Thinking Outside the Ledger:
A Visual Representation Project for Accounting Students

Linda McCann
Metropolitan State University

Abstract

"Thinking Outside the Ledger – a Visual Representation Project for Accounting Students" discusses a learning experience that provides practice in reflective thinking and communication skills. The project, called VRep, asks students to address an accounting issue and communicate it visually with their own independent creation, interpretation or modification – such as a diagram, concept map, picture, flow chart, acronym, drawing or model. This paper presents the theoretical arguments for such a project. It then details the dissemination of the project. Finally, it summarizes students' results and experiences with the project and provides examples of their work. Students' perceptions of VRep indicate that they perceive it as more useful to them than most homework assignments. They further believe that with VRep, they will retain more learning as compared to most homework assignments. In addition, 74% of students recommend VRep be assigned in future audit classes. Unexpected bright spots of the student results include engaged scholarship and opportunities for instructors to praise and reward normally "C" students with "A" grades. This paper begins a conversation among accounting educators as to how students can learn to communicate accounting matters visually, as well as how the creation of visual representations enhances learning.

Introduction

The accounting profession's first major study of accounting education, *Horizons of a Profession,* advocated for learned men and women capable of "wisdom, perception, imagination, circumspection, judgment and integrity" (Roy & MacNeil, 1967, p. 1). Indeed, "for accounting, above all, is a process devoted to the creation of order out of what otherwise might be chaos" (Roy & MacNeil, 1967, p. 43). The visual representation project for accounting students (VRep), as discussed in this paper, asks students to create order out of chaos, think critically and reflectively, and communicate using a visual representation of an accounting matter.

Recognition of the importance of communication skills to public accounting firms is not new. For example, the *Horizon's* study surveyed influential CPA's (generally partners of firms) and asked them to rank college subjects in order of importance. Written and oral English came up first (Roy & McNeil, 1967, p. 180). More recently Metrejean, Metrejean & Stocks (2008) showed communication skills ranked first out of eleven new hire characteristics, trumping accounting grade point average.

The Pathways Commission created the most recent comprehensive document regarding the education of accountants. Pathways reiterated support for the importance of communication and critical thinking skills (AAA, 2012). This paper discusses how an accounting visual representation project gives students a new way to practice communication, as well as critical and reflective thinking skills, in a manner students found satisfying and engaging.

The literature review section discusses the theoretical sources of support for VRep. Next, the project and its results with students are presented in detail. The paper concludes with limitations of the project and suggestions for future study.

Literature Review: Studies and Theories Regarding Visual Representations

Studies and theories related to assigning a visual representation project (such as a diagram, concept map, flow chart, etc.) to accounting students are both many and few. They are many in the sense that one can look at it from the point of view of psychology, learning theories, brain biology and more. The literature is minimal because no specific instances of similar projects were found in the accounting literature. Support for VRep comes from the following sources:

Efficacy of:

        1) visual representations to communicate concepts.
        2) reflective learning with visual representations.
        3) learning based on student satisfaction with an assignment.

VRep provides student practice in communication and reflective thinking, as well as satisfaction with the learning process. These three matters can be depicted visually – see Exhibit A. Scholarly articles relevant to the three sources of support for this project are discussed below.   The classification of visual representations, suggested in these articles, is also considered relevant and therefore included.

First Source of Support – Visual Representations to Communicate Effectively
Visual representations are everywhere. Visual representations accomplish effective, efficient and powerful communication. Discussion of articles that support these three assertions follow.

        Effective Communication in Accounting
Researchers Phillips, Alford & Guina (2012), note the proliferation of visual representations in accounting textbooks and investigate the impact on learning. Significant aspects of Phillips, Alford and Guina's research follow:

    1) Their literature review notes an increase in illustrations and images in business reports, as well as accounting textbooks. Further, prior research in accounting indicates that subtle messages may underlie illustrations in annual reports.

    2) Their literature review also notes that prior education research has identified at least five different functions that illustrations can serve – decoration, representation, organization, interpretation and transformation.

    3) They group illustrations into two categories – decoration and concept. Their literature review found evidence that decorative illustrations can detract from learning. However, well prepared concept illustrations promote learning.

    4) Their research (with actual students) concludes that contrary to the studies considered in their literature review, decorative illustrations in accounting textbooks have a positive effect on student learning, when the decorative illustration precedes the topic. However, concept illustrations had a more positive impact on learning when the illustration followed discussion of the topic (Phillips, Alford & Guina, 2012).

Accountants communicate matters to stakeholders and the implication here is that visual representations aid in communication. As provided in the introduction, through reference to Pathways, in particular, communication is a vital skill required of accountants. Therefore, it makes sense that accounting students may wish to begin practicing visual communication skills while in college.

        Efficiency of Diagrams
The work of Larkin & Simon (1987) titled - "why a diagram is (sometimes) worth ten thousand words" points to one reason for effectiveness of visual representations. Without any reference to biology or human subjects they show mathematically the efficiency of a diagram over a sequenced list. In particular they note that diagrams possess

geography whereby the location of an item on the diagram says something about its relationship to the other items. Grouping by location supports perceptual inferences and indexes information (Larkin & Simon, 1987, p. 98).

Another interesting study regarding diagrams was done by Moren, Ozogul and Reisslein (2011) with electrical engineering students as subjects. Students received instruction using concrete representations (e.g. light bulbs), abstract representations (e.g. electrical symbol for light bulbs) and both concrete and abstract representations. Moren, Ozogul and Reisslein noted that in past research studies, concrete representations had been shown to distract from learning compared to abstract representations. However, Moren, Ozogul and Reisslein's new study showed that the greatest learning occurred when concrete and abstract representations were combined.

The Moren, Ozogul and Reisslien's literature review revealed the following germane points:

- Visual representations play a central role in re-describing problems in terms of concepts and principles learned.

- Visual representation is a vital tool of experts in problem solving and reasoning, as well as one of the seven essential skills of a professional biologist (Moren, Ozogul & Reisslein, 2011).

Their work implies that those students who can master visual representations will not only learn more, but they will also develop important professional skills, such as problem solving. Problem solving is considered an aspect of critical thinking based on the Pathways Commission taxonomy of professional skills needed of accountants (2012).

