Trust in Archives–Trust in Digital Archival Content Framework

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ABSTRACT Trust in information found online matters now more than ever. The proliferation of fake news and "post-truths" makes it difficult for people to determine what is trustworthy. People even question digital versions of basic identity documents such as birth certificates, the processes that archivists use to preserve them, and attestations of their authenticity. Given the current landscape, we need to better understand trust in archival materials found online. Drawing from relevant literature, I developed a model to examine the relationship between trust in archives and trust in digital archival content, the Trust in Archives–Trust in Digital Archival Content (TIA-TDAC) Framework. This article outlines an empirical test of the TIA-TDAC Framework. Using measures of both levels of trust, I designed a survey to evaluate archives users and potential archives users' trust in a diverse range of digitized and born-digital materials from a broad range of archives in the United States. Results of the survey indicate both that the association of trust in archives with trust in digital archival content could be empirically measured and that the relationship between the two trust levels was positively correlated. The article also discusses future directions for research.

RÉSUMÉ La confiance accordée à l'information trouvée en ligne est maintenant plus importante que jamais. La prolifération des fausses nouvelles et des « post-vérités » fait en sorte qu'il est difficile pour les gens de cerner ce qui est digne de confiance. On remet même en question les versions numériques des pièces d'identité de base, comme les certificats de naissance, les procédés utilisés par les archivistes pour les préserver, et la certification de leur authenticité. Étant donné l'état actuel des choses, nous devons mieux comprendre la confiance accordée au matériel archivistique qui se trouve en ligne. Puisant dans les écrits pertinents, j'ai développé un modèle pour explorer la relation entre la confiance envers les archives et la confiance envers le contenu archivistique numérique, le cadre Confiance dans les archives-confiance dans le contenu archivistique numérique (CA-CCAN). Cet article souligne un test empirique du cadre CA-CCAN. En utilisant des mesures pour les deux niveaux de confiance, j'ai élaboré un sondage pour évaluer la confiance accordée par des utilisateurs et des potentiels utilisateurs d'archives à une variété de matériel numérisé et né numérique provenant d'une large sélection d'archives aux États-Unis. Les résultats du sondage démontrent à la fois que l'association entre la confiance accordée aux archives et la confiance accordée au contenu archivistique numérique peut être mesuré de façon empirique et que la relation entre les deux niveaux de confiance démontre une corrélation positive. L'article aborde également des orientations de recherche éventuelles.

Introduction

Trust in information found online matters now more than ever. Fake news and "post-truths" are becoming so pervasive online that it can be difficult for people to determine what is trustworthy.[1] Social network sites such as Facebook allow their users to freely share content, including by diffusing misinformation and hoaxes.[2] Research has shown that consumption of online information is mediated through filtering, ranking, and recommendation algorithms that can introduce unintentional biases as they attempt to deliver relevant and engaging content.[3] For example, negative biases against women of colour are embedded in search engines and other retrieval algorithms.[4] People even question basic identity documents such as birth certificates and the processes archivists use to preserve them, as well as attestations of their authenticity, when these are presented online.[5]

Given the current digital landscape, we need to better understand the relationship between trust in archives and trust in digital archival content. Before the advent of computers, it was clear to people when they were accessing archival content because they had to go to physical archives to view the materials. Those days are gone. In the current digital age, people do not have to visit archives or use institutional archives' websites to access archival materials. They can simply google the information they want. Additionally, companies such as Ancestry[6] and FamilySearch[7] increasingly provide the types of content that only archives

1 Nicole A. Cooke, *Fake News and Alternative Facts: Information Literacy in a Post-Truth Era* (Chicago: ALA Editions, 2018).

2 Eugenio Tacchini, Gabriele Ballarin, Marco L. Della Vedova, Stefano Moret, and Luca de Alfaro, "Some Like It Hoax: Automated Fake News Detection in Social Networks," in *Proceedings of the Second Workshop on Data Science for Social Good* (SoGood), Skopje, Macedonia, 18 September 2017, ed. Ricard Gavaldà, Irena Koprinska, and Stefan Kramer, *CEUR Workshop Proceedings*, 1960 (2017).

3 Dimitar Nikolov, Mounia Lalmas, Alessandro Flammini, and Filippo Menczer, "Quantifying Biases in Online Information Exposure," *Journal of the Association for Information Science and Technology* 70, no. 3 (2019): 218–29.

4 Safiya Umoja Noble, *Algorithms of Oppression: How Search Engines Reinforce Racism* (New York: New York University Press, 2018).

5 Albert Jacob Meijer, "Trust This Document! ICTs, Authentic Records and Accountability," *Archival Science* 3, no. 3 (2003): 275–90.

6 Ancestry website, https://www.ancestry.com.

7 Family Search website, https://www.familysearch.org.

have traditionally provided, and these companies present this information in very different ways for their target audiences. For some users, knowing that an archives preserved or digitized the material they view really matters. However, identifying the source of archival material found online can be quite challenging, depending upon the context in which the material is found. For all of these reasons, it can be difficult for users to know if they can trust the archival content that they have found.

The purpose of this article is to introduce and report on the empirical testing of a proposed new framework, the Trust in Archives–Trust in Digital Archival Content (TIA–TDAC) Framework.[8] Specifically, the article asks the question, "In what ways are users' trust in archives (i.e., TIA) associated with their trust in digital archival content (i.e., TDAC)?" It presents results of a large-scale research project on users' perceptions of trust. Using measures of both levels of trust, TIA and TDAC, I collected survey responses from 2,312 archives users and potential archives users in the United States of America. Participants evaluated their trust in a diverse range of digitized materials (e.g., death and marriage certificates) and born-digital materials (e.g., films and websites) from a broad range of archives (i.e., Alabama Department of Archives and History Digital Collections, Hagley Digital Archives, Missouri Digital Heritage, and University of Wisconsin-Madison Digital Collections). Results of the survey indicated both that the association of trust in archives with trust in digital archival content could be empirically measured and that the relationship between the two trust levels was positively correlated.

Among the aspects of trust investigated in the study was the impact of providing different source attributions (i.e., information about who digitized or preserved archival materials) on users' perceptions of trust. For example, findings suggest that participants who were told which archives digitized and/or preserved a marriage certificate and a website rated those materials as more trustworthy than did participants who viewed the same materials but were not told who digitized or preserved them. These findings suggest that knowing which archives digitizes and/or preserves archival material matters to users and that this information positively influences their trust in these materials. In

8 I published an earlier version of this model. At that time, the model was based on a synthesis of existing literature on this topic, and I had not collected any empirical data to test it. The previous version also had fewer constructs than the current model presented here. To access the previous model, see Devan Ray Donaldson, "The TIA-TDAC Framework," *MAC Newsletter* 45, no. 3 (2018): 25–27.

contrast, there was no statistically significant difference in perceptions of trust in a digitized death certificate and film, regardless of what participants were told about who digitized and/or preserved them. These findings suggest that participants were willing to assume that these materials were generally trustworthy whether they were told which archives preserved them or not. Taken together, these findings point to a need for follow-up studies to more fully understand how trust operates in the current digital environment.

