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APA Style Referencing: A Web-Based Module

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Introduction

American Psychological Association or APA style is widely used and essential for publishing journals. Professionals must be well versed in APA style for their research, but most students at the collegiate level will also use APA style in their studies. They may be required to write and definitely read APA style manuscripts for research in their coursework. Overcoming this hurdle can help produce better quality research because students will be better able not only to produce documents in APA style, but also to find and discriminate information using their knowledge in how APA style manuscripts are organized. Since web-based instruction is gaining popularity due to its many capabilities, a web-based tutorial module on APA style is a promising tool for students. However, in order for these resources to be effective, careful steps must be taken such as taking into account theories about how learning can be enhanced.

Literature Review

Resources for APA style

The APA publication manual is the official source for APA style formatting. However, it is lengthy, detailed, and complicated, making it difficult to use. Students looking for basic APA style information such as referencing, citation, and formatting (title page, headers, etc.) could benefit from other resources. Also, relying on one resource can be troublesome when it is outdated or contains errors.

In June 2007, the American Psychological Association released an update to its APA manual. The update includes new details on citation styles for the increasingly popular electronic resources. In the new style, Digital Object Identifiers or DOIs are used to cite articles because it is a consistent way to find articles on the Internet versus the old style of using a retrieval date and URL. According to Lewis (2008), not all articles currently have DOIs, making

this a difficult method to use. Furthermore, APA software is not completely up to date with the new changes. The suggested solution is to look up the article in a separate CrossRef.org website to find the DOI. If there is no DOI assigned, one must give the exact URL of the journal homepage. This means users will have to go looking for the exact website. Many students who are not proficient with APA citation avoid using databases to find articles so that they may avoid this extra step and instead will rely heavily on search engines such as Google. Relying heavily on search engines limits the amount of articles one has access to, so this may affect academic research.

Furthermore, the APA manual update does not address what to do if there is no DOI for an article and there is no current journal homepage. University librarian Leslie Lewis stated, "I am all for DOIs. I am all for developing a consistent way to cite journal articles retrieved electronically" (Lewis, 2008, p. 131) but also that there should be an alternative citation method for the interim period. Whenever a change is implemented, there must be steps taken to ensure that it can be adopted. In this case, the new APA electronic resource citation is not always adoptable due to the absence of DOIs.

Li and Cunningham (2005) discuss a web-based APA or American Psychological Association Style Converter. The Converter is a web-based tool that allows users to copy and paste text and upload figures for automatic conversion into APA style. Users can then save it in PDF or RTF format, and submit electronically or print manually. The converter differs from existing web-based APA tools due to its ability to convert text and figures that are copied and pasted. Other commercialized software such as the APA-Style Helper does not have this feature; it requires users to input each component separately which takes more time and effort.

Stylistic conventions such as APA style are designed to help authors achieve consistency, coherence, and clarity, yet the details put a heavy burden on the part of the author. However, guidelines are necessary for publication so that readers will be able to find and understand the information that is written. "The Converter in its current form represents only a beginning in the effort to automate the process of writing in style" (Li & Cunningham, 2005, p. 223). The Converter is an example of a tool that will make this easier in the future, but is not yet widespread.

Multimedia Leads to More Options

Using a web-based module will make available many options in instruction. However, many options does not always lead to more learning (Chandler, 2009). Dynamic visualizations and hypermedia can be used to enhance learning, but are often designed to "Wow" the audience and do not accommodate learning processes. This leaves them with little educational value. For example, static images are in some cases as effective as animations due to the restrictive working memory of the human mind. Animations can present information too quickly for learners to grasp. Chandler (2009) found that allowing learners to control the speed of the animation allows for much deeper understanding, given that the user interface is not too complicated. If the interface is complicated, it may end up consuming more working memory to operate the animation. An alternative strategy is to combine static pictures with video, which supports understanding of information better than either alone. Static pictures act as reminders or organizers for the video. However, if the number of static pictures is too large, it is no longer helpful due to the heavy cognitive load it takes to relate the pictures to the video.

The cognitive load theory and Mayer's theory of multimedia learning (Mayer & Moreno, 2003) suggest incorporating the cueing effect and modality effect to enhance learning and relieve

the cognitive load on the learner. Tabbers, Martens, and van Merriënboer (2004) concluded that learners who completed a multimedia lesson on instructional design scored higher on retention tests when visual cues were added to pictures. However, replacing visual text with audio yielded lower scores than when text was used. This reverse modality effect could be attributed to students being frustrated or tired due to the length of time it took for students to download the audio. Also, because the students could control the pace of the lesson, they could refer to the visual instructions as many times as needed. Self-reports of mental effort did show that replacing the visual text with verbal instructions required less mental effort although it yielded lower scores in this case.