Power of Visual Representations

This paper began with the subject of the need for accountants to communicate and think critically. But, as also previously noted, more and more information is being represented visually in annual reports and other communications. In an audit class, in particular, students evaluate management's assertions on financial data - which includes the validity of its presentation. Keinzler, in a business ethics article on visual representations notes:

> Visuals can sometimes have more impact than their accompanying text, for three reasons. First readers perceive visuals as a gestalt (Casner, 1990); therefore visuals have an emotional impact that linear words lack. Second, skimmers of items will see visuals even when they don't read the text. Third, readers remember visuals longer. (Keinzler, 1997)

Asking accounting students to create their own visual representations provides them with an opportunity to consider the presentation of visual data and its veracity. In an audit class, this consideration can extend to consider the veracity of visual representations in annual reports in conjunction with their study of key assertions embedded in accounting information.

Some argue that there is a lack of visual literacy and that this literacy can be taught, learned and applied. Consider the following:

> Visual propaganda is far older than writing. Its persuasive power has long been recognized and turned to advantage by those in authority. In medieval times, the church dominated the visual arts. In the modern era, broadcast television has been tightly controlled from its inception by political and commercial elites who wish to shape public discourse …The digital revolution exploded this top-down model. Vastly more individuals and groups across the globe now have access to inexpensive cameras, sophisticated visual media tool, and a virtually free delivery system in the internet…a more sophisticated appreciation of visual rhetoric will help all involved better discern signal from noise in a crowded, increasingly chaotic informational landscape. (Gurri, Denny & Harms, 2010, pp. 102-103)

Accountants and auditors have historically been capable of distilling information down into reliable and relevant chunks, such as earnings per share (King, 2012, p. 5). Accounting's domain is information and as noted above this is increasingly done through visual rhetoric. Therefore, challenging students to create and evaluate their own visual representations has merit.

The section above has looked at scholars views on visual representations and their effectiveness or efficiency. In summary one can say the following about visual representations:

- They have the ability to convey gestalt (a wholeness that is more than the sum of the parts).

- They have the ability to be more memorable, emotional and powerful than text.

- They can be classified as decoration, conceptual, concrete, abstract, or combinations of these classifications.

- They can represent, organize, interpret or transform textual information.

- The ability to create visual representations and the ability to discern visual rhetoric are important skills for professionals.

Second Source of Support - Effectiveness of Learning with Visual Representations
Obviously, asking a student to create a visual representation of an accounting concept will draw upon a variety of characteristics (such as imagination, prior knowledge, motivation, and more). At this point one could discuss student learning theories surrounding deep versus surface learning, effects of prior learning, inductive versus deductive reasoning, multiple intelligences, right and left brain thinking, cognitive load and much more. However, at the same time, the literature review revealed that few papers have been published (within college education) concerning the pedagogy of visual representations. The literature review revealed just one study, with some similarities to the VRep. This one study, and the key theory it drew upon, is discussed below.

Graduate Research Students Chronicle Experiences through Visual Imagery
Scholars Bailey and Van Harken created a visual imagery project for their graduate level teaching candidate students because students found the research process difficult. In this course, students qualitatively researched classroom practices by observing classrooms and connecting them to educational theories, such as scaffolding. The qualitative research of the graduate students improved with the introduction of visual representations as course assignments (Bailey & Van Harken, 2014).

Graduate students prepared three visual representation projects to assist in learning the research process. The projects included a collage, eight to fifteen pictures of a phenomenon, and a visual portrait that could be abstract, metaphorical or a combination of both. Each of these projects also required a written narrative (Bailey & Van Harken, 2014).

Bailey and Van Harken believe that their success with visual representations, in a graduate level research class, came about because of several matters. However, one matter - that of transmediation - is particularly relevant to the VRep project discussed here.

"Put simply, students were given the task of moving meaning back and forth between words and images. Advocating that "students need more than words to learn (Siegel (1995)" points out that transmediation between verbal and visual signs allows "opportunities to engage in generative and reflective thinking because learners must invent a connection between the two sign systems, as the connection does not exist a priori." (Bailey & Van Harken, 2014, p. 256)

Note that Bailey and Van Harken believe their experiment with visual projects for graduate teaching candidates validated the work of Seigel. Siegel further points out the following:

> In recent years, the well-worn image of classrooms as places where teachers talk and students listen, memorize, practice and display knowledge has begun to fade as educators recognize that there is more to teaching and learning than words…. Enquiry models invite learners to see themselves as knowledge makers who find and frame problems worth pursuing, negotiate interpretations, forge new connections, and represent meanings in new ways. Unlike the instructional routines associated with the transmission model, which have led students to believe there is no ambiguity in learning, no risks to be taken, no new knowledge to be made, enquiry models give a central place to instructional practices and strategies that encourage generative and reflective thinking. (Seigel, 1995, p. 455-456)

The VRep project fits with the lines of thinking of Bailey, Van Harken and Seigel because it encourages students to take risks (students must navigate the ambiguous nature of the project, including connecting it to real world situations), forge new connections (text to visual), find a problem worth pursuing (students choose topic) and create new knowledge. In this way students exercise the critical thinking (which includes problem solving and reflection) and communication skills so needed by accountants as discussed in the Pathways Commission report.

Third Source of Support – Student Satisfaction and Engagement
Few university professors desire to put their students through assignments not perceived as having value. Indeed, of eleven overall factors of student satisfaction in college, instructional effectiveness ranks second (behind student centeredness) in importance in predicting student satisfaction (Elliott, 2002). Therefore, it behooves instructors to consider students' perceptions of the effectiveness of an assignment. The research results of the VRep project shown below indicate that students found more value with this assignment than other homework assignments, in terms of likely retention and use in the future.

Posters Engage Students
While commonly used in the bench (e.g. laboratory) sciences, posters are a relatively new means to display research or conduct presentations in business. They are a recent substitute for research papers in the management discipline. Posters combine visuals (such as graphs and pictures) and text to showcase research or the highlights of a detailed paper. In a sense, VRep is a mini-poster presentation. Students gather information from authoritative sources about a problem or issue and communicate their findings in a visual manner and also prepare a two to five page paper.

Posters are considered an efficient way to improve learning and engage students (Schulz, Bernard, Angove, Stiles & Mauer, 2013). Posters have the added advantage in that they can be easily shared and discussed in a classroom or on-line setting.

Detailed Description of the Visual Representation Accounting Project

The VRep projects were done over four semesters as part of a senior level four credit accounting course in audit as follows:

- Project setting first semester – at a private liberal arts college with a relatively small (16 to 1) student to teacher ratio. Students were of the traditional age for college. Individual sessions were held with each student to develop the accounting visual representation concept and then further refine it.