Background

Research on trust in records is not new.[9] However, empirical research addressing actual users' trust in digital archival content is a relatively recent development and is not well understood.[10] This shift to studying users' perceptions of trust in digital archival content is important because it emphasizes the role users play in judging the trustworthiness of archival content – as opposed to considering trust as a property inherent within any particular archival document or object. Definitions of trust in digital documents and records tend to include notions of accuracy, authenticity, and reliability, yet users of such documents and records and scholars studying trust define and apply these terms in a variety of different ways. Analysis of existing research on users' trust in digital content underscores the importance of users' trust in archives as institutions.

Users' Trust in Digital Archival Content

A consistent finding across multiple user studies is the influence of the archives – through its institutional authority, reputation, or actions – on users' trust in

9 Luciana Duranti, "Reliability and Authenticity: The Concepts and Their Implications," *Archivaria* 39 (1995): 5–10; Heather MacNeil, *Trusting Records: Legal, Historical and Diplomatic Perspectives* (Dordrecht, NL: Kluwer Academic, 2000); Heather MacNeil, "Trusting Records in a Postmodern World," *Archivaria* 51 (2001): 36–47; Eun Park, "Understanding 'Authenticity' in Records and Information Management: Analyzing Practitioner Constructs," *American Archivist* 64, no. 2 (2001): 270–91; Heather Marie MacNeil and Bonnie Mak, "Constructions of Authenticity," *Library Trends* 56, no. 1 (2007): 26–52; Luciana Duranti and Corinne Rogers, "Trust in Digital Records: An Increasingly Cloudy Legal Area," *Computer Law & Security Review* 28, no. 5 (2012): 522–31; Victoria Louise Lemieux, "Trusting Records: Is Blockchain Technology the Answer?" *Records Management Journal* 26, no. 2 (2016): 110–39.

10 Paul Conway, "Modes of Seeing: Digitized Photographic Archives and the Experienced User," *American Archivist* 73, no. 2 (2010): 425–62.

digital archival content. This suggests that trust operates at two interdependent levels. For example, Albert Jacob Meijer[11] found that when parliamentary committee members (i.e., users) needed to use digital records about suspects in their investigation of the national police corps in the Netherlands, they trusted those records because of the safeguards that the national police had put in place. Suspects' records were kept in two places: (1) in a database management system of the central information agency and (2) in digital systems at each regional police department. Although possible, tampering with suspects' records would require collusion between the information agency and the regional police departments. The users did not think these organizations would intentionally orchestrate tampering with suspects' records in multiple locations. In this example, it is important to note that these users' concept of trust in digital records was dependent on the actions of an organization. Specifically, the users considered the national police corps' preservation of these records in multiple locations to be a safeguard against tampering; according to Meijer, this was one reason why they were willing to trust in the authenticity of the records. This trust in the records is based on a specific type of trust in archives: specifically, trust that the records have not been tampered with is based upon trust that the archives have not tampered with them.

Like Meijer, Paul Conway[12] also reported on the influence of the archives on users' trust in digital archival content. His study involved understanding the perceptions of users who had prior experience using photographs that had been digitized by the Library of Congress (LOC) American Memory Project. He found that participants trusted the digitized photographs based on their knowledge of the institution that had digitized them (i.e., the LOC) specifically, its authority in regard to cultural heritage preservation. Additionally, his study participants trusted the digitized photographs based on positive prior experience with photographs that had been digitized by the LOC, which served as evidence of the quality of its digitization processes. In this example, participants trusted the digitized photographs because they trusted the LOC to digitize photographs that were faithful representations of their originals.

11 Meijer, "Trust This Document!"

12 Conway, "Modes of Seeing."

Similar to Meijer and Conway, John Pattenden-Fail et al.[13] reported on users' trust in information preserved by archives. Their study involved analyses of users' perceptions of the National Archives of the Netherlands' (NA) digitized and born-digital content. In their sample, Pattenden-Fail et al. found that "users generally trust information that is preserved by . . . archives."[14] Unlike those in Meijer and Conway's studies, participants in the Pattenden-Fail et al. study did not base their trust in information on any knowledge of specific actions taken by NA. Instead, they seemed to trust archives in their role as sources of information. They generally trusted information preserved by archives, which was why they reported trusting information preserved by NA. The net result is still the same. Users' trust in digital archival content is shaped, at least in part, by their trust in archives.

Even though Jenny Bunn et al.[15] did not use the phrase "trust in information" for content preserved by archives, they found that their study participants perceived various types of digital archival content as authentic (i.e., "the real thing")[16] because of their trust in archives. In their study of University College London graduate students' perceptions of the authenticity of born-digital archival content, they found that their participants were willing to assume that the born-digital content they viewed (e.g., blogs and press notices) was the real thing because of their trust in the archives that preserved it (e.g., the National Archives of the UK and the British Library). Specifically, they believed that these archives would not risk diminishing their reputations by having content on their websites that was not authentic. This example shows users' assumptions about archives – specifically, assumptions about what archives do to protect their reputations – engendering trust in archives. This affects users' perceptions of archival content – in particular, their perceptions of the authenticity of digital archival content.

13 John Pattenden-Fail, Bart Ballaux, Annette Balle Sørensen, Filip Kruse, and Jørn Thøgersen, *Report on Usage Models for Libraries, Archives, and Data Centres, Results of the Second Iteration* (n.p.: Planets, 2009), accessed 22 April 2019, http://www.planets-project.eu/docs/reports/Planets_PP3-D2ReportOnUsageModels.pdf.

14 Ibid., 12.

15 Jenny Bunn, Sara Brimble, Selene Obolensky, and Nicola Wood, *Team Europe EU28 Project 2015–16: Perceptions of Born Digital Authenticity* (n.p.: InterPARES Trust, 2016), accessed 15 July 2019, https://interparestrust.org/assets/public/dissemination/EU28_20160718_UserPerceptionsOfAuthenticity_FinalReport.pdf.

16 Ibid.

Taken together, findings from multiple studies on users' trust in digital archival content demonstrate (1) that trust in archives can be defined in terms of reputation, users' past experience, and/or archives' authority as sources of information; (2) that trust in digital archival content can be defined in terms of a perceived lack of tampering (e.g., authenticity), faithfulness to the original, accuracy, and/or reliability; and (3) that trust in archives can positively influence users' trust in digital archival content. These findings provide insight into the relationship between trust in archives and trust in digital archival content in terms of user perceptions. At present, what we know about this relationship is largely based on research in which users have been fully aware of where the archival content comes from and have interacted with the content within an archival context (e.g., a digital archives or an archives' website). As a result, we are limited in our understanding of how trust in digital archival content operates outside of the "control zones" that digital archives and archives' websites provide.[17] This is important because search engines and companies can crawl the Web, index archives' digital materials, and provide access to these materials without users having to visit archives' websites directly.

Source Attribution and Context

In contrast to archival science research, web credibility research focuses on users' perceptions of content found in both controlled environments (e.g., institutional repositories) and uncontrolled environments (e.g., the Internet and unfiltered search engine results). Credibility is "people's assessment of whether information is trustworthy based on their own expertise and knowledge."[18] Over the past two decades, web credibility researchers have developed useful conceptual frameworks and methods for evaluating users' perceptions; these include the factors that influence users' trust in the information that they find online.[19] Key among these factors is the source of the information and the context in which it is found.

17 Ross Atkinson, "Library Functions, Scholarly Communication, and the Foundation of the Digital Library: Laying Claim to the Control Zone," *Library Quarterly* 66, no. 3 (1996): 239–65.

