An Accessibility Evaluation of Social Media Websites for Elder Adults

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Abstract. Elder adults account for only a small portion of social networking site users despite the numerous benefits provided by social media. Although the number of elder users has grown in the past few years, many are not engaged with social media. Are there any special reasons for the elderly not to take advantage of social media? Are there any accessibility and usability challenges for the elderly to use social media? What are they? How do current social networking sites perform when it comes to accessibility for the elderly? This paper reports the preliminary findings to the above questions based on an instructor's notes on the discussions within an elderly computer class along with an accessibility evaluation of popular social media sites. The results show that many elders struggle with the understanding of Web 2.0 concepts and interpreting the complex layout of the social networking sites. Many sites do not adhere to respected accessibility standards and guidelines. Findings from this study will contribute to the understanding of the elder adults as a user group and improving the design of a more accessible website for the elderly.

Keywords: Social Media, Social Networking, Elder Adults.

1 Introduction

According to the Administration on Aging [1], 39.9 million people in the United States are 65 and older, with the expectation of this demographic to grow to 72.1 million in 2030. As of 2012, 53% of elder adults are engaged online [12] compared to 95% of teens [13]. The number of online elder adults engaged in social networking sites has grown from 7% in 2009 [14] to 34% in 2012 [12]. However, compared to 81% of online teens, elders aged 65 and older still represent the smallest demographic utilizing the internet and social media.

Social media is a popular internet activity because of its collaborative and resource-rich environment. It allows family, friends, and other users to interact synchronously and asynchronously from any device with internet access [10]. Therefore, social media can be beneficial to older adults that can become isolated from family, friends, and society due to health and immobility issues. To reap the benefits of this trend, the reasons behind the low social media participation of elders needs to be investigated.

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The following research questions should be investigated: (1) Are there any special factors/reasons that prevent elders from using social media? (2) Are there any accessibility and usability challenges for the elderly to use social media? If so, what are they? And, (3) are current social media sites usable and accessible for the elderly? To answer these questions, we conducted discussions with a group of elder adults and an accessibility inspection on some popular social networking sites. This paper reports the preliminary findings of these studies.

This paper is organized as the following: after a brief literature review on social media, elder adults and web usability as well as accessibility guidelines are reviewed. The research design including the class discussion and social media evaluation is discussed in detail. Afterwards, the findings from the class observation and social media site evaluations are presented. To conclude, future research is discussed.

2 Literature Review

2.1 Social Media

Social media is a type of application found within the Web 2.0 trend. Examples of social media include social networking, social bookmarking, blogs, discussion forums, wikis, photo-sharing, and video-sharing sites. These types of sites are characterized by their collaborative and interactive nature and dynamic, user-contributed content. Posting comments, viewing pictures, and connecting with users are just a few activities that can be achieved on these sites. Other unique characteristics include the ability to share, tag, and trend content. According to Alexa.com [2], four of the top ten visited sites on the internet are social media related, including Facebook (Ranked #2), YouTube (Ranked #3), Wikipedia (Ranked #6), and Twitter (Ranked #9).

2.2 Elder Adults

Elder adults can be defined by numerous measures, such as age, legal status, health, dependency, and milestone criteria. An objective way to define an adult is by age. Much research finds an elder adult as being aged 65 and greater, however past and current studies refer to elderly status based on generation, such as Baby Boomers who were born after World War II, from 1946 to 1964 [4]. Legally, an elder can possibly collect social security starting at age 62 or be eligible for Medicare by age 65 [16]. By health or dependence qualifications, elders can be seen as someone with gray hair or wrinkles, or have corrective support devices such as a walker or hearing aid [8]. In addition to age, legal, and physical criteria, elders can be defined by their life milestones, such as having grandchildren, living through the Great Depression, or work retirement [9]. In this paper, adults that are 65 or older are considered.

2.3 Elder Adult Social Media Advantages and Barriers

Elder adults can benefit from engaging in social media activities. Social media can improve self-worth and self-esteem of an elder, empowering them to be self-sufficient and independent [15, 17]. It can also provide a plethora of digital resources for learning found on blogs, wikis, and social bookmarking sites [3]. Contact between elders and others can increase because these types of sites facilitate communication and interactions between other users. Therefore an elder that is immobile or physically bound at a location like an assisted living community or nursing home can still communicate with the outside world.