- Project setting second and third semesters – at a larger public university with a student to teacher ratio of 25 to 1, where students could voluntarily choose to do the project for extra credit. This university is different than many, in that most of the students are working adults and of an older age than is typical for college

students. Students who chose to participate were either very good students (who did not need the credit but wanted the challenge) or students concerned about their grade point average. About 20% of the class participated.

- Project setting forth semester (spring term 2014) – at the same larger public university (above) whereby the VRep project accounted for seven percent of the student's grade. One individual session (about five to 10 minutes) was held with each student to help develop the concept. At the point that these individual meetings were held, the instructor knew something about the academic capabilities and the prior work experiences of the students. During this individual meeting, students were encouraged to use this opportunity for engaged scholarship and connect the auditing class or accounting concepts to real world dilemmas. Many students came to the individual meeting with one or more ideas for a project. Probing questions – such as "what has interested you most about this course so far?" – were asked of learners who did not have a topic in mind and this line of questioning generated suitable topics.   Projects were approved by the instructor during this meeting so that they met academic rigor and course objectives.

Instructions, Learning Objectives and Grading Criteria

Instructions for preparing the VRep included the following guidance to help students solve a problem or critically think about an accounting situation.

Suggestions for projects included the following:

- Create a visual "cheat sheet" that could be used to help make a decision or to help one to maintain one's professional ethics in their current or future workplace.

- Develop an original acronym for remembering steps to solve an accounting problem, auditing problem or ethical dilemma.

- Describe an auditing process, accounting problem or dilemma using a flow chart, table, diagram, visual cue, picture(s), representation or equation that is unique or is used in a unique combination or manner.

- Diagram an internal control problem at one's current place of employment using a flow chart and relate it to the COSO (Committee of Sponsoring Organization's Internal Control framework) model. Suggest an improvement to the control environment.

- Create a concept map, or diagram any concept in auditing in a manner that is unique and will help one to remember the concept going forward.

- Consider a financial reporting matter (such as leases, revenue recognition or goodwill impairment). Take a very small piece of an issue and draw out the new solution being proposed as Generally Accepted Accounting Principles (GAAP) or the solution that is in place now according to GAAP.

In addition to preparing the visual representation, students were required to explain their representation in a two to five page paper (double spaced) and cite appropriate authoritative sources supporting the validity of their representation. Most students chose to execute their visual representation using PowerPoint. However, some students chose Excel, Word or a hand drawing to accomplish the task.

The learning objectives were (1) to provide students with practice communicating an accounting idea in a visual and verbal manner, (2) to require students to critically and deeply think about one key audit or accounting concept that they felt was important to their current or future work situation and (3) to foster reflective and imaginative thinking.

The grading criteria focused on two aspects (problem solving and written communication) of the validated VALUE rubrics of the Association of American Colleges and Universities (AACU, 2014). In addition, attention was paid to the quality of the problem presented – was it important or interesting? Did it relate to audit, accounting or professional ethics? Was the solution compelling and not "off the shelf"? See Exhibit B for the rubric.

Student Survey Results

Upon handing in their VRep, students also turned in (anonymously) answers to a survey regarding their perceptions of the project. Students were asked eight questions. Exhibit C details the questions and the response results.

Students were told that they had the opportunity to say "yay" or "nay" on whether or not this project should be assigned in future courses. On a five point scale, with five considered "a lot more", four = "more", three = "neutral", two = "less", and one = "a lot less", students responded to four matters. Students believed that the visualization project was more challenging than typical homework (3.45), more interesting (3.89), likely to be useful in the future (3.78) and more likely to be retained (4.18) than most homework assignments. Further, 95% believed the project to be reflective, 97% said the amount learned was reasonable in relation to the time spent on the project, and 74% believed the project should be assigned to future students. Interestingly, of the 26% of students who believed the project should not be assigned in the future, their responses to the questions indicated they felt even more strongly that the project was challenging, interesting, useful for the future and likely to be remembered.

What these results show is that students perceived the assignment to be an effective learning tool. As was shown in the literature review, effective learning is a key determinant of student satisfaction with college. The high value of 4.18 for "more likely to be retained than other homework" may indicate that transmediation, as discussed earlier in the literature review, occurred. It was observed that students did indeed invent connections between the verbal and visual signs. The papers largely supported the visual representation and vice versa.

Hand written comments indicated that students would like to have received more examples of visual representations. Visual representations in the audit text book, the COSO internal control framework model and the Fraud triangle were pointed out as examples. One could reasonably expect that if too many examples were provided, the result would be a number of projects that looked very similar to the examples – defeating one of the purposes of the project – to foster critical (reflective) thinking.

Student Project Results

As was noted above, visual representations may be classified in a number of ways. Forty student projects (two class sections) for the spring term 2014 have been summarized using the classifications discussed in the literature review. This summary is helpful to educators who wish to refine a project such as this and obtain more uniform results.

Visual representations may be abstract (lines and shapes), concrete (pictures of real things) or a mix of these two. In addition, visual representations may decorate a primarily textual (or sentential) concept or they may interpret (including metaphorically) or organize (including in a gestalt or manner depicting wholeness) or transform. One example of a transforming visual would be going from a digital clock to an analog clock. An analog clock has more meaning embedded into it (by the nature of the placement of the hands in a particular space) than a digital clock.

All forty projects are described in Exhibit F. Several student projects are shown for illustration in Exhibit G. This detail is provided for several reasons.

    a)   It allows future instructors to see what kind of results to expect on an open ended assignment.

b) It allows instructors to take these samples and consider a narrower focus to suit their purposes (i.e., assign only certain kinds of visual representations such as concrete or abstract, decorative or conceptual, organizational, interpretive or transformative).

c) It provides sufficient detail to discuss the pros and cons of this kind of assignment from a pedagogical point of view, which was one of the purposes of this paper.

The projects have been grouped into three categories – engaged scholarship (17.5%, seven total), audit or accounting concepts (55%, twenty-two total) and professional standards, ethics and auditing (27.5%, eleven total), with one student not participating. See visual representation of this result in Exhibit D.

