

## An Engineering Approach to Teaching APA Style in the CIS Curriculum

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### Abstract

The ability to properly research, write professionally, and correctly cite sources is a must for any business major, including Computer Science (CS) majors. Throughout CS programs, emphasis is often placed on learning new languages, specifically code syntax, with little emphasis on researching and writing papers. The authors have seen an abundance of students in, or coming out of CS programs whose citation skills are substandard when compared to their business peers at the same level. In fact, recent data obtained from our capstone course which uses a contextualized case study found that on average, students received a score of 62.22 (standard deviation of 1.36) in proper APA formatting and citation. As a result, the authors believe that students within CS programs are not paying enough attention to APA as they should be. Therefore, this paper provides an engineering approach to teaching and learning APA style geared towards the CS professors and students.

### Introduction

According to the Educational Policy Improvement Center "the ability to write is one of the most important skills a student needs for academic success" [1]. It goes without saying that instructors know this yet, it is witnessed repeatedly that students are not following the APA guidelines. Often when questioned they state that they did not purchase the APA manual (required in all our courses), and most have not followed links that were provided to the Purdue University Online Writing LAB (OWL) website. With over 200 million hits yearly [1], OWL has become one of the world's most popular sites, yet many students fail to utilize its advantages. In an attempt to understand why this is happening, the authors found that many professors do not emphasize proper APA citing within their courses.

Kay [4] presented what he called a customary practice known as "writing across the curriculum" which encourages faculty in all disciplines to require writing/research assignments. The authors encourage this because what is seen in the real world, much like Kay [4], is that CS programs tend to be so specialized that students are often left with the impression that writing is something that should be left to English majors. While some universities have experimented with the use of workshops including APA style, Jorgensen and Marek [2] offer that specific elements of student research improved. The study also noted that workshops may have the potential to save time so that the focus may be placed on learning the course concepts.

Based on the findings that these workshops appear to improve research students' grammar, mechanics, and reference capabilities, these workshops were only 20 to 30 minutes in length [2]. Rather than offer an upper-division course requiring an extensive amount of writing, or try to impose a short in-person briefing, the authors intend to ascertain if there may be another way to offer a well-focused and practical approach to enhance the understanding and value of proper APA formatting.

Supporting this, Kaczmarczyk et al. [3] found that by requiring students to study the writing of professional computer scientists, they learn how structure and rhetorical technique can enhance or detract from an argument. This insight is then linked to the expectations of each student's writings where they present their analysis as formal narrative essays. Likewise, Kumar [5] considers writing (and reading) an essential part of a CS student's training. He goes on to say, "the practice of programming (or writing) has much to gain from the practice of writing (essays) and vice versa" [5]. Both activities require structured analysis and refinement.

Although proper APA formatting can at first seem overwhelming with 272 pages in the APA 6<sup>th</sup> Edition Publication Manual, the authors have narrowed most issues in student research papers down to the following two common errors: improper inline citations and improper reference section citations. If one considers the CS learning environment, syntax is emphasized because programming languages require proper formatting. Therefore, it is believed that emphasizing APA formatting (syntax) in CS courses is akin to emphasizing code syntax. This is an opportunity to make the connection through the coding distinction for CS students.

### **Code and writing syntax**

In a C++ program comments start with `/*` and end with `*/`. That's syntax. Likewise in a research paper, citing an author in text starts with a parenthesis "(" and ends with a parenthesis ")" such as in (Brown, 2016).

Another example in C++ is that functions have a particular syntax such as:

**function linkifyElement(id)** where the name of the function follows the word "function" and a parameter is passed into function via the variable found between the parenthesis. This is a particular syntax that must be followed. Similarly, in a research paper reference section, there is a particular syntax which must be followed. Authors must be listed alphabetically by last name, followed by first initial only.

For example:

Brown, A. (2016). Title of article follows and only the first word is capitalized. *Name of journal is italicized, volume # (issue), pages.*

As shown, syntax is important, be it in a C++ program or a research paper.

