# MEASURING ALGORITHMIC LITERACY AND INTERNET SKILLS IN HAWAIʻI RESIDENT INTERNET USERS

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Keywords: Algorithm Literacy, Internet Skills, Digital Divide

**Abstract**

This paper explores what standards and foundations of algorithmic comprehension are correlated to engage equitably in our current digital economy. The tenets foundational to this study will be algorithm literacy, comprised of algorithm awareness and algorithm knowledge, and Internet skills provided based on current research in the field. Empowering users to successfully recognize and navigate algorithm-experiences online will limit misinformation, data exploitation and manipulation leading to enhanced autonomy in online and offline decision-making. The study results offer plausible policy recommendations for a civil society that is equipped to make the most comprehensive and considerate decisions with regards to digital innovations and implementation.

*Keywords:* Algorithm Literacy, Internet Skills, Digital Divide

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## INTRODUCTION

The American industrial state of affairs during the turn of the 21st century was characterized by new media technologies, the Dot Com Era, convenience and accessibility. The successful (Bernays, 1928) and intensified use of public relation campaigns and social movements (Ellul & Kellen, 1965) for geopolitical (Jowett & O'Donnell, 2006) and socio-government communications (Granovetter, 1973; 1982) beginning as early as the 1920s, validated the buildup of foundational media technologies and strategies. A media literate and perceptive population would have enabled a broader self-sovereign and autonomous electorate during the buildout of surplus authoritarian rule utilizing these communication tactics (Gregor & Mlejnková, 2021). The current shift towards a commercial attention economy corresponding with the expansion of online disinformation (Feezell, 2016) geared at end-user consumption continues to prove effective and lucrative.

The growing digital infrastructure (Star, 1999) that consumes an increasing role in our social, organizational, mobile (Campbell & Kwak, 2011) and civic (Gergen, 2008) dynamics has become synonymously intertwined with big data analytics. This can help define contemporary information and communication technology dominance. The expansion increases confrontation of Internet users with algorithmic decision-making. Spanning a wide range of applications in digital environments (Gaver, 1996), algorithm-based decisions are largely governing how internet users perceive their public (and private) world (Dogruel, Masur & Joeckel, 2021). The transformation of social (boyd & Ellison, 2007) engagement is coupled with media technologies. The extension to which algorithms manage what online content we seek out and arrives at us has only increased with usage and time.

The ebb and flow of digital divide studies in communication often moves in tandem with the undulation of innovation and technology consumption. Topics such as platformization, multilateral sociotechnical affordances, and Information Communication Technologies for Development (Teeters, 2016), offer insights into conscientiously navigating the planning of infrastructure with community partners. These areas of study bestow an equilibrium between physical deterministic implementation and sociotechnical possibilities.

Amidst the artificial intelligence boom post-COVID, algorithmic decision-making capabilities have become highly sought commodities. Global businesses are vying for the latest technologies to generate the most efficient and complex models and systems. Manufactures and developers are constantly fabricating and designing new and updated machine learning hardware. Users envy engaging with the latest trends and devices. Computer systems and its proprietary algorithms have captured society's attention engulfing every day users through the extensive nature of big data in multiple designed digital environments (Bucher, 2021). US stock exchanges and market capitalizations reaching continual all-time highs places a palpable sense of value in commodifying users' (Bucher & Helmond, 2018) data, information, and attention. The turnover of analytical machinery and computer program software yield unwieldy abilities to sort, personalize, and filter Internet users' data in particular and increasingly widespread methods.