Within those categories the projects were grouped as to whether or not they mostly decorated an existing concept, interpreted a concept in a new light, organized a concept(s), or transformed a concept. Transformative projects created new information. There were about seven transformative projects (17.5%). Two examples of a transformative project include one with a specific recommendation for improved internal control at her company and the other a comparison of the Qur'an to the AICPA's professional ethics standards. (Neither of these projects are shown in the exhibits at the request of the students.) Projects that organized concepts made up 27.5%, while projects that interpreted ideas were 22.5%. Projects that decorated constituted 17.5% of submissions. It should be noted that six (15%) of projects were weak or insufficiently executed and represented a low effort on the part of the student. See visual representation of this result in Exhibit E.

In addition, the projects were labeled as mostly abstract, concrete, metaphorical, both abstract and concrete or gestalt. There were three projects that could be considered metaphorical (7%). An example of a metaphorical project is one that related to seeking truth about "Big Foot" to seeking truth in audit evidence. There were six projects (15%) that took a great deal of information and presented or (attempted to present) compelling overviews (gestalt in nature). Some of the projects could have been categorized in more than one column. However, in general, only one column was predominant. Results also show that accounting students tend towards abstract (80%) as opposed to concrete (20%) visualizations.

What the detail of projects shows is that accounting students, given a great deal of latitude with a project, will produce varied results. Visualization projects clearly within the do-able range for most students include those that are abstract, focus on an accounting concept or idea (as opposed to internal control or professional ethics) and organize or interpret that concept.   It was also observed that students had not received similar assignments in their college experience. Hence, for most students, this was their first exposure to this kind of a project. Several actual student projects are included in Exhibit G.

Bright Spots

Several interesting things occurred with this project.

1) About 18% of the 39 student projects were examples of engaged scholarship in the spring term 2014. Students took audit concepts directly to their places of work to interpret or suggest changes for improvement. One student worked in fast food and spotted internal controls he would change as a manager based on his study of the COSO internal control framework. Projects along this line were also noted in prior semesters at both the large university and the traditional liberal arts college described above.

2) For a few students, this was their best work of the semester. It was a great opportunity to provide positive feedback, in what would otherwise have been a semester of mediocrity for the students. Further, students who frequently got A's on exams did not necessarily produce the best visual representations. Some of the finer visual representations came from students who typically got C's on exams. It was observed that many students were proud of their creations.

3) The visual images were easy to discuss in class. Students from both universities where this project was assigned, had significant numbers of individuals for whom English was not the first language. In fact about one-third of the students came from Africa, Asia or Europe. Visual representations cross language barriers and therefore aid in creating understanding – a desirable outcome, given the global nature of business today.

4) As previously noted, visuals tend to be seen as gestalt (sum is more than the parts or wholeness.) Many students naturally suggested projects to create wide sweeping overviews connecting several audit concepts.

5) Some students prepared projects that will be particularly useful for later study for the CPA exam.

6) The classification of projects allowed the accounting instructor to refine the project for subsequent semesters.

Future Semesters with Visual Representations

Based on the classification of projects discussed above, the visualization project was refined so that it required less instructor time (no individual meetings with students) and reflected the majority of the kinds of projects discussed in detail in Exhibit F. Over 140 students (at a large, diverse public institution), during three subsequent semesters (2014-2015) were asked to create a visual representation that organized, interpreted or decorated a concept or idea in one of two key chapters in the audit textbook. Those two chapters deal with audit risk assessment, audit evidence and the audit process. Exams, collaborative assignments, on-line homework and a large case study dominate the course learning activities for this audit course, with the revised visual representation project reflecting only three percent (3%) of the overall grade. This project is consistently and strikingly mentioned, as a highlight of the semester, in the final reflection course essay papers.

In addition, the project continues to be a bright spot for "C" students, in that "A" students do not always do the best visual representations. Anecdotal evidence from observation of students, suggests there are multiple reasons for this result, including motivation – this is an assignment students enjoy and therefore put more effort into.

Limitations of the Project

Limitations of the project included the following:

1) The projects turn out better when more feedback can be given. Additional five to ten minute sessions spent with each student, to help them refine and clarify their VRep, results in more accurate and informative projects. Students who sought out such feedback before or after class or through e-mail, made surprisingly pleasing changes to their visual representations.

2) Like written term papers and assignments, visual representations may also be plagiarized and this may be difficult for the instructor to spot.

3) Several questions were not asked of students that would have been helpful for further analysis. For example – how many hours did you spend on this assignment? When evaluating this project against other homework assignments – what did you have in mind for homework?

4) It is not possible to determine how much of the effectiveness of the visual representation project results from the accompanying paper and instructor consultation, as a separate matter from construction of the visual representation. However, anecdotal evidence from student comments suggests that it was the visual representation that made the assignment particularly engaging and satisfying.

5) Accounting instructors are not visual design experts. Accordingly, advice given to the students was of a general nature and focused on the accounting matters, rather than graphic arts matters.

With respect to the last limitation, there are a number of resources for the accounting instructor, as well as for the accounting student pursing life-long learning. For example, Academics Vazques and Chiang (2014) make the case for using pictures in the economics classroom. They provide a brief discussion of the biological assumptions and cognitive tenants and then go into best practices for visual representations in economics.

Other good places to begin to develop fluency in visual representations include *Beautiful Evidence* (Tufte, 2006), *Storytelling with Data* (Knaflic, 2015) and *Unfolding the Napkin* (Roam, 2009). Further, big data is becoming more and more important for accounting students to understand. A key challenge with big data is to be able to visualize it.

Suggestions for Future Study

It would be interesting to assess the difference in performance on exams when students look at a textbook visual representation compared to creating their own accurate visual representation. For example, the instructor could prepare a concept map of a chapter and ask students in one class to study it. Then in another class, the instructor could ask students to prepare their own concept maps. The test scores of the two different approaches could be compared. It would also be interesting to test (in six months or a year) the amount of information retained relative to the concepts students chose to visualize. Visual image projects for accountants are not well studied, so additional papers by other accounting instructors would be welcome additions.

Conclusion

In the literature review it was shown that visual representations are efficient, powerful and being used more and more in accounting. Further, to be able to communicate a matter in visual form is a key skill for professionals today. Based on the most recent comprehensive accounting education document (the Pathways Commission Report) accountants must excel at communication and critical thinking. On top of that, asking students to create visual images (such as posters) has shown to be an effective and active learning endeavor at the college level.