Another significant thing multimedia can bring to education is visual stimulation. It can make learning engaging and interactive. "A good design will allow students to (1) visualize difficult and naturally dynamic concepts, (2) promote active learning, problem-solving, and critical thinking with interactive simulations and virtual environments, (3) interact with the content with self-quizzes, and (4) access content anytime, anywhere, at any pace" (Huang, 2005, p. 224).

Learning Theory and Multimedia

"The key factor to the ongoing success of work in this field is a continued appreciation of the complex cognitive processes that underlie learning in technologically driven environments" (Chandler, 2009). One major problem with learning with multimedia is cognitive overload. Therefore, when designing instruction using dynamic visualization and hypermedia, one must carefully consider learning processes.

Gerjets, Scheiter, Opfermann, Hesse, and Eysink (2009) conducted two experiments on the use of hypermedia in learning environments. Experiment 1a tested multimedia design

principles' validity in hypermedia environments. Experiment 1b tested how learner control affects performance and whether it is moderated by prior knowledge. Hypermedia is an augmentation of hypertext, where multimedia elements can be used in flexible ways. For example, hypermedia allows learners to customize the sequence, selection, and representation of the material.

In experiment 1a, arithmetical information was tested either alone or with: Written text, spoken text, written and spoken text, written text and animation, and spoken text and animation. The learners (grade 10 and 11 students) did not show improvements when using hypermedia versus arithmetic alone. This may be partly due to redundancy in multimodal learning and the extra time it takes to use hypermedia. Experiment 1b combined the environment of experiment 1a with a high level of learner control. They then used results of experiment 1a (low level of learner control) to compare data. The learners were able to navigate through the instruction and choose to enrich the arithmetical format with any combination of representational formats (written text, spoken text, animations). Results showed that there was improvement in some areas with a high level of learner control but it also took a lot more time. Also, the results did not show that more prior knowledge allowed learners to learn more using hypermedia. Therefore, there was insufficient data to prove that learning in a hypermedia environment was superior to traditional methods. However, a significant conclusion is that the decisions to use or not to use dynamic representations available in hypermedia substantially impeded performance. This is because the cognitive load it takes to make these decisions took away from the ability to problem solve later.

The dual-task paradigm can be used to explain the role of cognitive load in learning with multimedia. Gyselinck, Jamet, and Dubois (2008) asked 56 first and second year engineering

students to perform either an articulatory task or spatial tapping task while being presented a document about electronics in visual or auditory format. Then, they were to complete a series of comprehensions questions about the document. The visual and auditory formats both yielded about the same test scores, showing no modality effect. However, the concurrent articulatory and spatial tapping tasks significantly interfered with comprehension of the document.

Individual differences of the target audience is another consideration for designing web-based instruction. In a study by Lusk, Evans, Jeffrey, Palmer, Wikstrom, and Doolittle (2009), 133 undergraduate students were first tested for working memory capacity and put into either a low or high working memory group. Then, they completed an Adobe Flash-based tutorial on historical inquiry, some with segmented instruction and some without. Segmented instruction allowed students to control the speed of the tutorial with commands such as start, stop, pause, rewind, and fast-forward. The students in the low group did not perform as well as the high group on the recall and application tests. This is consistent with working memory capacity theory which says that students with low WMC will have difficulty synthesizing information from the tutorial with prior knowledge as well as difficulty keeping multiple knowledge representations in their working memory (Baddeley, 2003). This ability is required for constructing complex representations such as those made with multimedia programs like Adobe Flash. However, the low group using segmented instruction was able to perform just as well as the high group using segmented instruction. Thus, "Low WMC students will have difficulty learning from complex multimedia tutorials and segmentation is one strategy for mediating this difficulty" (Lusk, Evans, Jeffrey, Palmer, Wikstrom, & Doolittle, 2009, p.648).

Quality of service refers to the perceived multimedia quality due to technical parameters and quality of perception refers to the enjoyment and comprehension of the content. Ghinea and

Chen (2003) found that quality of service issues such as bandwidth constrained environments did not have a negative impact learner experience. Quality of perception were found to be much more important; learners showed more understanding when the multimedia content was dynamic rather than static and the content was in line with their preferences. "This would imply that in order to deliver an enhanced multimedia edutainment experience, educators should focus on relatively static multimedia video and take into consideration the appropriateness of the subject matter for the purposes of the specific educational objectives being sought" (Ghinea & Chen, 2003, p. 404).

