66)

Session	**N**	**Class Level**		**Gender**	
		Senior	Grad	Male	Female
Experiential	25	8	17	14	11
Lecture	20	0	20	8	12
Control	21	9	12	10	11
	66	17	49	32	34

Table 2
Analysis of Covariance

Panel A: **Identification**						
	df	SS	MS	F	Sig.	
Training Method (TM)	2	0.842	0.421	3.096	0.076	*
Class Level	1	0.365	0.365	2.684	0.108	
Gender	1	0.021	0.021	0.154	0.696	
Work Experience	1	0.020	0.020	0.147	0.693	
Acct. Work Experience	1	0.012	0.012	0.088	0.732	
Fraud Classes	1	0.135	0.135	0.992	0.340	
Auditing Classes	1	0.067	0.067	0.493	0.421	
GPA	1	0.211	0.211	1.551	0.113	
Effort	1	0.409	0.409	3.003	0.088	*
Time	1	0.789	0.789	5.801	0.023	**
Effort x TM	2	0.123	0.062	0.453	0.649	
Time x TM	2	0.501	0.251	1.845	0.192	
Error	50					
Adjusted R^2 = 0.361						

Panel B: **Justification**						
	df	SS	MS	F	Sig.	
Training Method (TM)	2	88.126	44.063	74.682	0.000	***
Class Level	1	0.745	0.745	1.263	0.276	
Gender	1	1.701	1.701	2.883	0.127	
Work Experience	1	0.110	0.110	0.186	0.688	
Acct. Work Experience	1	1.363	1.363	2.310	0.138	
Fraud Classes	1	0.091	0.091	0.153	0.699	
Auditing Classes	1	1.470	1.470	2.492	0.108	
GPA	1	0.663	0.663	1.124	0.283	
Effort	1	3.700	3.700	6.271	0.016	**
Time	1	3.207	3.207	5.435	0.026	**
Effort x TM	2	0.064	0.032	0.054	0.948	
Time x TM	2	0.831	0.415	0.703	0.499	
Error	50					
Adjusted R^2 = 0.771						

***, **, *: significant at 0.01, 0.05, and 0.10 level.

Table 3
Task Performance Scores

Panel A: **Identification**

	Mean	Std. Dev.	
Experiential	3.320	0.610	
Lecture	3.575	0.494	
Control	3.095	0.201	
		Sig.	
Control vs. Experiential		0.312	
Control vs. Lecture		0.006	***
Experiential vs. Lecture		0.222	

Panel B: **Justification**

	Mean	Std. Dev.	
Experiential	9.800	0.990	
Lecture	7.750	0.911	
Control	5.900	1.068	
		Sig.	
Control vs. Experiential		0.000	***
Control vs. Lecture		0.000	***
Experiential vs. Lecture		0.000	***

***: significant at 0.01 level.

Table 4
Raw Efficiency Scores

Panel A: **Effort Expended (1-5 scale)**

	Mean	Std. Dev.	
Experiential	3.840	0.688	
Lecture	3.800	0.548	
Control	4.100	0.490	
		Sig.	
Control vs. Experiential		0.150	
Control vs. Lecture		0.076	*
Experiential vs. Lecture		0.833	

Panel B: **Time Taken (in minutes)**

	Mean	Std. Dev.	
Experiential	36.360	12.799	
Lecture	37.250	7.545	
Control	44.290	5.587	
		Sig.	
Control vs. Experiential		0.008	***
Control vs. Lecture		0.002	***
Experiential vs. Lecture		0.773	

***, *: significant at 0.01 and 0.10 level.

Figure 1
Identification Efficiency Scores Relative to Performance
(Mean z-scores)

	Performance	Effort	Time
Experiential	-0.012	-0.118	-0.280
Lecture	0.491	-0.185	-0.191
Control	-0.455	0.312	0.515

	Sig.	
Control vs. Experiential	0.093	*
Control vs. Lecture	0.000	***
Experiential vs. Lecture	0.129	