18 Soo Young Rieh, "Credibility and Cognitive Authority of Information," in *Encyclopedia of Library and Information Sciences*, 3rd ed., vol. 1 (Boca Raton, FL: CRC Press, 2010), 1338.

19 For a comprehensive review of web credibility research, see Soo Young Rieh and David R. Danielson, "Credibility: A Multidisciplinary Framework," *Annual Review of Information Science and Technology* 41, no. 1 (2007): 307–64.

A consistent finding across multiple web credibility studies is that the source of anything found online is what or who the receiver believes it to be, and that those source attributions affect people's evaluation of online information.[20] Numerous studies have shown that when users think a source is trustworthy, they are more inclined to believe information from that source.[21] For example, Soo Young Rieh and Brian Hilligoss found that their participants trusted journal articles because they came from peer-reviewed journals.[22] They also trusted articles they found using Google Scholar because they knew that this platform provided journal articles and peer-reviewed information. Thus, trusting a journal article found using Google Scholar represents the concept of source layering.[23] The journal where the article came from and Google Scholar, the place where the participant found the article, are both considered sources by the participant. And both source attributions positively influenced the participant's perception of the article as trustworthy.

The web credibility literature is replete with examples where what is said about the source of the information affects people's perceptions of the trustworthiness of that information. For example, S. Shyam Sundar and Clifford Nass found that providing their participants with different information about the sources of identical online news stories (e.g., that they came from news editors, a computer terminal, other online users, or were self-selected) affected participants' perceptions of the news stories. In particular, their participants preferred news stories from other users over those selected by the news editors or the receivers themselves.[24] Similarly, Andrew Flanagin and Miriam Metzger found that their participants rated the trustworthiness of a news story differently based

20 S. Shyam Sundar, and Clifford Nass, "Source Orientation in Human-Computer Interaction: Programmer, Networker, or Independent Social Actor," *Communication Research* 27, no. 6 (2000): 683–703; S. Shyam Sundar, and Clifford Nass, "Conceptualizing Sources in Online News," *Journal of Communication* 51, no. 1 (2001): 52–72.

21 For a review of these studies, see Miriam J. Metzger, Andrew J. Flanagin, Keren Eyal, Daisy R. Lemus, and Robert M. McCann, "Credibility for the 21st Century: Integrating Perspectives on Source, Message, and Media Credibility in the Contemporary Media Environment," *Annals of the International Communication Association* 27, no. 1 (2003): 293–335.

22 Soo Young Rieh, and Brian Hilligoss, "College Students' Credibility Judgments in the Information-Seeking Process," *Digital Media, Youth, and Credibility*, The John D. and Catherine T. MacArthur Foundation Series on Digital Media and Learning, ed. Miriam J. Metzger and Andrew J. Flanagin (Cambridge, MA: MIT Press, 2008), 49–72.

23 Sundar and Nass, "Conceptualizing Sources in Online News," 68.

24 Ibid., 65.

on what they were told about where the story came from.[25] Their participants rated the same information as more trustworthy when they viewed it on a news organization site or an e-commerce site than when they viewed it on a special interest group site or a personal site.[26] In both examples, the web credibility researchers employed research designs and methodologies that allowed them to test the impacts of different source attributions on their participants' perceptions of the trustworthiness of content from those sources.

Web credibility researchers have also examined the importance of context in people's evaluation of online information. For example, Eszter Hargittai et al. found that their participants trusted the information they found online if it came from a top search result in Google, because they trusted that search engine.[27] As a result, the participants rarely investigated their search results with regard to who had authored the information they found or their credentials. For the study tasks, their trust in the Google search results was so high that they did not need to verify the information. Thus, context can be seen to play an important role in users' evaluation and judgment of online content. Although these findings are consistent with studies that underscore the importance of archival context in trusting archives, it is important to note that Google provides a very distinct type of environment. In contrast to search engines, institutional archives preserve content and control which materials are made accessible on their websites. They also establish and monitor the integrity of these materials. Even though Google does not perform these sorts of actions for the materials that appear in its search results, findings from the Hargittai et al. study suggest that people still seem to trust Google's selections.

In sum, although archivists have studied trust for centuries, they have just recently begun to study trust in digital archival information in terms of actual users' perceptions. According to prior research, users' trust in archives can be based on the perceived reputation of an archives, users' past experience with an archives, or users' perceptions of archives as good sources of information,

25 Andrew J. Flanagin and Miriam J. Metzger, "The Role of Site Features, User Attributes, and Information Verification Behaviors on the Perceived Credibility of Web-Based Information," *New Media & Society* 9, no. 2 (2007): 319–42.

26 Ibid., 329.

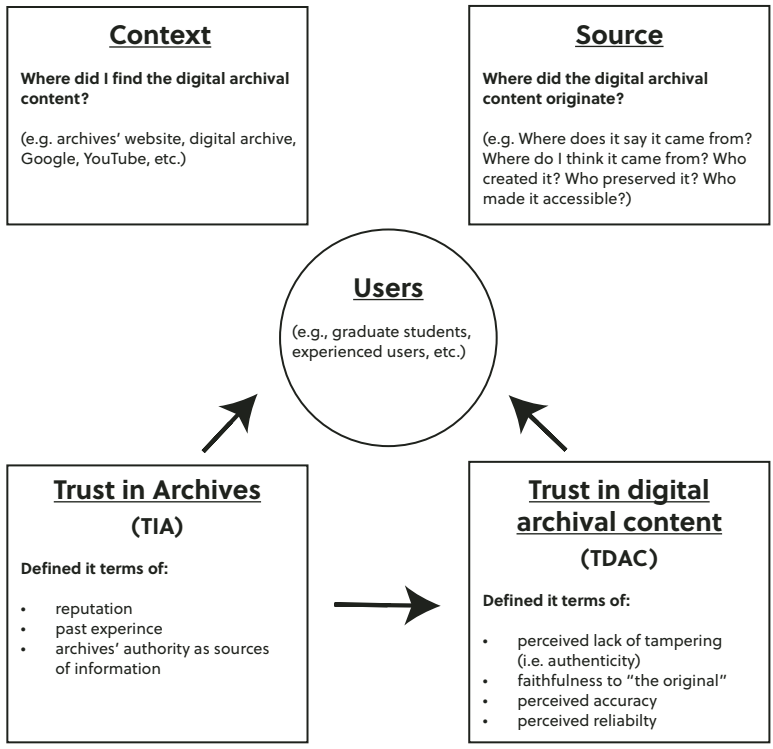
27 Eszter Hargittai, Lindsay Fullerton, Ericka Menchen-Trevino, and Kristin Yates Thomas, "Trust Online: Young Adults' Evaluation of Web Content," *International Journal of Communication* 4 (2010): 27, accessed 29 April 2019, http://ijoc.org/index.php/ijoc/article/view/636.

generally speaking. Users' trust in digital archival content can be based on a perception that there has been no tampering with the content, on the extent to which users think the content is faithful to the original, and on the perceived accuracy and reliability of the content. Outside of archives' websites or digital archives' contexts, web credibility research has shown that people's trust in digital information can be affected both by their understanding of who or what is the source or sources of the information and also by the context in which the digital information is found. At present, we lack a framework that brings together all of these notions of trust within a unified model. Such a framework could be useful for identifying which specific aspects of users' trust in digital archives affect their trust in digital archival content. Further, such a framework could be applied to users' assessments of digital archival content that can be found in contexts other than digital archives and archives' websites. This is very important since users can now find archival materials from a variety of different locations on the Internet, for example, by doing a Google search, a Google image search, or a YouTube search. The next section proposes that framework – the TIA–TDAC framework.