## LITERATURE REVIEW

The growing reliance on Internet consumption reaches vast, nearly all, areas of society. The effectiveness of algorithm-based decisions constantly governs visible "human-algorithm interplay" (Zarouali, Boerman & de Vreese, 2021, Table 1). General comprehension about the Internet of Things (IoT) becomes more crucial as data-driven practices contributes to large-scale implementation of algorithms. Spanning a broad range of personalized services from video streaming and social media to search engines and even dating platforms, computer algorithms have contributed significant influence to the encounters of tailored selection (Reinis, 2019) and presentation of online content during internet use and application. The application of algorithmically curated content in areas such as, online news (Hyun & Kim, 2015) and product recommendation systems have potential extensive effects across all social, communicative, and economic activities online (Dogruel, et al., 2021). The possibilities for unconscious and blasé algorithm consumption are recognizable in examples found on machines or around online, such as entertainment or music streaming services, and rideshare products frequented by the production and embeddedness in distinct social, cultural, and political practices (Gillespie, Boczkowski, & Foot, 2014). For users to understand the possible effects these inventions have on daily, almost necessary, function, they must develop a literacy in navigating these digital ecosystems. Approaching these applications and platforms in study will reflect the degree in which users must grapple with the multitude of dimensions algorithms possess. Taking into consideration measures associated with what algorithms are and can be used for will form a foundation into studying contexts that are more or less visible in scope (Dogruel, et al., 2021). The ability to discern issues of encoded values and assumptions these programmed actors often contain in their powerful systems arise with acknowledging algorithms' role in our digital lives

(Noble, 2018). The curation of these algorithms is far from amateur. Instead, they are produced and developed systematically to confront, interact and engross market share of attention (Leaver, Highfield & Abidin, 2020) and presumptions while using digital media services online.

Importantly, raising the question of whether Internet users are aware and understand these environments they frequent is critical to having an informed user base. The foundational understanding in awareness and knowledge, hence literacy (Gran, Booth, & Bucher, 2021; Dogruel, Facciorusso, & Stark, 2020; Dogruel et al., 2021) will not only bridge the digital divide, but further agency and autonomy of Internet users.

## Digital Divide and Digital Inequality

Rapid shifts in competitive technologies can be seen as a form of arms race. While these inventions critically advance the types of achievements possible for society at a pace unaccounted, there is a simultaneous division and filing of groups that have access, application, and utility of these technologies and those who effectively do not, or *cannot*.

Proliferation in technologies, especially in the latest 'A.I. surge', requires purposeful and meaningful utilization of their capabilities. Expanding on this notion of practice (Ferrari, 2012), there are individuals who have developed personal skills for engaging with algorithms, and those who have not. The individuals who have honed their manipulation of media effects show the ability to cope with the expanding influence of platformed systems (Hobbs, 2020). This is tangential to remediating the threat of an expanding digital divide. Understanding primary divides in access, the relative difference in specific skills and ways of dealing with algorithms further separates individuals (Ragnedda, 2017). Businesses, even nations, may swiftly be segregated into organizations and systems with or without the wherewithal to identify,

implement, and counter the impact of algorithmic decisions. This will directly disadvantage severely scant populations lacking self-determination, awareness, knowledge, and related cognitive subdimensions about the implementation and operations of algorithms.

## Digital Divide and Digital Inequality in Hawaii

Since the initial study by Connolly and Crosby (2014) examined e-Health literacy and the digital divide in an underserved population in Hawai'i, broadband access, infrastructure and technologies have improved in Hawai‘i. Although commonly seen as a destination of leisure and paradise, “the islands of Hawai‘i contain deep social, economic, and political inequities” (Silva, 2004; Trask, 1999, as cited in McMahon et al., 2023, p. 287). Improved access to the Internet and the skills needed to retrieve said information most likely has materialized over the past decade, ubiquitously (Williams & Craig, 2011; Hargittai, 2021). As seen in the fact that 70.9% of surveyed homeless in Hawai‘i have their own cell phone (Buente et al., 2020). The ability to access the technology is only the first step to overcoming barriers that form while using the Internet. It is probable that due to a lack of knowledge in how to use and retrieve the technology’s information that inequities have continued to expand in a third-level digital divide (Ragnedda, 2017).