Despite these advantages, physical impairments and disabilities, computer illiteracy, and negative perceptions may present challenges for elders utilizing social media. The natural aging process can deteriorate the body physically, cognitively, and physiologically [6, 7]. Many elders suffer from arthritis, vision, or memory loss, making it very difficult to use and interact with a computer. Other elders do not engage in internet activities because of computer literacy issues. Elders that were not raised with technology in their daily lives are considered digital immigrants, having to transition their lives from an analog to a digital world. Because of this unfamiliarity, many elders have negative perceptions of computers, the internet, and social media, fearful of breaking something, viewing inappropriate material, and becoming vulnerable with privacy issues.

Although many of these barriers are not easy to fix, there are website mandates and guidelines that address the accessibility issues.

2.4 Interface Design Mandates and Accessibility

There are numerous mandates, standards, and guidelines associated with the disabled to improve the usability and accessibility of computer systems. Although the elderly are not synonymous with the disabled, as discussed above many elders suffer from disabilities due to the natural aging process. Therefore many guidelines available for the disabled can also benefit the elderly.

For evaluation purposes, this study will address the government-mandated Section 508 Compliance, and WCAG 1.0 and 2.0. Section 508 makes it mandatory for government agencies to follow sixteen guidelines related to making webpages accessible and usable to those with disabilities. If any of these guidelines are not met, a site will be deemed as out of compliance. Similar to Section 508, WCAG 1.0 and 2.0 provide guidelines and three conformance levels to ensure a website is usable. WCAG 1.0 has 14 guidelines, including criteria on equivalent alternatives, colors, and language. WCAG 2.0 holds similar, but more detailed criteria that are organized into four principles. Differences between the two versions include inputs, formats, and pre-recordings [18].

Unfortunately, many social media sites do not adhere to these standards. Observations from the class discussion demonstrate how elders interact with social media. These observations provide us with motivation to evaluate current social media sites' compliance with available mandates and guidelines.

3 Class Discussion

To better understand the current state of elders and social media usage, in particular, social networking sites; a class discussion comprising of elderly adults with little computer experience was conducted in May of 2013. In conjunction with a church in the Mid-Atlantic area and an education institution; a free computer class with five sessions was offered to elderly adults with little to no computer experience. Adults accepted in the elderly class were chosen based on age requirement (65 years of age or older). Those that did not meet the age requirement were offered to attend a different class section offered by the same program.

Eight females attended this session. All of them had little to no previous computer and social networking experience. Within this class, students learned how to turn on and off a computer, use the drawing program Microsoft Paint, perform internet searches, and use email. At the end of the program, most of the elderly adults were able to use a mouse, including clicking, scrolling, and moving the cursor, except for those with hand/dexterity issues.

Some adults still had issues on the number of clicks, typing, opening and closing a program, understanding how to use an internet browser, and email. For example, many elder adults did not know when to double click or single click on a page or link. Others did not know how to exit a program, instead, minimizing or maximizing the page after clicking on the wrong button or toggling between applications. Many did not understand the internet browser window, often opting to type search terms in the address bar. Additional issues included elders not understanding the difference between subject lines and the body text of an email. After the final session of review, there was a class discussion on social networking.

During the class discussion, the instructor asked the students to describe what a social networking site is, identify examples of social media, identify and describe the features provided by the social networking sites. The instructor then corrected any misconceptions presented by the students. At the end of the discussion, the instructor conducted a walkthrough of a social networking site (Facebook) with the discussion on how to utilize different features the site has to offer (e.g. viewing a person's timeline, posting and receiving comments).

Throughout this class discussion, the instructor recorded notes regarding student's answers and feedback. The notes were then analyzed after the class to identify any possible issues/challenges that may have prevented elders in using social media/social networking sites.

4 Class Discussion Results

For the start of the class discussion, the instructor asked the students their definition of social media. Instead of giving a clear definition or any characteristics, such as collaboration, tagging, or sharing information; six participants were able to identify YouTube and Facebook as examples of social media applications. Two of the participants assumed that social media was 'the internet' or a chat room.