## The Basics of APA

### Intext citation:

1. Almost every paragraph should have a reference to an author as the information came from somewhere. Start a paragraph or sentence within the paragraph with "Brown (2016) stated that..." or conversely one may end a paragraph with "Brown (2016)".
2. If utilizing a quotation less than 40 words, the inline citation must be immediately followed with author, date and page/paragraph number, for example "if this were the end of the quote" (Brown, 2016, p. 237).
3. If there are multiple authors, introduce them all the first time they are cited, then only the primary author followed by et al. For example: "Smith, Fronrath, and Glover (2015) found that...". Any subsequent use of these author would be cited as follows: "Smith et al. (2015) stated that ... ". If there are more than 6 authors, list only the first author, followed by et al.

### Reference Section:

1. "References" is always centered on the top of its own new page and is not in boldface. Consider the example on page 49 of the APA Manual. Many students do not center the References, or they use bold typeface.
2. References are always placed in alphabetical order in the References section. Section 6.25 of the manual describes this in detail. Consistency is key.
3. Chapter 7 offers examples of References. It appears many students are using formatting tools - these are helpful but not always correct. They should be directed to read Section 6.22 starting on page 180 of the APA manual for more details and include the correct formatting of the second and subsequent lines of the references. This is fundamental.

### A One-page Checklist for APA 6<sup>th</sup> Edition Publication Manual

Running head: TITLE OF PAPER On page 41, there is the start of examples of how to format papers - for students it would be the value of the title page elements, the "Running head: TITLE OF PAPER", page numbers, etc. There is a number "1" required on the title page as described on page 41. The Running head and page numbers are not in boldface and require Times Roman. As mentioned before, the research paper submissions in research classes do not require an Abstract or Author Note.

Inline citations There is an excellent table on page 177, that provides the basics for inline citation rules. Only the basics are here, but it is a helpful quick guide to the most common problems encountered. The most important items are described in this table. Please use the correct format for two or more authors within the same parentheses - see Section 6.16 on page

177 and 178, for correct examples. Make certain to understand when to use "and" and "&" in the inline citations and references.

Proper use of et al. The use of et al. requires a period since it is an abbreviation for all. Again, the inline citation format changes (when a comma is used) if one uses it in the narrative or the parenthetical format. Also, use et al. only after the certain number of authors (six or more) are spelled out the first time as provided in the figure on page 177. et al. - period required after al. since it is an abbreviation. No period is required after et since it is not an abbreviation and is only used in certain circumstances after the authors are spelled out the first time and the number of authors has an impact. Again, see page 177 for the examples. Also, make sure the et al. opportunity is used correctly, only after it meets the numbers of authors and placement in the narrative.

Levels of Heading Section 3.03 Note the correct format for different level of headings. "References" on the reference page is an exception that it is not in boldface.

References Chapter 7 offers the References examples. It appears students are using formatting tools - these are helpful but not always correct. Also, note that all references are always placed in alphabetical order in the References section. Read Section 6.22, starting on page 180, for more details which includes the correct formatting of the second and subsequent lines of the references. "References" is always centered on the top of its own new page and is not in boldface. See page 49 for the example.

Proof reading Proofread submissions for correct grammar, syntax, spelling, typographical errors, and of course APA 6th Edition format. Read it out loud before submitting; use the "second set of eyes" approach and/or ask someone knowledgeable to read through it and provide constructive feedback.

Title page elements Of importance, utilize page 41 for the example and make sure only the required five title page elements for student papers are used. Running head: TITLE OF PAPER: page number "1", Title of Paper - in title case, author's full name and educational institution. Remember, consider limiting the title to 12 words or less.

Quotations When using a quotation, it is a must include the page, paragraph, and/or additional citations as described in Sections 6.06; 6.07; 6.08; 4.10, and online material 6.05.