The TIA–TDAC Framework

The TIA–TDAC framework models the influence of users' trust in archives on their trust in digital archival content (see figure 1). It is derived primarily through a synthesis of the literature on users' trust in digital archival content and relevant web credibility literature. The circle in the centre of the framework, Users, represents users of digital archival content. Examples of users in prior research on trust include undergraduate and graduate students as well as users with past experience using specific archives. In the TIA–TDAC framework, users' perceptions of trust in archives (TIA) and trust in digital archival content (TDAC) play a central role, as indicated by the arrows pointing from TIA and TDAC to Users.

FIGURE 1 *The TIA–TDAC framework.*



TIA, the left rectangle under Users, represents users' perceptions of trust in archives, which can be defined in terms of an archives' reputation, users' past experience with an archives, or users' perceptions of archives' authority as sources of information more generally. TDAC, the right rectangle under Users, represents users' trust in digital archival content, which can be defined in terms of a perception that there has been no tampering (i.e., an aspect of authenticity), that the content is faithful to the original, that it is accurate, and that it is reliable. Examples of digital archival content in prior research on trust include digitized and born-digital primary source materials such as press notices; photographs; police records; blog postings; and marriage, death, and birth certificates. The arrow pointing from TIA to TDAC represents the influence that users' trust in archives can have on their trust in digital archival content. The arrow points

from TIA to TDAC since prior research suggests that TIA has a positive effect on TDAC such that users are inclined to trust digital archival content based, at least in part, upon their trust in archives.

The TIA–TDAC framework also takes into account the roles of both source and context in users' trust judgments. The Source rectangle at the top-right corner of figure 1 represents both the source that users are told digital archival content comes from and also the source they believe digital archival content comes from. This construct is important for the TIA–TDAC framework because, as prior web credibility research demonstrates, a user may judge the trustworthiness of online information differently based on what they are told about its source or on who or what they believe the source to be. Users might consider the source concept in response to any one or combination of the following questions: Who authored it? Who created it? Who or what provided access to it? Who digitized it? Who preserved it?

The Context rectangle (see the top-left corner of figure 1) represents the location where users find digital archival content. Sometimes, the context is simple to determine. For example, the user finds the digital archival material by visiting a digital archives' website or by browsing through an archives' digital collections. At other times, users can find digital archival content by performing Google image searches or by using other search engines. In these contexts, it may be more difficult for a user to determine the source of the content. Regardless, where users find content can affect their perceptions; thus this construct is included in the framework.

It is important to note that the concepts of source and context are not mutually exclusive and are dependent upon users' understanding as they interact with archival materials on the Web. For example, when users find archival photographs by browsing a digital archives' collections, they might consider that digital archives to be both the source of the photographs and also the context in which the photographs were found – or they might consider the photographer who took the original photographs to be the source and the digital archives to be the context in which they were found. Even though source and context can overlap, they are cast as distinct and separate concepts in the TIA–TDAC framework so as not to assume or presuppose any given user's understanding.

Methodology

This large-scale, quantitative study employed survey research to gather data in the form of self-reports from archives users and potential archives users to measure the variables of interest (i.e., TIA and TDAC) and test the TIA–TDAC framework. The study applied survey methodology – that is, "design, collection, processing, and analysis of surveys," which "are linked to the cost and quality of survey estimates" – as specified in Robert M. Groves et al.[28] It used Qualtrics[29] online survey software to support the design and administration of a web-based questionnaire.

Research Question and Hypotheses

The overarching research question for the study was as follows:

- In what ways is users' trust in archives (i.e., TIA) associated with their trust in digital archival content (i.e., TDAC)?

  Based on prior empirical research on users' trust in digital archival content reported in Bunn et al., Conway, Meijer, and Pattenden-Fail et al., the research hypotheses were as follows:

- H1: If a person thinks that archives in general are good sources of information (i.e., if they have high TIA), they will be more likely to perceive digital content that has been preserved or digitized by an archives as trustworthy (i.e., to have high TDAC) than someone who thinks that archives are bad sources of information (i.e., a person with low TIA).

- H2: If a person has had positive past experiences with a specific archives (i.e., if they have high TIA), they will be more likely to perceive digital content that has been preserved or digitized by that archives as trustworthy (i.e., to have high TDAC) than someone who has had negative past experiences with that archives (i.e., a person with low TIA).

28 Robert M. Groves, Floyd J. Fowler Jr., Mick P. Couper, James M. Lepkowski, Eleanor Singer, and Roger Tourangeau, *Survey Methodology*, 2nd ed. (Hoboken, N.J.: Wiley, 2009).

29 Qualtrics website, www.qualtrics.com.

- H3: If a person thinks that a specific archives has a good reputation (i.e., if they have high TIA), they will be more likely to perceive digital content that has been preserved or digitized by that archives as trustworthy (i.e., to have high TDAC) than someone who thinks that archives has a bad reputation (i.e., a person with low TIA).

- H4: Telling participants that content was digitized or preserved by an archives will result in higher perceptions of trustworthiness than not telling them anything about who digitized the content (i.e., providing no source attribution).

- H5: Telling participants that a specific archives digitized or preserved the content will result in higher perceptions of trustworthiness than simply stating that the content was digitized or preserved by an archives, without specifying which one.

- H6: Telling participants that content was digitized by an archives – either any archives or a specific archives – will result in higher perceptions of trustworthiness than telling them that the content was digitized by an entity that was not an archives (e.g., Ancestry).

Survey Development and Testing

To address the research question and test the research hypotheses, the research team selected publicly available, real-world digital archival content from four different archives, and participants viewed and answered questions about this content during the survey (see table 1). All the archives had paper-based and digital collections. The archives were diverse and included state government archives, institutional university archives, and independent research archives. In determining which materials would be included in the survey, the research team searched in these archives for digital materials that were representative of each archives' holdings. Two of the items, a marriage certificate and a death certificate, were digitized. The other two items, a website and a film, were born digital.

TABLE 1 *Digital archival content evaluated by participants.*

DOCUMENT TYPE	BORN DIGITAL OR DIGITIZED?	ARCHIVES
Death certificate	Digitized	Missouri State Archives – Missouri Digital Heritage
Website	Born digital	University of Wisconsin-Madison Digital Collections
Marriage certificate	Digitized	Alabama Department of Archives and History Digital Collections
Film	Born digital	Hagley Digital Archives

Measures of Trust in Archives and Trust in Digital Archival Content

The survey was designed to measure trust in the digital archival materials listed in table 1 by presenting participants with the digitized and/or born-digital content and asking them to judge the trustworthiness of this content. Participants' perceptions of trustworthiness were measured according to the Digitized Archival Document Trustworthiness Scale (DADTS),[30] which was developed, based on the responses of hundreds of users of the Washington State Digital Archives, to identify which survey items could be used to effectively measure users' perceptions of the trustworthiness of typical archival materials they used from that archives. DADTS was included in this study because the overall goal of constructing DADTS was to create an instrument that could be used to measure users' perceptions of the trustworthiness of digital archival content. DADTS asks participants to respond to 12 items that describe specific aspects of trustworthiness for digitized content: (1) the document is authentic; (2) the document is factual; (3) the document includes documentation of where it came from; (4) the document was created using responsible and accepted practices; (5) the digitized document is an actual picture of the original physical document; (6) the document is credible; (7) the document appears free from error; (8) the document is what it claims to be; (9) the document is a primary source; (10) the document accurately reflects what happened; (11) the document is official; and (12) the document

30 Devan Ray Donaldson, "The Digitized Archival Document Trustworthiness Scale," *International Journal of Digital Curation* 11, no. 1 (2016): 252–70.

was written at the time of the event.[31] The survey developed for this study asked participants to rate each DADTS item for both the digitized marriage certificate and the digitized death certificate. For the website and the film, it asked them to rate modified DADTS items that asked about the trustworthiness of the specific type of born-digital content. Participants rated all of these items on a seven-point scale ranging from −3, very untrustworthy, to +3, very trustworthy.