Therefore, it makes sense to provide accounting students with opportunities to experiment with creating visual representations of accounting concepts. Students can even be challenged to depict accounting concepts related to their current work situation (even if just part-time) and make the assignment an engaged scholarship activity that benefits the community. One such assignment, offering these benefits, called VRep, was described in this paper.

The bright spots of the VRep project included opportunities for normally lackluster students to shine and real world immediate suggestions for improvement in several workplaces. In addition, students reported satisfaction (74%) with the VRep assignment described in this paper.

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Exhibit A – Sources of Theoretical Support for the Accounting Visualization Project

The accounting visualization project provides student:

practice in communication.

practice in reflective thinking.

student satisfaction with the learning process.

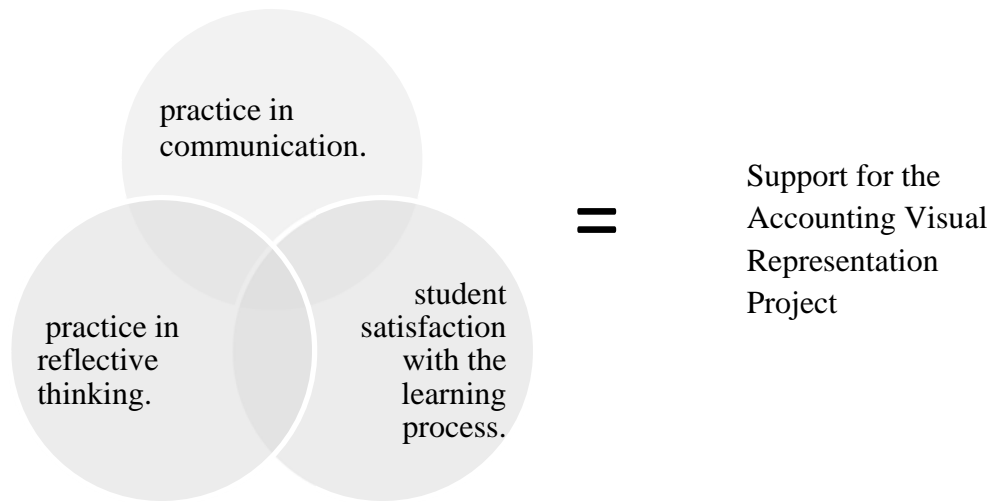= Support for the Accounting Visual Representation Project

Exhibit B – Grading Rubric Used

VALUE rubrics of the Association of American Colleges and Universities (AACU, 2014).

These VALUE rubrics are shown below. These rubrics were chosen because they are validated

rubrics used at many colleges to assess key learning outcomes of an overall college program. The

capstone level is considered the highest level of performance, with the milestones 3 and 2

indicating levels of lesser performance. Benchmark is considered the minimal performance.

	Capstone 4	Milestones 3	Milestones 2	Benchmark 1
Problem solving rubric				
Propose solutions/ Hypothesis	Proposes one or more solutions/hypotheses that indicates a deep understanding of the problem. Solution/hypotheses are sensitive to contextual factors as well as all of the following: ethical, logical, and cultural dimensions of the problem.	Proposes one or more solutions/hypotheses that indicates comprehension of the problem. Solution/hypotheses are sensitive to contextual factors as well as one of the following: ethical, logical, or cultural dimensions of the problem.	Proposes one solution/hypothesis that is "off the shelf" rather than individually designed to address the specific contextual factors of the problem.	Proposes a solution/hypothesis that is difficult to evaluate because it is vague or only indirectly addresses the problem statement.
	Capstone 4	Milestones 3	Milestones 2	Benchmark 1
Written communication rubric				
Content development	Uses appropriate, relevant, and compelling content to illustrate mastery of the subject, conveying the writer's understanding, and shaping the whole work.	Uses appropriate, relevant, and compelling content to explore ideas within the context of the discipline and shape the whole work.	Uses appropriate and relevant content to develop and explore ideas through most of the work.	Uses appropriate and relevant content to develop simple ideas in the writing.

(AACU, 2014)

Exhibit C – Student Survey Results

On a five point scale with five considered "a lot more", four = "more", three = "neutral", two = "less", and one = "a lot less", students were asked to address the following:

| **Student Survey Responses** – spring term 2014, n = 39 students (with 2 blank responses for a total of 41)	**Result**
This project was more or less challenging than most homework assignments.	3.45
This project was more or less interesting than most homework assignments.	3.89
This project was more or less likely to be useful to me in the future than most homework assignments.	3.78
This project was more or less likely to help me retain the information than most homework assignments.	4.18
The project challenged me to be reflective.	95% = yes
With respect to time, the amount I learned on the project was reasonable in relation to the time spent on it.	97% = yes
The project challenged me to use skills of an inter-disciplinary nature.	87% = yes
I believe the project should be further refined for future students and assigned	74% = yes