### **Grading with Proper Incentive**

Recent data obtained from our capstone course which uses a contextualized case study found that on average students received a score of 62.22 (standard deviation of 1.36) in the area of proper APA formatting and citation. This leads the authors to believe that professors are not stressing the importance of APA and/or students are giving little value to learning it. The writing skills of CS students concern many educators [4]. The authors have found that the more weight given towards proper citation, the more students pay attention to getting it right. Given a checklist, students generally follow it and ultimately end up with a good grade. The authors,

however, have found few professors that provide a basic APA check list or guide and so one is provided here with the belief that Instructors should hold students to a level of standards. This is necessary to support the “writing across the curriculum” [4] philosophy.

The authors also believe that for students to properly learn, there needs to be a progressive scale of incentive. For example, the first assignment might have an APA weighted value of 5, the next 10, the next 15, the next 20 and so on. This is recommended because students spend little time on APA when the weight stays at a constant 2-5%. In fact, when this low, students often don't bother to read the feedback and make corrections for the next paper. Interestingly at a recent “Grandparents Day” at middle school, one of these authors was sitting in a classroom listening to the teacher talk briefly about writing papers. The teacher left the room briefly and one of the 13-year-old students talked about how he writes great papers and gets good grades but doesn't care to understand APA. He said he just puts it together, guessing how it should be and doesn't worry about it because he only gets ‘dinged’ a few points. With this other chimed in, basically saying the same thing and that they often use bibme.org to figure out proper APA format. When asked, all 16 students in the class stated that they did not have a copy of the APA manual!

### **Continued Research**

Collaboration on this paper has brought the authors to the conclusion that further research is warranted. Specifically, testing the use of peer-review editing in which students review each other's papers with final markup by the professor. It is believed that this will reinforce student learning by both the submitter and the reviewer.

The authors also recognize that a concise and anonymous survey will offer additional insights on several questions that have been raised as a result of this paper. It is our intention to advise the candidate students that their individual feedback this semester is requested, with the desire to improve our course delivery through enhanced research. Students will be requested to respond to eight questions answering honestly, completely, and without concern for attribution. The survey results will provide valuable feedback for further study and research.

The survey questions that will be asked are described in the following manner:

1. What specifically were your expectations of APA grading on your papers in this course?
2. Do you have an APA 6th Edition Publication Manual (hard copy)?
3. Did you use the APA 6th Edition Publication Manual (hard copy)?
4. Did you regularly use Purdue University's Online Writing Lab (OWL) or other related sites throughout this semester?
5. On a scale of 1-10, 10 being the most, how much emphasis would you say you put into APA formatting this semester? Or, do you do what you can and read your instructor's feedback?
6. If APA 6th Edition formatting had more weight towards your grade in your research papers, would you put more emphasis on it?

7. Again, on a scale of 1-10, how would you rank the value instructors and professors generally put on APA formatting (please consider all the classes you have completed to date)?
8. Finally, on a scale of 1-10, how do you think the business world observes and values APA formatting when you research, write, and present publications, white papers, and PowerPoint presentations?

The desire is to improve the overall delivery of APA lifelong learning for all CS students and is planned to support the enhanced delivery and value of APA 6th Edition instruction.

### Conclusions

There are many value-added reasons for enforcing the APA standards for students; one of the most important is that it deters and protects graduate research students from plagiarism. Roig [6] shares the concept that self-plagiarism is often overlooked by research students. When students are directed to read Section 6.02 in the APA 6th Edition Manual, there is improved situational awareness. Students are further advised to read and meet the standard provided in Section 1.10 regarding methods to ensure proper citation and use of the student's previous work.

The authors have concluded that writing is very much like computer programming and providing proper citations is no different than providing proper syntax in a C++ program. This paper emphasizes a customary practice known as "writing across the curriculum", which encourages faculty in all disciplines to enforce proper APA writing.

There is a recognized the need for continued research in this field of study. The value of the use of a concise and anonymous survey will offer additional insights on several questions that have been raised because of this research.

### References

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