To measure trust in the archives, the survey asked participants whether they thought archives in general were good sources of information. Participants rated their responses to this question on a five-point scale ranging from −2, extremely bad, to +2, extremely good. To measure trust in the archives that the materials listed in table 1 came from, the survey asked questions about whether the participants had ever used the archives that had preserved or digitized the four items selected for the study, whether they had had good experiences using the archives, and whether they thought those archives had good reputations. These questions were developed in an effort to measure the TIA construct and were drawn from participants' statements about their trust in archives in previous, primarily qualitative studies.[32]

Measuring the Impact of Source Attribution on Perceptions of Trust

The survey provided participants with different information about who had digitized or archived the digital content to measure whether this influenced participants' judgment of the trustworthiness of the content. As shown in table 2, each document type had three or more different source attributions, which were randomly assigned. Participants were divided into groups of 500 or more for each document type. For example, for the digitized death certificate, the survey presented one group of participants with the certificate but with no information about who had digitized it (i.e., the no-attribution condition) and then asked them to judge its trustworthiness. For another group of participants, the survey stated that an archives had digitized the certificate, but did not specify which archives. Another group of participants was told exactly which archives had digitized the certificate (the Missouri State Archives). Another group was told that the certificate had been digitized by Ancestry – a source that might plausibly have digitized it, but had not.

31 Ibid., 263.

32 For examples of previous studies where users articulate their concept of trust in archives, see Conway, "Modes of Seeing" and Pattenden-Fail et al., *Report on Usage Models for Libraries, Archives, and Data Centres*.

TABLE 2 *Document types and source attributions.*

DOCUMENT TYPE	SOURCE ATTRIBUTION
Death certificate	No attribution
	An archives (unspecified)
	Missouri State Archives (the source archives)
	Ancestry (a plausible source)
Marriage certificate	No attribution
	An archives (unspecified)
	The archives it could have come from
	Ancestry (the actual source)
Website	No attribution
	An archives (unspecified)
	The Internet Archive
	The University of Wisconsin
Film	No attribution
	An archives (unspecified)
	Hagley Digital Archives

Context

I controlled context – where participants encountered the digital archival materials – by having the participants interact with all of the digital materials within the context of the online survey. I embedded the digitized death and marriage certificates into the survey pages where the participants answered questions about them. I embedded links to the born-digital materials, the website and the film, in the survey, and participants clicked these links to view the materials and then answered questions about them.

Demographics

The survey included demographics questions that asked about each participant's gender, age, income, and education level.

Attention Checking

The survey included a simple, multiple-choice arithmetic question as an attention check to validate the quality of the data.[33] The responses of participants who answered this question incorrectly were eliminated from data analysis.

Testing

To pre-test the survey, I conducted cognitive interviews[34] with five graduate students to assess the clarity of the instructions and survey questions while testing the logic built in to the web-based questionnaire protocol. Based on findings from these cognitive interviews, I revised the wording of four questions to increase their understandability and dropped one of the choices from each of three questions.

Data Collection

In March 2018, I administered the survey as a human intelligence task (HIT) through Amazon Mechanical Turk[35] to 2,312 archives users and potential archives users located in the United States. Potential archives users were individuals who reported that they had not used archives before or did not know if they had used archives. Participants were paid 50 cents in exchange for their participation in the study.

Data Analysis

All data analysis activities were performed using SPSS 25.0, a software program for statistical computation, and following procedures outlined by Samuel B. Green and Neil J. Salkind for computing variables and generating descriptive statistics.[36] Additionally, three different types of statistical tests were performed to test the hypotheses: (1) a linear mixed model (LMM), (2) Mann-Whitney U tests, and (3) one-way analysis of variance (ANOVA) tests.

33 Groves et al., *Survey Methodology*.

34 Debbie Collins, "Pretesting Survey Instruments: An Overview of Cognitive Methods," *Quality of Life Research* 12, no. 3 (2003): 229–38.

35 Amazon Mechanical Turk website, https://www.mturk.com.

36 Samuel B. Green and Neil J. Salkind, *Using SPSS for Windows and Macintosh: Analyzing and Understanding Data*, 5th ed. (Upper Saddle River, NJ: Pearson Prentice Hall, 2008).

To analyze the data resulting from testing my first hypothesis, I created a linear mixed model (LMM).[37] I selected an LMM because this model accounts for the fact that multiple responses from the same person are more similar to each other than to responses from other people. In this study, I used an LMM to measure the relationship of each participant's general trust in archives as good sources of information to their trust in each type of digital archival content that they viewed, as measured by the DADTS.

To analyze the data resulting from testing my second and third hypotheses, I conducted a series of Mann-Whitney U tests to determine whether statistically significant differences in trust in digital archival content existed (1) between those who had had positive past experiences with archives and those who had had negative past experiences with archives and (2) between those who thought archives had good reputations and those who thought archives had bad reputations.

To analyze the data resulting from testing my fourth, fifth, and sixth hypotheses, I conducted a series of one-way analysis of variance (ANOVA) tests to detect statistically significant differences in perceptions of trustworthiness based on the source attributions for the four different types of archival content that participants evaluated during the study.

Findings

The findings are organized into four sections. The first section describes the demographic characteristics of the study participants. The remaining three sections provide the results of testing the study's six hypotheses.

Demographic Characteristics

A profile of the participants by gender, age, income, and education level (see table 3) shows that most of the participants were male, between the ages of 20 and 39, made less than $50,000 annually, and had at least some college education.

37 Brady T. West, Kathleen B. Welch, and Andrzej T. Galecki, *Linear Mixed Models: A Practical Guide Using Statistical Software*, 2nd ed. (Boca Raton, FL: CRC Press, 2014).

TABLE 3 *Descriptive statistics of participants' demographic characteristics (n = 2,312).*

CATEGORIES	CATEGORY CHOICES	%
Gender	Female	39%
	Male	60%
	Alternative self-identification	1%
Age	19 or under	1%
	20–29	33%
	30–39	34%
	40–49	16%
	50–59	10%
	60–69	5%
	70 or older	1%
Income	Under $30,000	28%
	$30,000–$49,999	26%
	$50,000–$74,999	23%
	$75,000–$150,000	20%
	Prefer not to answer	3%
Education	Some high school	1%
	High school graduation or general education diploma (GED)	8%
	Some college or two-year degree	34%
	Four-year degree	38%
	More than four-year degree	19%

Results of Testing Hypothesis 1: Linear Mixed Model Results

To test the first hypothesis (H1), I generated a linear mixed model (LMM) to illustrate the relationship between trust in archives (TIA) and trust in digital archival content (TDAC) based on the data I collected. I entered TIA, as measured by the extent to which participants thought archives in general were good sources of information, into SPSS and entered the type of digital archival content the participants viewed (e.g., death certificate, film, marriage certificate, or website)

as fixed effects.[38] As shown in the summarized estimation results (see table 4), TIA, as measured by the extent to which participants thought archives in general were good sources of information, is significant at the 0.05 level (p = 0.000). This means that TIA is a potentially important predictor of the dependent variable, TDAC. There is also a linear relationship between TIA and TDAC across all document types (see figure 2). As shown in figure 2, the more participants thought archives in general were good sources of information, the more they perceived the digital archival content that they viewed to be trustworthy.