When asked if they could provide additional examples of social media and the purpose of these sites, most were not able to contribute or had heard of the teacher's suggestions of LinkedIn, Instagram, or Google+. A majority of the adults assumed that social networking sites were geared towards all users for the purpose of sharing pictures with family/friends. After explaining the numerous uses of these sites, the instructor asked if they would be open to utilizing these sites for business connections or current events. Most of the participants were hesitant because of their computer skills and unfamiliarity with social media; however two were willing to use it to find a job and most of the students never thought of using social media for news purposes.

Regarding the features provided, most users did not fully understand Web 2.0 terms such as "wall", "timeline", "instant messaging", "posting", "sharing links", or "tagging". When asked what was "posting to someone's wall or timeline", a participant answered that it is writing on someone's "homepage" (homepage is a term learned in the internet session of class) and that everyone would be able to see what was written. Additionally, the instructor asked what they think is 'sharing a link', and a participant answered that "it's sharing something that is interesting to you." Only three of the eight participants had ever engaged in social media usage for picture viewing purposes. They pointed out that they had received a Facebook link in their email or were told by the poster to navigate to Facebook to view pictures. These terms were further explained in the demo.

After showing how to log into Facebook with the instructor's account, the instructor asked the students their initial thoughts on the main page. Most participants were confused by the layout and did not know where to start or what functions were available on the site. All users asked to enlarge the text on Facebook before continuing. After adjusting the projector to show a larger resolution, the instructor asked the participant's help in completing a few tasks.

The instructor first asked how to view the instructor's main profile page. None of the users knew to click on the instructors name at the top of the page; however seemed to understand after the instructor asked them a few more times after toggling back and forth from the news feed and profile page. When viewing the tagged pictures of the instructor, the participants did not understand that tagging would pull pictures associated with the person. Each user continued to be surprised that the next picture in the series contained the instructor. On the main activity feed, the instructor pointed to a random post and asked the students what the particular fields contained. Most understood that the first line was the poster's name; however, they were confused with the actual post and its purpose, along with the concept of a news feed posting numerous people's posts.

After the teacher explained that the purpose of the particular person's post was for personal reasons, the instructor showed a few more posting examples on the news feed, such as links and images. Most participants did not know if something was a link when there was general text. For posts with links, images, and text, they were not sure where to click to view the entire post (Fig. 1).

Fig. 1. Screenshot of SNS difficulties experienced

After this task, users were asked how to find a friend's profile. Most participants skipped over the search bar in the top-center of the page and told the instructor to click on the "Find Friends" label at the top right of the window.

When asked for additional questions on the demo, a participant asked if the instructor could show her how to view her friend's pictures. After navigating to the photos section, the participant was still confused on how she would be able to complete this task at home without any help. The last task the instructor asked was to sign-out of the website. None of the users were able to find the "log out" button, which was a sub-link after rolling over the settings icon.

At the end of the discussion, the instructor asked how she could encourage the elders to use social networking sites. Their responses included having some sort of support to guide them in using a computer and the internet, as well as having a way to verify that their information is safe without privacy issues. Most users were very interested in learning more about social media, particularly to look at pictures posted by family and friends. It was also suggested that there be a class dedicated to just using social media, so that they could have someone create the account for them and to show them how to view pictures.

5 Social Media Evaluation

Evident by the class discussion results, it is apparent that elder adults encounter a number of hindrances when interacting with a social networking site. Based on these findings, the authors evaluated the accessibility of current social media applications.

The purpose of this assessment is to evaluate the current state of the compliance of the accessibility guidelines, and to identify the most frequently violated accessibility guidelines by social media websites. To evaluate these websites, the automated tool, SiteSort was chosen for its ability to evaluate websites based on Section 508 compliance, WCAG 1.0, and WCAG 2.0 criteria. The results were verified by the author by manually checking the source code of sample pages on each site.

In February 2013, nineteen popular social media websites, ranging from social networking (Facebook, LinkedIn, MySpace, Google+, Meetup), social bookmarking (Delicious, Digg, Reddit), blogs (Twitter, Blogger, WordPress, LiveJournal), photo-sharing (Pinterest, Flickr, Instagram), video-sharing (YouTube, Vimeo), and wiki sites (Wikia, Wikipedia), were reviewed for violations against Section 508 compliance and both versions of WCAG. Within these sites, unauthenticated and authenticated accounts were used to evaluate up to 100 pages of each social media site.