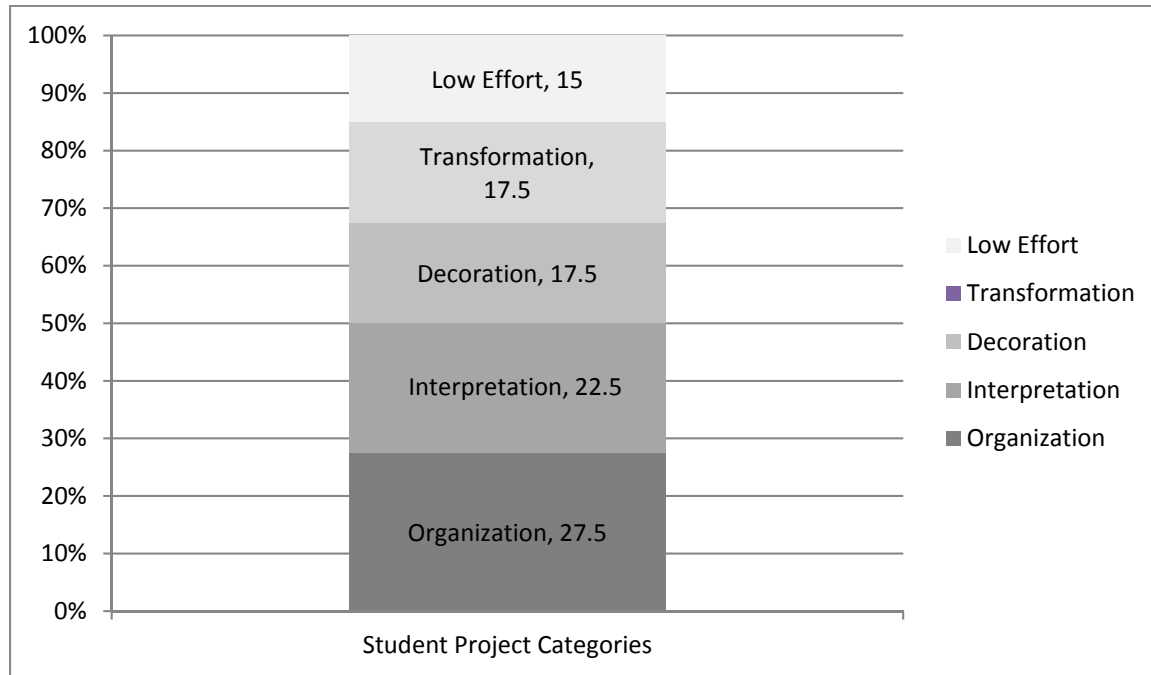**Exhibit D – Student Choices for Projects – Percent of Total**
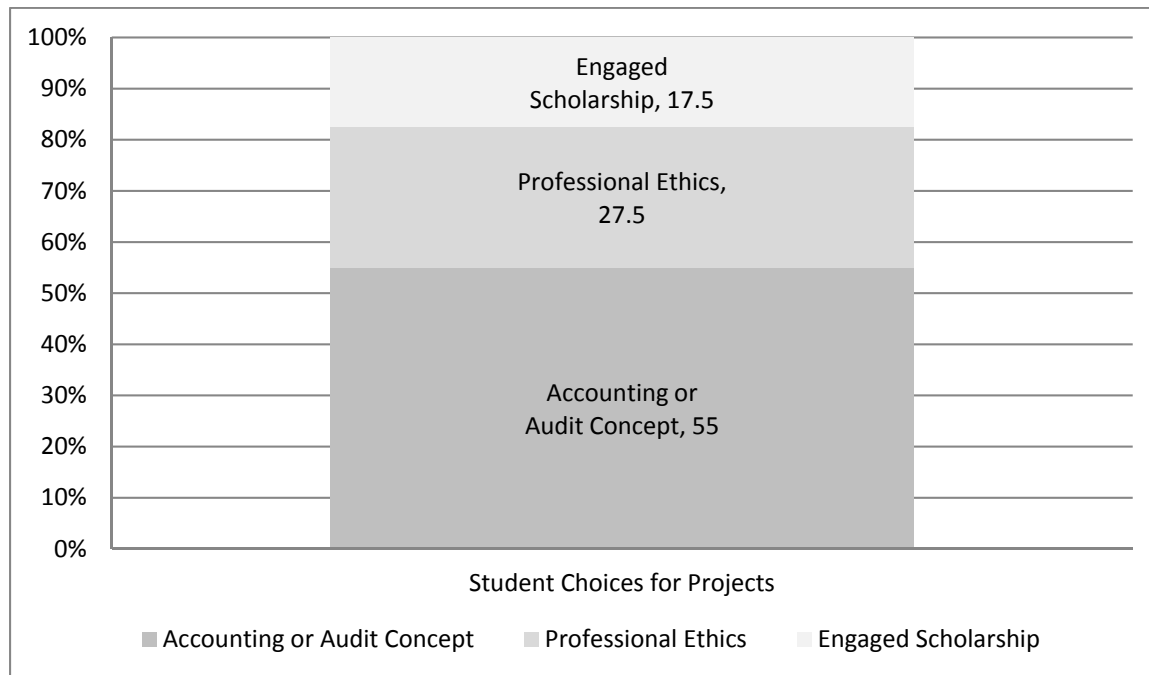
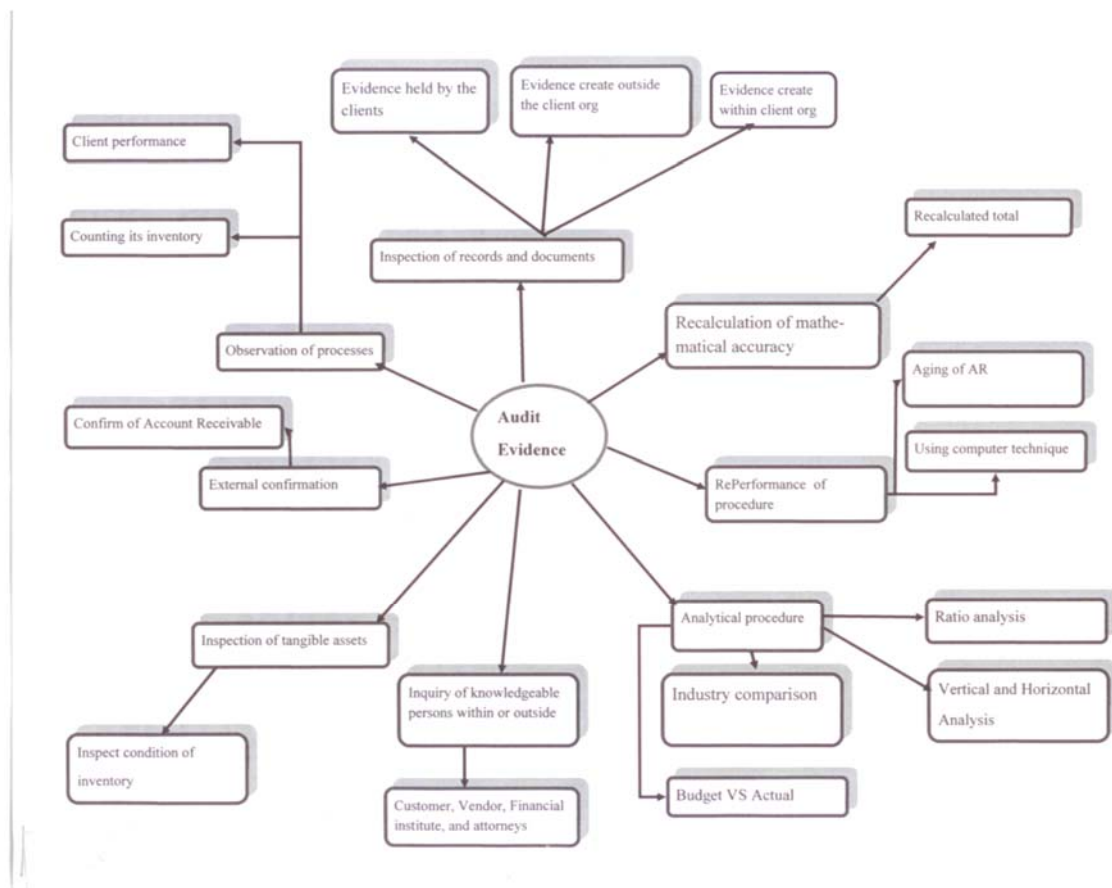## Exhibit E – Student Projects – Percent by Categories