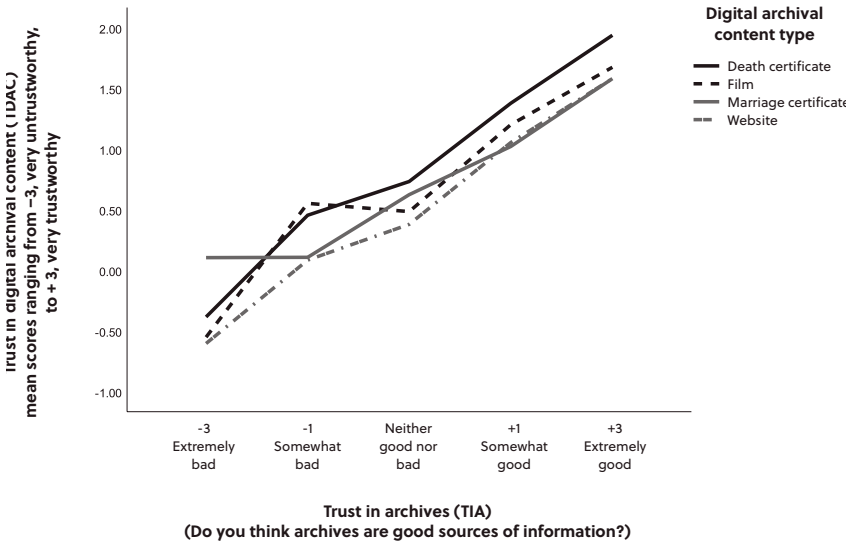


FIGURE 2 *Linear mixed model (LMM) graph of the relationship between users' trust in archives (TIA) and their trust in digital archival content (TDAC) (n = 2,312).*

38 The fixed effects pertain to the independent variables in this study. The fixed effects assumption is that the individual-specific effects are correlated with the independent variables.

TABLE 4 *Tests of fixed effects (dependent variable: trust in digital archival content)(n = 2,312). Belief that archives are good sources of information.*

PARAMETER	ESTIMATE	SE	T	SIGNIFICANT
Intercept	1.57	0.03	52.10	0.00
Trust in archives (extremely bad source)	−2.08	0.23	−8.98	0.00
Trust in archives (somewhat bad source)	−1.39	0.12	−11.32	0.00
Trust in archives (neither good nor bad)	−1.15	0.05	−22.14	0.00
Trust in archives (somewhat good source)	−0.53	0.03	−18.30	0.00
Trust in archives (extremely good source)	0.00[a]	-	-	-
Document type (death certificate)	0.34	0.04	9.13	0.00
Document type (film)	0.12	0.04	3.20	0.00
Document type (marriage certificate)	0.01	0.04	0.25	0.81
Document type (website)	0.00[a]	-	-	-

a: parameter is set to zero because it is redundant.

Results of Testing Hypotheses 2 and 3: Mann-Whitney U Tests Results

To evaluate the second hypothesis (H2), that users with positive past experience with an archives would rate the trustworthiness of digital archival content from that archives higher than users who had had negative past experiences with that archives, I attempted a series of Mann-Whitney U tests. For the digitized death certificate, the results were in the expected direction and significant: $z = -2.12$, $p = 0.34$. Those who reported having had positive past experiences with the Missouri State Digital Heritage had an average rank of 25.39, while those who reported having had negative past experiences with the Missouri State Archives had an average rank of 4.00. In this case, past experience mattered. Participants who had had positive past experiences with the Missouri State Archives rated the death certificate as more trustworthy than participants who viewed the same death certificate but had had negative past experiences with the Missouri State Archives.

There were too few participants with negative past experiences with the other archives to compare with those who had had positive experiences in order to run Mann-Whitney U tests to evaluate H2 for the marriage certificate, the website, or the film. There were also too few participants who thought the archives had bad reputations to compare with those who thought the archives had good reputations in order to run Mann-Whitney U tests to evaluate the third hypothesis (H3) for any of the digital archival materials.

Results of Testing Hypotheses 4, 5, and 6: ANOVA Tests Results

To evaluate the relationship between source attributions and users' perceptions of the trustworthiness of digital archival content, I conducted a series of one-way analysis of variance (ANOVA) tests. For the first ANOVA, the independent variable, source attribution, included four levels: no attribution, an archives (unspecified), the Alabama Department of Archives and History Digital Collections, and Ancestry. The dependent variable was users' perceptions of the trustworthiness of the marriage certificate as measured using the DADTS. The ANOVA was significant: $F(3, 2{,}276) = 2.86$, $p = 0.04$. The strength of the relationship between source attribution and the perception of trustworthiness, as assessed by $n2$, was weak, with source attribution accounting for 0.4 percent of the variance in the dependent variable.

I conducted follow-up tests to evaluate pairwise differences among the means. Because tests for equal variances assumed were not found to be significant, I chose to assume that the variances were homogeneous and conducted post hoc comparisons with the use of Tukey's honestly significant difference (HSD) test,[39] which assumes equal variances among the four groups. There was a significant difference between the mean of the group that did not receive any information about who had digitized the marriage certificate (e.g., the no-source-attribution group) and that of the group that was told that the marriage certificate had been digitized by the Alabama Department of Archives and History Digital Collections, but there were no significant differences between the means of the groups that were provided with the two other source attributions and that of the no-source-attribution group. The group that did not receive a source attribution rated the trustworthiness of the marriage certificate lower than the participants who were

39 For information on the theoretical background of Tukey's HSD test, see Hervé Abdi and Lynne J. Williams, "Tukey's Honestly Significant Difference (HSD) Test," in *Encyclopedia of Research Design*, ed. Neil Salkind (Thousand Oaks, CA: Sage, 2010).

told that the same marriage certificate had been digitized by the Alabama Department of Archives and History Digital Collections. In this case, whether or not participants received specific information about who had digitized the marriage certificate mattered. The 95 percent confidence intervals for the pairwise differences, as well as the means and standard deviations for the four source attributions, are reported in table 5.

TABLE 5 *Confidence intervals of pairwise differences in mean changes in perceptions of trustworthiness based on different marriage certificate source attributions.*

SOURCE ATTRIBUTION	M	SD	NO SOURCE	AN ARCHIVES	ALABAMA
No source	1.13	1.50			
An archives	1.28	1.46	−0.37 to 0.07		
Alabama	1.38	1.40	−0.47 to −0.03*	−0.32 to 0.12	
Ancestry	1.27	1.45	−0.36 to 0.08	−0.21 to 0.23	−0.33 to 0.11

* *the 95% confidence interval does not contain zero, therefore the difference in means is significant at the 0.05 significance level using Tukey's HSD procedure.*

For the second ANOVA, the independent variable, source attribution, included four levels: no attribution, an archives (unspecified), the Missouri State Archives, and Ancestry. The dependent variable was users' perceptions of the trustworthiness of the death certificate, as measured using the DADTS. The ANOVA was not significant – $F(3, 2{,}306) = 0.87$, $p = 0.46$ – suggesting that the difference in perceptions of the trustworthiness of the death certificate was not statistically significant regardless of what participants were told about who digitized it.