6 Social Media Evaluation Results

The overall results showed that social networking, video-sharing, and image-sharing sites accounted for the most combined violations, while social bookmarking sites and wikis recorded the least amount of infractions (chart). According to the SiteSort report, many disabled users could find it impossible to use some pages of these sites (Fig. 2).

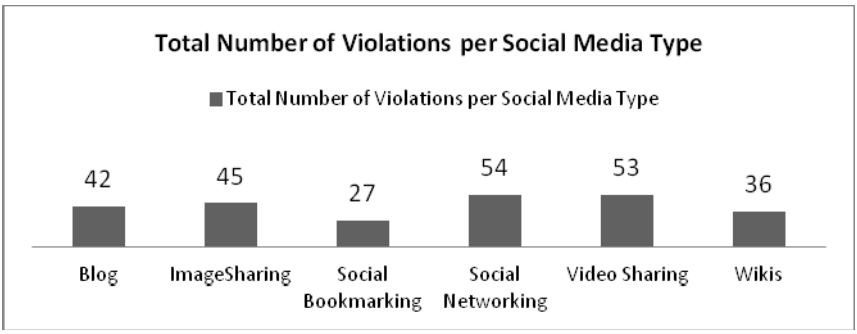

Fig. 2. Total Violations per Social Media Type

Evaluating against Section 508 compliance, video-sharing sites accounted for the majority of violations, followed by social networking sites, image-sharing sites, and wikis (Fig. 3). The social networking sites Facebook and MySpace were the biggest violators, along with Vimeo and YouTube , which was in contrast with the social bookmarking sites Delicious and Digg.

The most violated guideline was Section 508 1194.22 (a), where a text equivalent should accompany a non-text element, either with an alt tag or other type of descriptor, followed by Section 508 1194.22 (n), where electronic forms should be able to be completed by assistive technology.

SiteSort identifies the following page as an example of the Section 508 1194.22 (a) violation: https://myspace.com/onetwowatch?pm_cmp=ed_spl_5top_sky (Fig. 4).

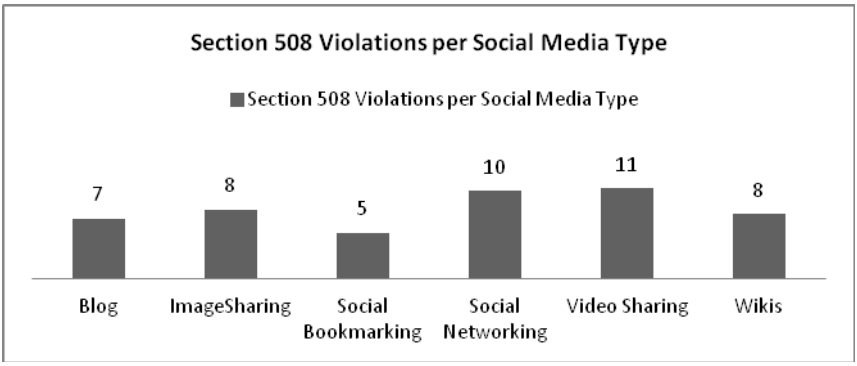

Fig. 3. Section 508 Violations per Social Media Type

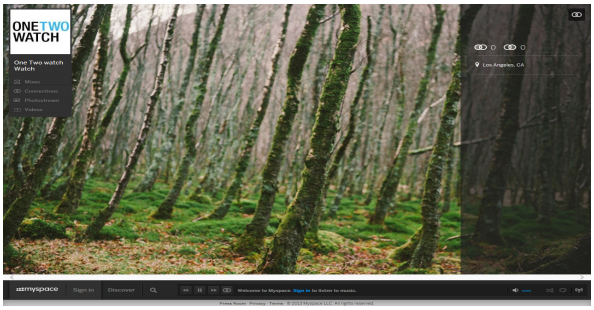

Fig. 4. Sample Screenshot of MySpace Violation

A view of the source confirms the violation that there is no alternative text associated with an image on this page (Fig. 5):