***, *: significant at 0.01 and 0.10 level.

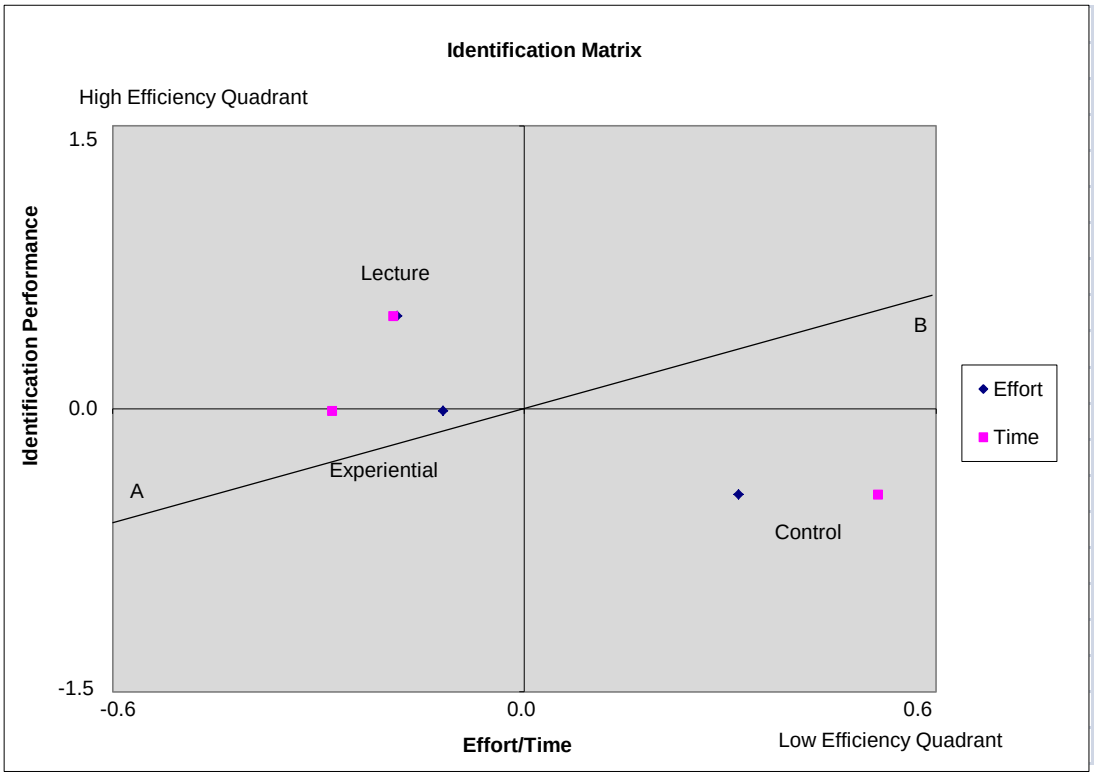
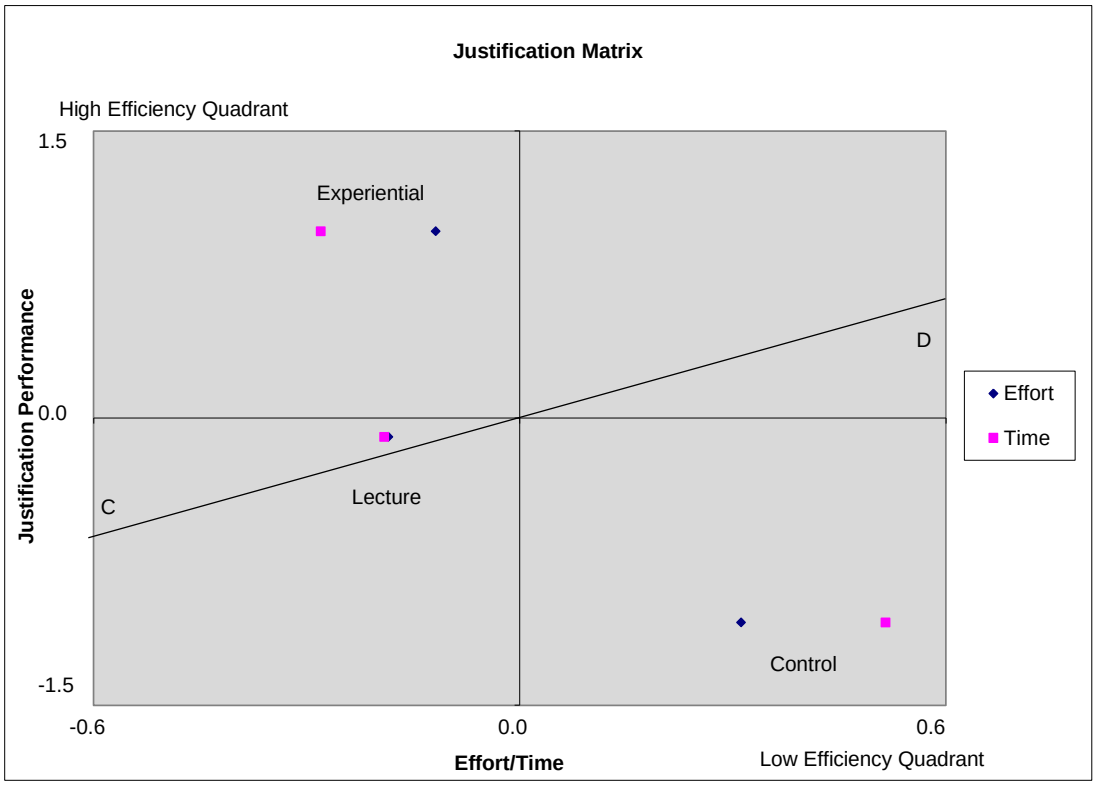


Figure 2
Justification Efficiency Scores Relative to Performance
(Mean z-scores)

	Performance	Effort	Time
Experiential	0.976	-0.118	-0.280
Lecture	-0.100	-0.185	-0.191
Control	-1.068	0.312	0.515

	Sig.	
Control vs. Experiential	0.000	***
Control vs. Lecture	0.000	***
Experiential vs. Lecture	0.000	***

***: significant at 0.01 level.



REFERENCES

Aliabadi, S., Dorestani, A., & Qadri, M. (2011). Fraud detection and prevention in the United States: A macro perspective. *Journal of Forensic and Investigative Accounting, 3*(3), 150-165.