For the third ANOVA, the independent variable, source attribution, included four levels: no attribution, an archives (unspecified), the Internet Archive, and the University of Wisconsin-Madison Digital Collections. The dependent variable was users' perceptions of the trustworthiness of the website, as measured using the DADTS. The ANOVA was significant: $F(2, 2{,}307) = 2.06$, $p = 0.10$. The strength of the relationship between source attribution and perception of trustworthiness, as assessed by $n2$, was weak, with source attribution accounting for 0.3 percent of the variance in the dependent variable.

I conducted follow-up tests to evaluate pairwise differences among the means. Tukey's HSD tests showed that there was a significant difference between the mean of the group that did not receive any information about who preserved the website (e.g., the no-source-attribution group) and that of the group that was told that the website had been preserved by the Internet Archive, but that there were no significant differences between the means of the groups that were provided with the two other source attributions and that of the no-source-attribution group. The group that did not receive a source attribution rated the trustworthiness of the website lower than the participants who were told that the same website had been preserved by the Internet Archive. In this case, whether or not participants received specific information about who had preserved the website mattered. The 90 percent confidence intervals for the pairwise differences, as well as the means and standard deviations for the four source attributions, are reported in table 6.

TABLE 6 *Confidence intervals of pairwise differences in mean changes in perception of trustworthiness based on different website source attributions.*

SOURCE ATTRIBUTION	M	SD	NO SOURCE	AN ARCHIVES	INTERNET ARCHIVE
No source	1.17	1.42			
An archives	1.27	1.29	−0.28 to 0.08		
Internet Archive	1.36	1.26	−0.37 to −0.01*	−0.27 to 0.09	
Wisconsin	1.23	1.40	−0.24 to 0.12	−0.13 to 0.23	−0.32 to 0.05

** the 90% confidence interval does not contain zero, and therefore the difference in means is significant at the 0.10 significance level using Tukey's HSD procedure.*

For the fourth ANOVA, the independent variable, source attribution, included three levels: no attribution, an archives (unspecified), and the Hagley Digital Archives. The dependent variable was users' perceptions of the trustworthiness of the film as measured using the DADTS. The ANOVA was not significant: $F(2, 2{,}301) = 1.022$, $p = 0.36$. This suggests that the difference in the perception of the trustworthiness of the film was not statistically significant, regardless of what participants were told about who preserved it.

Discussion

This study adds to the body of literature concerned with understanding the relationship between users' trust in archives and their trust in digital archival content. Previous, primarily qualitative studies have gathered information from archives users demonstrating that their trust in archives positively influences their trust in archival content, and this informed the development of the first hypothesis (H1). Findings from this study – in particular, results of the LMM – draw from a sample of over 2,000 archives users and potential users to provide empirical, statistical support for a positive association between trust in archives (TIA) and trust in digital archival content (TDAC), confirming H1. Consequently, these LMM results make this study the first to provide a conceptual framework and a statistical measurement model for explaining and examining the relationship between trust in archives and trust in digital archival content from the user's perspective.

This study was not able to test the second or third hypotheses (H2 or H3) because it included too few participants who had had bad experiences with archives or thought the archives considered in this study had bad reputations to test the associations between users' experience with archives, their perception of archives, and their trust in digital archival content. This is very good news, given the large sample size. It suggests that, in the current digital environment, many people are having good experiences with a wide range of archives, and many people consider archives to have good reputations.

There was no statistically significant difference between the perceptions of trustworthiness held by those who were told that the archival materials (e.g., the birth certificate, death certificate, website, and film) had been digitized or preserved by an archives and those who viewed the same materials but were told nothing about who had digitized or preserved them; thus, the fourth hypothesis (H4) was not supported. These findings are counter to the web credibility research literature, which suggests that source attribution affects perceptions of the trustworthiness of digital information such that any source attribution, whether specific (i.e., to a specific archives) or vague (i.e., to an unspecified archives), is better than no source attribution. In this case, even if they did not know which archives had preserved or digitized the archival material, participants who knew that an archives had preserved or digitized it considered this sufficient grounds for trust, compared to a scenario where no source was

mentioned. Participants generally thought the archival materials were at least somewhat trustworthy, regardless of what they were told. Means, between 1.00 and 2.00, were similar in both cases and were anchored by the (1), somewhat trustworthy, and (2), trustworthy, scale points the participants used to rate the DADTS trustworthiness items. A possible explanation for these findings is that the context in which the participants interacted with the materials played a role. All participants learned about these materials in the context of the study survey. Perhaps these circumstances influenced their perception of the materials such that they were willing to trust the materials at least somewhat. For example, finding the materials within a known context (i.e., a research study and survey) may have caused the participants to be less skeptical of the materials than they might have been if they had found them on the open Web or somewhere else out of context. Another explanation could be that the materials looked trustworthy or did not give the participants any reason to think they were not. This sentiment is consistent with findings from existing archival science research literature, where participants reported assuming that digital materials were trustworthy and authentic unless they had reason to suspect otherwise.[40]

As with the fourth hypothesis (H4), there was no statistically significant difference in perception of trustworthiness between those who were told that the archival materials had been digitized or preserved by an unspecified archives and those who viewed the same materials but were told which archives had digitized or preserved them; thus, the fifth hypothesis (H5) was not supported. Although it is plausible to assume that being more specific about a source (e.g., Hagley Digital Archives) could engender more trust than being vague about a source (e.g., an archives), participants in this study were generally willing to assume that the digital materials were at least somewhat trustworthy regardless of how much specific information they received about the source. Context may have played a role in these results. For example, regardless of what participants were told about who had preserved the website and the film, they had to click links in the survey to view these materials, and this brought them to the websites of the archives that had preserved them, thus clarifying their archival context. This might explain why, on average, participants thought the film and website were at least somewhat trustworthy regardless of their source attribution in the

40 For more on this issue, see the findings reported in Margaret Hedstrom, Christopher Lee, Judith Olson, and Clifford Lampe, "'The Old Version Flickers More': Digital Preservation from the User's Perspective," *American Archivist* 69, no. 1 (2006): 159–87.

survey. In contrast, the digitized marriage certificate and death certificate were uploaded into the survey as content, so participants did not view them outside of the survey. Notwithstanding this difference, the overall context for the materials (i.e., a research study and survey) may have positively influenced participants to judge the digitized materials as at least somewhat trustworthy, or participants may have judged the certificates as at least somewhat trustworthy because they found no reason to think they were untrustworthy.[41]

Although I did not create a hypothesis for this, I did find a statistically significant difference in perceptions of trustworthiness between those who were told which specific archives had digitized the marriage certificate (i.e., Alabama Department of Archives and History Digital Collections) and preserved the website (i.e., the Internet Archive) and those who were not told anything about who had digitized or preserved them. Participants rated the trustworthiness of the marriage certificate and the website more highly when they were told which archives had digitized or preserved them than when they were not told anything about their sources. These findings underscore the value and importance of attributing the specific archival sources of digital materials. They offer empirical, statistical support for the need to provide users with clear, concise information about the archives that digitize or preserve content. These findings have implications for digital archives managers who make important decisions about what information to provide about the digital objects they manage. However, digital archivists already do a good job of providing metadata about who is responsible for the digitization and preservation of archival materials. Thus, more importantly, these findings have implications for the individuals and companies who take digital materials out of their archival contexts and deliver them to users of their own websites and platforms – removing them from their digital archival contexts. These actors need to ensure that they provide information about who originally digitized or preserved the materials to help inform users' trust judgments.