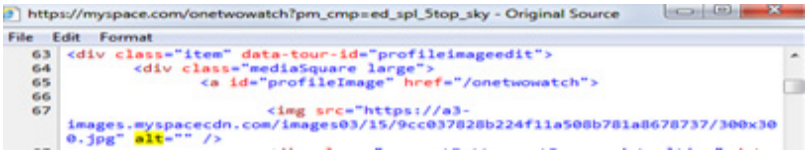

Fig. 5. MySpace Source Code

Similar to Section 508, most violations were found for guideline WCAG 1.1, priority 1, suggesting incorporating text equivalents for every non-text element, including images, graphics, image maps, animations, audio, and video files. Another highly violated guideline was priority 2, WCAG 13.1, where each link's target should be clearly identified. SiteSort identifies the following page as an example of a WCAG 1.1 violation, stating that title attributions should be accompanied with each page: http://www.livejournal.com/search/ (Fig. 6).

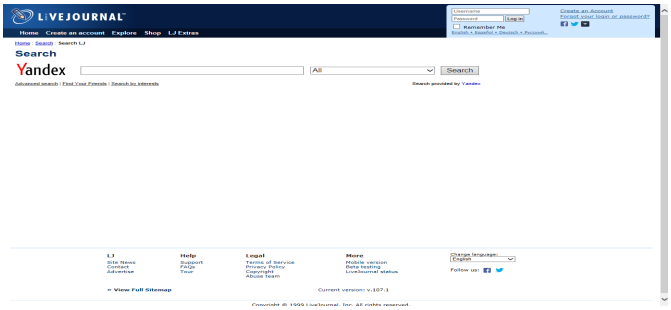

Fig. 6. Sample Screenshot of LiveJournal Violation

A view of the source confirms that no title was added to the page (Fig. 7):

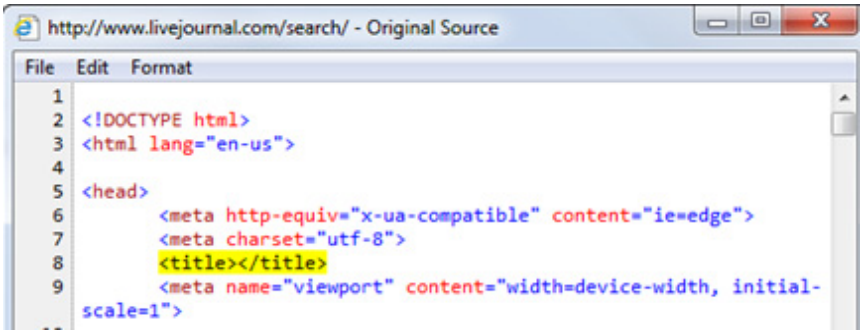

Fig. 7. LiveJournal Source Code

An evaluation of WCAG 2.0 shows similar results. Again, social networking sites and video sharing sites averaged the most number of violations, with the majority of violations from MySpace, YouTube, Facebook, and Flickr , and the least amount found with social bookmarking sites, Delicious and Digg having the least amount of infractions (Fig. 8).

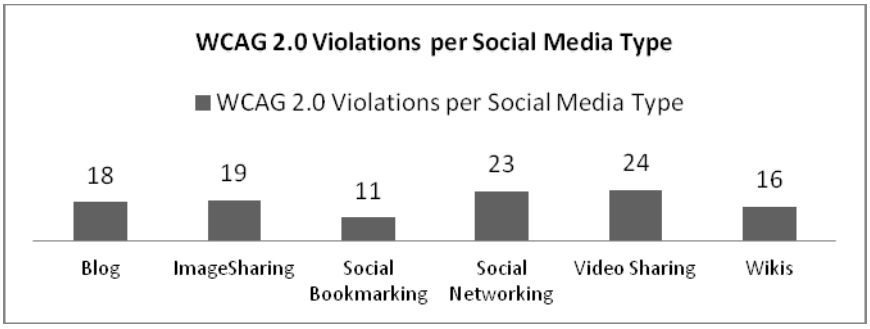

Fig. 8. WCAG 2.0 Violations per Social Media Type

Concerning conformance levels, the social networking sites MySpace and Facebook had the most amounts of level 1 priority violations, with the majority from Facebook and MySpace, in comparison to Blogger and Wiki. For priority level 2, Pinterest and YouTube had 11% of all violations, with the least amount coming from the social bookmarking site Delicious. Flickr and YouTube had the most violations for priority level 3. Overall, social networking sites were the biggest violators of level 1, in comparison to social bookmarking sites (8%). For level 2, video-sharing sites were the biggest offender, followed by wikis and image-sharing sites. Level 3 shows that image-sharing sites had the most violations in contrast to wikis (Fig. 9).