American Institute of Certified Public Accountants (AICPA) (2002). *Consideration of fraud in a financial statement audit*. Statement on Auditing Standards No. 99. New York, NY: AICPA.

Association of Certified Fraud Examiners (ACFE) (2012). *2012 report to the nation on occupational fraud and abuse*. Austin, TX: ACFE.

Ballatine, J. A., Duff, A., & Larres, P. M. (2008). Accounting and business students' approaches to learning: A longitudinal study. *Journal of Accounting Education, 26*(4), 188-201.

Ballou, B., Mueller, J., & Zikmund, P. (2004). TruGloss Shanghai JV: Investigating fraud in an international joint venture. *Journal of Forensic Accounting, 5*(2), 433-456.

Bloom, B.S. (1953). Thought processes in lecture and discussion. *Journal of General Education, 7*(3), 160-169.

Boyce, G., Williams, S., Kelly, A., & Yee, H. (2001). Fostering deep and elaborative learning and generic (soft) skill development: The strategic use of case studies in accounting education. *Accounting Education, 10*(1), 37-60.

Bratfisch, O., Borg, G., & Dornic, S. (1972). *Perceived item difficulty in three tests of intellectual performance capacity (report 29).* Stockholm: Institute of Applied Psychology.

Carpenter, T. D., Durtschi, C., & Gaynor, L. M. (2011). The incremental benefits of a forensic accounting course on skepticism and fraud-related judgments. *Issues in Accounting Education, 26*(1), 1-21.

Chi, M., De Leeuw N., Chiu, M., & Lavancher, C. (1994). Eliciting self-explanations improves understanding. *Cognitive Science, 18*(3), 439-477.

Dee, C. C., & Durtschi, C. (2010). Return of the Tallahassee BeanCounters: A case in forensic accounting. *Issues in Accounting Education, 25*(2), 279-321.

Durtschi, C. (2003). The Tallahassee BeanCounters: A problem-based learning case in forensic auditing. *Issues in Accounting Education, 18*(2), 137-173.

Geary, W. T., & Rooney, C. J. (1993). Designing accounting education to achieve balanced intellectual development. *Issues in Accounting Education, 8*(1), 60-70.

Gopher, D., & Braune, R. (1984). On the psychophysics of workload: Why bother with subjective measures? *Human Factors, 26*(5), 519-532.

Grove, H., & Cook, T. (2004). Lessons for auditors: Quantitative and qualitative red flags. *Journal of Forensic Accounting, 5*(1), 131-146.

Kurfiss, J. G. (1989). Helping faculty foster students' critical thinking in the disciplines. In A. F. Lucas (Ed.), *The department chairperson's role in enhancing college thinking* (pp. 41-50). San Francisco, CA: Jossey-Bass.

Moray, N. (1979). *Mental workload: Its theory and application.* New York, NY: Plenum.

Paas, F. G. W. C. (1992). Training strategies for attaining transfer of problem-solving skill in statistics: A cognitive-load approach. *Journal of Educational Psychology, 84*(4), 429-434.

Paas, F. G. W. C., & Van Merrienboer, J. G. (1993). The efficiency of instructional conditions: An approach to combine mental effort and performance measures. *Human Factors, 35*(4), 737-743.

Phillips, F. (1999). Auditor attention to and judgments of aggressive financial reporting. *Journal of Accounting Research, 37*(1), 167-189.

Phillips, F., & Vaidyanathan, G. (2004). Should case materials precede or follow lectures? *Issues in Accounting Education, 19*(3), 305-319.

Public Company Accounting Oversight Board (PCAOB) (2004). *Financial fraud*. Standing Advisory Group Meeting. Washington, D.C.: PCAOB.

Public Company Accounting Oversight Board (PCAOB) (2007). *Observations of auditors' implementation of PCAOB standards relating to auditors' responsibilities with respect to fraud*. Release No. 2007-001. Washington, D.C.: PCAOB.

Public Company Accounting Oversight Board (PCAOB) (2010). *Identifying and assessing risks of material misstatement*. Auditing Standard No. 12. Washington, D.C.: PCAOB.

Rezaee, A., Crumbley, D. L., & Elmore, R. C. (2004). Forensic accounting education: A survey of academicians and practitioners. *Advances in Accounting Education, 6*(1), 193-231.

Sarbanes-Oxley Act of 2002. (2002). Pub. L. 107-204, 116 Stat. 745.

Tan, H. (1995). Effects of expectations, prior involvement, and review awareness on memory for audit evidence and judgment. *Journal of Accounting Research, 33*(1), 97-113.

Tan, H., Ng, B. P., & Mak W. Y. (2002). The effects of task complexity on auditors' performance: The impact of accountability and knowledge. *Auditing: A Journal of Practice and Theory, 21*(2), 81-95.