Connolly & Crosby (2014) has found that those who are “more knowledgeable and capable in accessing e-Health information also have been shown to have better self-management of their health and health behavior” (p. 44) (Neter & Brainin, 2012). Health outcomes, livelihoods and well-being are examples that are directly negatively influenced by the lack of access to technology, literacy skills, and knowledge needed to utilize Internet resources. Continuing this line of reasoning, it may be reasonable to also assume educational and resource

divides may also negatively impact one's opportunities in a far range of possibilities (Petrovčič, et al., 2024). The increase in access to the Internet, while maintaining a barrier in skills and knowledge in retrieving online information continues to prevent a "digital *ea*" (McMahon et al., 2023, p. 291).

Previous Studies on 'Literacy'

The goal to cease repeating generational inequities or subjugation of peoples without awareness, knowledge, or skill, due to various systemic and political factors (Valeriani & Vaccari, 2017), will require the evolution of related and neighboring research that has led to algorithm literacy. The discussion of these concepts has changed overtime. Theoretically, charting through media and new media literacy, digital/code literacy**,** privacy literacy, and leading up to the arrival of relevant works of recent studies by Dogruel, et al., (2021) will set the base for algorithm literacy studies. Combining and building off of these fields of research encourages growth in a manner which allows for the necessary constitution of awareness *and* knowledge about algorithms as a form of literacy. The literacy outlined in these prior studies can act as a precedent due to their cognitive concepts. Not only is literacy dependent on other cognitive and socio-demographic factors, but can also serve as a defense mechanism against potential media effects (Nabi & Oliver, 2010). The operations of algorithmic curation, similarly related to online privacy literacy (Park, 2013) and advertising literacy (Rozendaal et al., 2011) may have negative effects without the buffering protection of higher algorithm literacy.

These existing broader concepts form a comprehensive elaboration of literacy in previous studies of communication (Dogruel, 2021). A new formation of digital divide may underpin the importance of highlighting the novel and potential algorithmic inequities (Helsper, 2021)

constituted in digital spheres. One which categorizes factors of achievable benefits in online services by monitoring, evaluating, and ranking engagement levels (Dogruel, et al., 2021).

Definition of Algorithm Literacy

For the purposes of this study, Dogruel et al. (2021) define the cognitive dimensions of algorithm literacy as a combination of awareness and knowledge; to be cognizant of algorithm use in online mediums, while simultaneously understanding how they work, function and exist on Internet systems. Understanding the uncoupling, yet unification of these two critical dimensions will be essential to my survey. Examining awareness of algorithms used in online application will capture a baseline to the extent to which people perceive the areas in which algorithms are used in practical services. To be aware of particular device platforms' algorithms is not to say that there is an understanding by the user in how an algorithm works or even what it is. Dogruel at al. (2021) make the clear distinction that recognition of algorithms existence and use does not equate to the knowledge of *how* they work. This explanation addresses the extent of which awareness of algorithms is constituted. This is not to sever the two dimensions' relationship creating algorithm literacy. These different areas of internet use are related, yet distinct. The propensity to notice user data being extracted, should not be conflated with the capacity to understand the generative capability and predictive process of how and where data emerges and organizes (Dogruel, et al., 2021). The advanced understanding of how algorithmic systems actually work contrasts and distinguishes the knowledge required to comprehend algorithms beyond the awareness about them. While recognizing the constantly evolving nature to which algorithms operate, along with their context-dependency (Bucher & Helmond, 2018), Internet users' knowledge of algorithm can be constituted using Dogruel, et al. (2021) defining

factors that; “information is automatically personalized and customized based on information the system collects and processes” (Dimension 2) (Hargittai et al., 2020), as well as how the content encountered online (e.g., the customization and prioritizing of output based on prior behaviors), is impacted by the types of information algorithms process. The performance of the duality these two dimensions reinforce will address the primary algorithm literacy scale for my study.

Previous Studies on ‘Skills’

Browsing through the theoretical background for literacy in communication studies lattices a complementary approach for comprising a wholistic survey. Schematically, the incorporation of van Deursen, Helsper, and Eynon’s (2016) validated measures on Internet skills will map an aspect around a full range of Internet skills from basic to advanced levels. Aiming for a study while adjusting for relevance and various corelates leaves a combination framework that is applicable. Similarly to the lack of instrumentation and design of validated algorithm literacy scales, Internet skills and its relative approaches are derived from a handful of prior studies.