Findings from this study do not support the sixth hypothesis (H6), that telling participants that content had been digitized by an archives – either any archives or a specific archives – would result in higher perceptions of trustworthiness than telling them that the content had been digitized by another kind of entity, such as Ancestry. Comparisons between the means of those who were not

41 Ibid.

told anything about who had digitized the death or marriage certificates (i.e., the no-attribution group); those who were told that an archives had digitized them but not which archives; those who were told which specific archives had digitized them (e.g., the Alabama or Missouri digital archives); and those who were told that they had been digitized by Ancestry suggest that participants were generally willing to assume that the certificates were at least somewhat trustworthy regardless of what they were told about their sources. A possible explanation for these findings is that users think they have a clear understanding of the relationship between the digitized documents they are seeing and the original analog versions of the documents (i.e., they are likely to be "faithful representation[s]" of the originals).[42] This is consistent with findings from previous studies on digital archives users' trust in digitized materials.[43] Another possible explanation is that, over time, Ancestry has developed a reputation for providing access to genealogical materials, including digitized death and marriage certificates, such that its authority is now comparable or equal to that of archives in the eyes of users and potential archives users. In fact, archives are increasingly partnering with commercial entities such as Ancestry, blurring the lines between archives and companies in terms of digitization, preservation, and access to digital materials.[44]

Results that show no difference in perceptions of trustworthiness despite different source attributions may have us question the role of archival authority when it comes to users' perceptions of digital archival content. If users are generally willing to assume that content is relatively trustworthy regardless of what is said about who digitized or preserved it, what does this say about the authority of archives? Has the authority of archives diminished over time in the digital environment? Or has the authority of other sources, some of which leverage archival materials, increased over time? For example, what does this say about the authority of Ancestry relative to the authority of archives? Perhaps

42 For more on the concept of digital preservation and the need to provide a faithful representation of the original, see David M. Levy, "Heroic Measures: Reflections on the Possibility and Purpose of Digital Preservation," in *Proceedings of the Third ACM Conference on Digital Libraries* (New York: ACM, 1998), 152–61.

43 For more research on this topic, see Devan Ray Donaldson and Paul Conway, "User Conceptions of Trustworthiness for Digital Archival Documents," *Journal of the Association for Information Science and Technology* 66, no. 12 (2015): 2427–44.

44 For more on public–private partnerships between archives and companies, see Adam Kriesberg, "The Future of Access to Public Records? Public–Private Partnerships in US State and Territorial Archives," *Archival Science* 17, no. 1 (2017): 5–25.

we think that archives have more authority than our users and potential users actually ascribe to archives? If this is true, what should we do about this? Should we or can we do anything about it?

Future research should apply the TIA–TDAC framework and accompanying statistical measurement model to new types of digital content that archives will become responsible for preserving in the future. There exists an opportunity to develop a research agenda for trust research based on the TIA–TDAC framework. Specifically, the TIA–TDAC framework could be used to develop a more robust research agenda around the impact of trust at one level (i.e., trust in archives) on trust at another level (i.e., trust in digital archival content). Future research needs to compare how users' trust in archives influences their trust in digital archival content as new and different types of digital archival content emerge. For example, several years ago, staff at the Library of Congress decided to archive tweets.[45] Other cultural heritage institutions will undoubtedly decide to preserve archival content in other yet-to-be-created digital formats in the future, and we will need to understand how users perceive the trustworthiness of those archival materials. Future research will also need to investigate the influence of users' trust in archives on their trust in digital archival content as new and different types of archives begin to emerge. There are many varieties of archives, including – but not limited to – college and university archives, corporate archives, government archives, religious archives, and special collections.[46] As new archives are established within these categories and as new categories of archives emerge, future research should investigate users' trust in those archives and the effect of that trust on their trust in digital archival content. Finally, future research must compare the impact of trust in archives on trust in digital archival content for different types of users. Although prior research has examined undergraduate and graduate students' as well as experienced users' views on this topic, future research should seek to identify other types of users for study. This type of research will provide further insight into the development of the TIA–TDAC framework. In many respects, the TIA–TDAC framework serves as a starting point and a reference point for research on trust in digital archival content from the user's point of view.

45 Library of Congress, "Twitter Donates Entire Tweet Archive to Library of Congress," news release, Library of Congress, 15 April 2010, accessed 15 July 2019, https://www.loc.gov/item/prn-10-081/.

46 Laura Schmidt, *Using Archives: A Guide to Effective Research* (Chicago: Society of American Archivists, 2011), accessed 15 July 2019, http://files.archivists.org/pubs/UsingArchives/Using-Archives-Guide.pdf.

This study has two primary limitations: First, the presentation of the archival materials may have biased the results. An online survey does not accurately represent the ways users encounter digital archival materials in the real world. Perhaps users are less trusting of materials when they find them on the open Web or are more trusting of materials when they find them in digital archives and are not encountering them in a survey. Second, the selection of materials included in the study may have biased the results. For example, perhaps digitized materials like marriage certificates and death certificates are documents that users tend to think are trustworthy anyway, and thus comparisons of different source attributions will not yield differences in perceptions of trustworthiness.

Conclusion

Even though users still visit archives to access materials in designated reading rooms, they increasingly expect to be able to access archival materials online. The Internet is growing at a rapid pace, and new companies such as Ancestry are granting access to the types of content that have traditionally been provided only by archives. At the same time, content of important historical, cultural, and evidentiary value is becoming more dynamic and is being created in new digital formats. In light of all these changes, we need to better understand how users think about archives and how that thinking affects their assessments of archival content. Given this evolving environment, the proposed TIA–TDAC framework is important because it provides a model for understanding the relationship between users' trust in archives and their trust in digital archival content. This framework will serve as a base for future research and will assist archivists in understanding their users' perceptions of archives and the material they contain.

Recently, there have been so many changes in the digital environment that archivists need to know where they stand with their users and potential users. New sources of archival content are emerging in the digital environment, and it could be that users regard these new sources as more trustworthy than archives. The digital formats of archival materials are also evolving, raising new questions about whether users can trust the information they encounter while on the Internet. Further, the contexts in which archival materials can be found on the Web can vary. Users can access archival materials by browsing digital archives' collections or by visiting archives' websites, but they can just as easily – or perhaps more easily – encounter digital archival materials in lists of

search engine results, where they may not know or understand the relationships between the materials they are viewing and the institutions that are responsible for their description, preservation, and access. These issues remain understudied in archival studies; however, the TIA–TDAC framework can provide a useful lens for exploring these topics. Research based on the TIA–TDAC framework can provide new knowledge of users' trust in archives and digital archival content in new formats, and it can test new methodologies for comparing the influence of trust in archives on trust in digital archival content in a variety of different online contexts. Overall, such research could advance the current state of scientific knowledge in the area of trust in digital records.

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