Exhibit F
McCann

	Table 2 - Summary of Student Projects	(students enrolled in Spring 2014)			
	Key: A=abstract, M = metaphorical, C = concrete, C&A - mixed concrete and abstract, G = gestalt in nature				
Project		Decorate	Interpret	Organize	Transform
	Engaged Scholarship				
1	Flow chart - suggested improvement of internal control in the reconciliation process at medium sized company				A
2	Flow chart - discussion of change in internal control procedures over inventory		A		
3	Diagrams - key concepts for a compliance audit at a specific bank			A	
4	Flow chart - customer service and payment collection at a retail establishment		A		
5	Flow chart - segregation of duties in a small business		A		
6	Table - COSO model and controls at a fast food restaurant and suggestions for improvement				A
7	Decision tree - reporting of fraud in a sensitive political environment				A
	Conceptual Audit or Accounting				
8	Decision tree - independence, firm and CPA			A, G	
9	Decision tree - independence - covered member		A		
10	Shapes - lease treatment, IFRS vs. GAAP			A	
11	Shapes - value added tax	A			
12	Pictures - observed segregation of duties at a movie theatre		C		
13	Pictures - segregation of duties	M, C			
14	Pictures - uncovering truth and audit evidence	M, C			
15	Concept map - audit assertions and things to check			A	
16	Drawing - aspects related to audit sample size				A
17	Concept map - audit evidence and examples			A, G	
18	Process cycle - twelve steps in an audit			A, G	
19	Table - thirty audit procedures organized for meaning on a horizontal and vertical level				A, G
20	Process chart - twenty audit procedures organized in 5 columns			A, G	
21	Drawing - Five steps in an audit	C			
22	Chart - twenty matters along four dimensions on IT internal controls				A, G

Project		Decorate	Interpret	Organize	Transform
	Summary of Student Projects – continued from prior page				
	Key: A=abstract, M = metaphorical, C = concrete, C&A - mixed concrete and abstract, G = gestalt in nature				
	Conceptual Audit or Accounting				
23	Pictures - Internal controls to prevent hacking of data bases	C			
24	Chart - comparison of text chapter with COSO model			A	
25	Diagram - comparison of text chapter internal controls and what he would look for in aquiring a small business			A	
26	Pictures - explaining Securities Acts of 1934, 1933	C			
27,28,29	Weak student projects reiterating the COSO model or an internal control	(Visual representations with little added value)			
	Professional standards, ethics and auditing				
30	Comparison of Qur'an to accounting professional standards				A
31	Pictures - three ethical realms that make a professional			C	
32	Decision tree - identifying consequences and ethics		A		
33	Flow chart - ethical issues and solutions		C & A		
34	Flow chart - ethical decision making		A		
35	Concept map - AICPA professional standards in three groups			A	
36	Decision tree - consequences of unethical professional choices		A		
37	Picture - consequences of malpractice to attorney CPA	C, M			
38,39,40	Weak student projects reiterating fraud triangle or text's decision model	(Visual representations with little added value)			
41	One student chose not to participate				