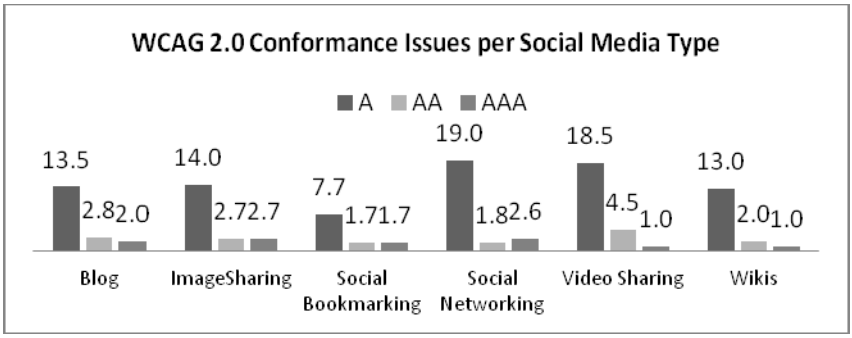

Fig. 9. WCAG 2.0 Conformance Issues per Social Media Type

The most violated criteria for this guideline was navigation. Level 1, WCAG 2.4.1 had 7% of all violations, showing that there was no mechanism to bypass blocks of content that are repeated on other pages. According to the guidelines, there should be a way to skip repetitive links.

The second most violated guidline was priorty 1, WCAG 1.4.4, where content should distinguishable, in particular, text should be able to be resized without assistive technology. The most violated priorty 2 level dealt with predictability, in particular, WCAG 2.0 AA 3.1.2 suggest that content should be readable and understandable.

7 Conclusion and Future Work

Elders are a growing demographic and can largely benefit from social media usage. To investigate the reason for the low participation rate of elder social media users, the following three research questions were investigated in this study: (1) Are there any special reasons for the elderly not to take advantage of social media? (2) Are there any accessibility and usability challenges for the elderly to use social media? If so, what are they? (3) How do current social networking sites perform when it comes to the accessibility for the elderly?

To find out the answer to the two research questions, we examined instructor's notes during the social media discussion in an elderly computer class and a sample social networking site walkthrough exercise. It was noted that many were hindered

based on the difficulty of correctly interpreting the page layout and the apprehension of lack of computer skills and computer security. More training on how to use the computer as well as how to interact with the social networking sites is needed to help less experienced users understand the basics.

It is important to note that despite all the issues experienced by the elders, during the class discussion, the majority of students expressed interest in further learning how to use social media. From the class discussion, elder user's motivation in using these types of sites is to stay connected with family and to view family and friend's pictures.

The difficulty in interpreting the page layout led us into the investigation of how well current social media sites are doing when it comes to compliance against accessibility guidelines. We assessed nineteen popular social media sites against Section 508 compliance and WCAG 1.0 and 2.0. Social media usage and elderly computer usage have grown, making it important that these types of sites be usable for this demographic. Although there are many mandates available for the disabled and elderly, this study's results show that many of these highly-used sites do not follow available guidelines and many sites continue to be designed without an evaluation of best practices for those with accessibility issues.

Research show that elder adults already have issues using technology [1], and the violations found in this study could decrease the usability and accessibility of these sites. The websites could improve their websites by adhereing to known guidelines, and correcting issues such as missing labels, titles, headings, and subheadings; providing text-equivalents, identifying all links, creating content that is readable and understandable, and providing pages that can be resized with or without assistive technology.

This paper reported results from a preliminary study on the attempt to help improve the accessibility of the social networking sites. More research using focus groups, usability testing, and other methods of "soliciting unbiased comments" [1] to evaluate usability and accessibility of a website is needed. It is also recommended that the redesigned social media interface should adhere to current mandates and guidelines, paying special attention to criteria regarding text size, layout, and navigation. In addition, it was suggested by the users that to help them be engaged in social media, more classes need to focus strictly on social media. They would also need some type of support while learning how to use these types of sites, as well as verification that their security and privacy would not be compromised.

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