Instructional Design and Multimedia

Web-based learning objects are growing in popularity, but those who choose to integrate them into education must know how to use and generate them regarding technical and instructional design aspects. "This Instructional Design stage might be considered as the heart of the process of generation of learning objects and virtual learning environments, as it is the moment when the content, the communication media, the technological information, the technology tools, and the teacher become a harmonic unit that works perfectly together to help students to carry out their own learning process." (Chiappe Laverde, Segovia Cifuentes, & Rincón Rodríguez, 2007, p. 676). Traditional instructional design models such as Gagne's hierarchical model face challenges when it comes to modern computer-based learning due to its promotion of surface learning rather than deeper learning. Focus on the social dimension and constructivist approach to learning challenges instructional designers to build interactions between the learner and their environment and learners with other learners/instructors (Häkkinen, 2002).

Chiappe Laverde, Segovia Cifuentes, and Rincón Rodríguez (2007) go on to discuss two instructional design models for learning objects. The instructional design based on informative objects consists of a set of activities that easily interact with one another, leading to a final learning object. The instructional design based on learning objects is more complex. It requires a set of activities that normally are thought not to work well with each other to be integrated so that they are perceived as one activity or set of related activities.

Mayer proposes an evidence-based instructional design theory consisting of 10 principles. "They are evidence-based in the sense that they are based on multiple experimental comparisons that generally yielded large effect sizes" (Mayer, 2008, p. 763). Of the 10 principles, five are aimed at reducing extraneous processing, which wastes precious cognitive capacity on things that the learner is not aiming to learn. These include the coherence principle, which means to reduce extraneous material, signaling principle, or to highlight essential material, redundancy principle, which in multimedia means not to add on-screen text to narrated animation, spatial contiguity, or placing printed words next to corresponding graphics, and temporal contiguity, which is done by presenting corresponding narration and animation simultaneously. The next three principles are segmenting, pretraining, and modality. These are aimed at managing essential processing or in other words, to make complex material manageable. Segmenting requires presenting animation in learner-paced segments. Pretraining refers to previewing vocabulary such as the name, location, and characteristics of key components so that more of the learners' cognitive capacity can be devoted to other tasks. The modality principle means to present information verbally rather than in text because of the split attention phenomenon (when learners are reading text they cannot look at the animation). The final two principles foster generative processing, or help learners understand and use the

cognitive capacity they have. Using the multimedia principle, words and pictures are presented rather than words alone to help learners build connections between the verbal and pictorial representations of a set of material. Finally, personalization principle requires that information be presented conversationally rather than formally (Mayer, 2008).

APA Style Referencing: A Web-Based Module

The instructional module will follow the trend toward web-based automation. It will be simple because its primary purpose is to format writing without burdening the author. Also, taking into account findings from Chandler (2009) and Gerjets, Scheiter, Opfermann, Hesse, & Eysink (2009), information must be presented in a way that is conducive to learning and the user interface is not so complicated that it impedes learning. Care must be taken to ensure not too many options are made available to the learners because the cognitive load it takes to make decisions takes away from the ability to problem solve.

The target audience will consist of college students, who will find the instructional module useful since they are usually just getting acquainted with APA style. They range in age and fields of study. Regarding prior knowledge, they must have basic computer skills and may or may not have experience in APA style formatting. The learners will be given a pre-test, embedded test, and post-test, and the data will be analyzed using Excel. Graphs will illustrate areas learners did or did not do well on. Data arranged by objective on a hierarchy chart will display pre-test and post-test scores to show learners' progress after completing the module. A conclusion will follow, discussing what areas the learners did or did not do well on and why. Data from demographic surveys, attitude surveys, and notes will also help theorize why learners performed the way they did. Based on this data, appropriate steps will be taken to revise the module.

Data from surveys will be used to revise the module in regards to individual differences such as content preference, perceived cognitive load. The pre-test will integrate questions to test learners' working memory capacity so that this data can be used to make connections with working memory capacity and performance on the embedded and post-tests. Instructional design models using evidence-based principles will be used in the creation and organization of the instructional module so that the instruction will be effective for learners.

A question to address with findings from implementation of the web-based module includes, is a web-based module an effective means of instruction of APA style referencing for college students? Also, it more research must be done to determine which multimedia design theories prove to be effective for learning.

Conclusion

A web-based instructional module on APA style referencing will be give students easy access to learning a skill needed for academic success. Acquiring skills to write in APA style may help them produce better quality research which benefits students and the academic community. The trend toward automation in APA style writing is taking place and the APA web-based instructional module will be a small contribution. It will take into account multimedia learning theories and known problems such as cognitive overload, working memory capacity, dual task paradigm, and individual differences. Steps will be taken to increase effectiveness of the module such as keeping the user interface simple and keeping options at a reasonable level to avoid cognitive overload. Individual differences in prior knowledge, content preference, and working memory capacity will be considered during the design of the module which will be created from an instructional design model.

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