Exhibit G – Student Visual Representations (five samples). These samples are the original and unmodified work of students (Yong Yang, Beau Baxter, Heather Levy, Hillary Welna and Leah Hassler, respectively) and are used with their permission.
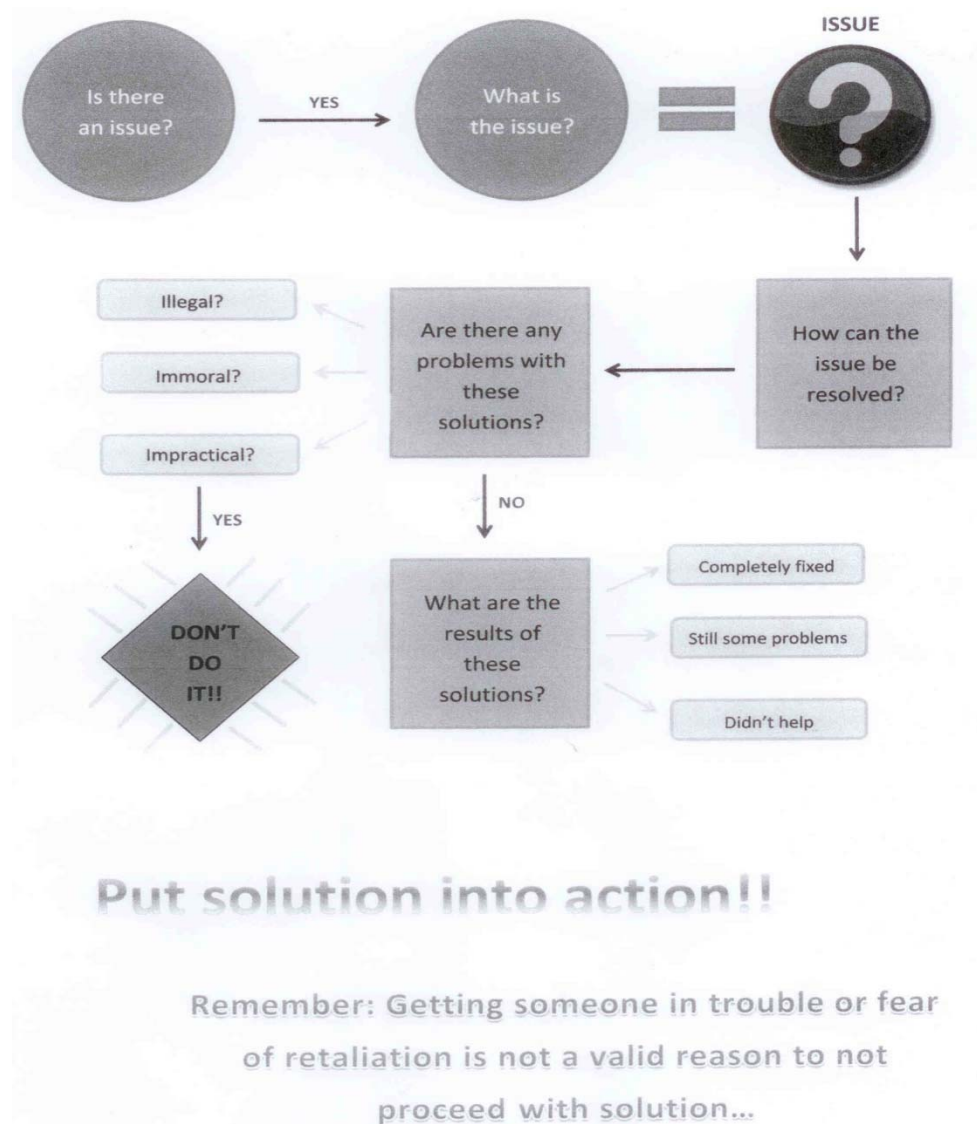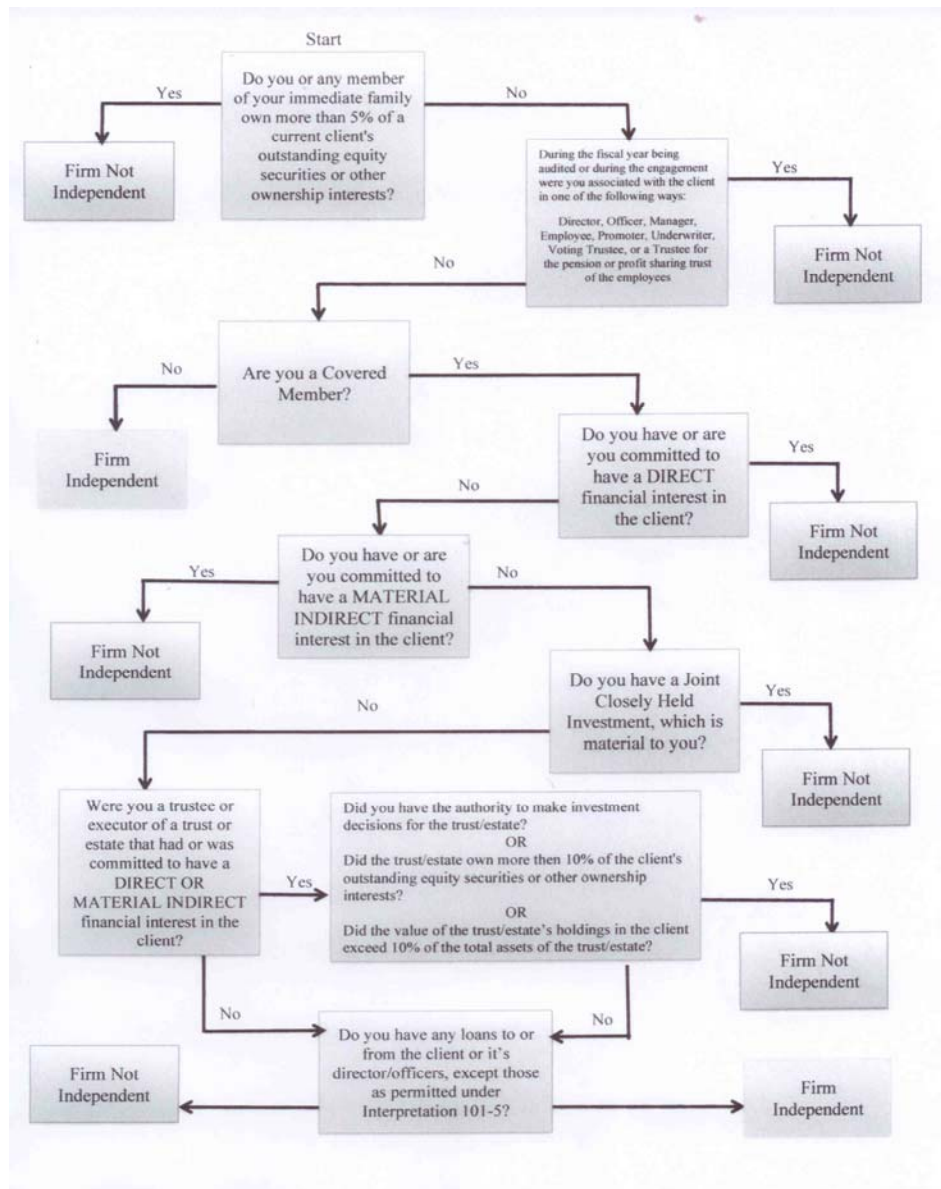
1) Audit Evidence

2) Audit sample size factors

3) Ethical decision tree

Put solution into action!!

Remember: Getting someone in trouble or fear
of retaliation is not a valid reason to not
proceed with solution...
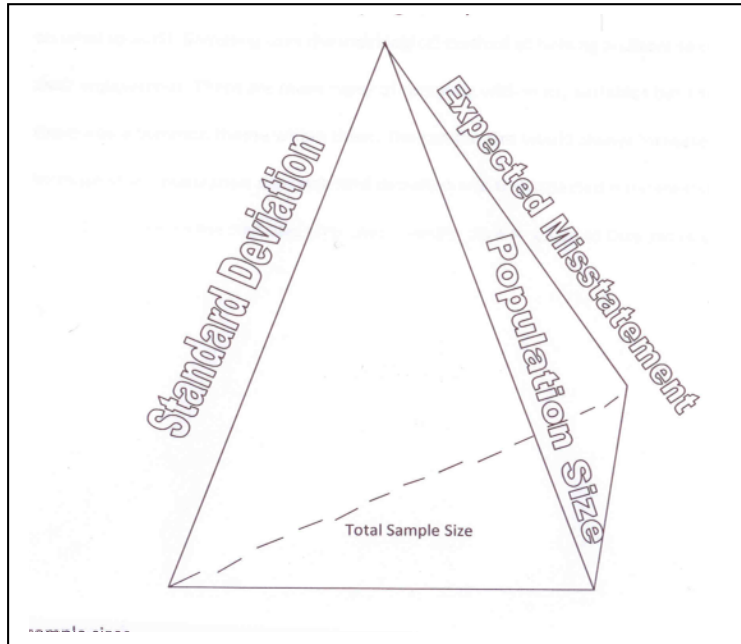
4) Auditor independence decision tree

5) Expanded assertion checklist