Moving past former notions of existing literature on Internet skills, which places predominant focus on the technicalities such as computer skills and digital competence, which Ferrari (2012) sites as a combination of “skills and attitudes” (p. 19). Broadening the scope of the definition of Internet skills, Van Deursen et al. (2016) explain that the focus on skills exclusively oriented at the basic technical level limits the classification in relation to the ability to work with ICT for social purposes. Ferrari (2012) initially offered; information, communication, content creation, safety, and problem-solving as skills defining the area of research. Helsper and Eynon (2013) narrowed the study of dimensions towards four broadly defined skill categories;

technical, social, critical, and creative skills. Van Deursen, Van Dijk and Peters' (2012) further adjusted their association with Internet skills by defining operational, formal, information, and strategic skills; "to operate digital media", "to handle special structures of digital media", "to search select and evaluate information in digital media", and "to employ the information contained in digital media as a means to reach a particular personal or professional goal", respectively (van Deursen, et al., 2016, p. 6). The inclusion of a 5th dimension, content creation: "exchange meaning with other humans using messaging systems, act upon contacts, attract attention, profile and experiment online, pool knowledge and realize transactions", to this framework by Van Dijk and Van Deursen (2014) nearly rounded out the field of study (van Deursen, et al., 2016, pp. 6-7). Finally, van Deursen, et al., (2016) adapted the previously mentioned research and derived an updated five-Internet-skill framework; operational, navigation information, social, creative, and mobile. I will be using this framework for my study on Hawai‘i residents.

These classifications will account for "both basic skills necessary to use the Internet and skills required to comprehend and use online content" (van Deursen et al., 2016, p. 5). The incorporation of van Deursen, et al.'s (2016) Internet skills with Dogruel, et al.'s (2021) algorithm literacy scale will pair nicely and accompany one another lending to further insights on the reliability and correlation between online functions and algorithmic comprehension. Our approach follows van Deursen, et al.'s (2016) by maintaining a broad approach to encompass the largest possible group of participants (van Laar, et al., 2025). In the aim to achieve a transposable context, the measures used are incorporated to shy away from singular specific skills. Testing a combination of validated-online scales, Dogruel et al. (2021) and van Deursen, et al. (2016), algorithm literacy and Internet skills, respectively, will measure a baseline of understanding and

application that can lead to discovering correlations that may better chart a pathway to empowering users to successfully participate in our growing digital societies.

Combination of Literacy and Skills

It is arduous attempting to keep pace with the speed, innovation, and creativity in the information communication technology sectors. However, considering the challenges, the role of emphasizing and steering principles of design to better empower, engage, and socialize users, policy makers, and corporations in corresponding Internet advancements seems dutiful. This is achievable through directed studies and deterrence of perpetuating illicit and perverse practices and ideas. Our research needs to be necessary and tangential to the power that users hold in their cooperation and terms of agreements with digital technologies and advertisement services. Properly measuring how Internet users navigate algorithmically curated digital spheres (Dogruel, et al., 2021) should acknowledge Internet skills alongside evaluating algorithmic literacy. A more complete picture garners accurate measures and regressions that can be applied across populations (van Deursen, et al., 2016). Developing my survey by combining the necessary aspects of digital inclusion and evaluative practices in algorithmic machinery will better allow for the study of different types of engagement with the Internet. Recent advancements in the field of AI, machine learning, and large language models (LLMs) require the developed understanding of the intersection of political, capital, and economic searches for information data, online communication, even created content. The key roles which continually evolve in our digital media landscapes have to be understood as the instruments that are created, deployed, and managed by our social-platformed (Zarouali et al., 2021) and information companies. The importance of studying research aims through reliable measures will better validate and aid the

importance of repairing a growing digital divide. The conceptualization of Internet skills will aid in my proposed study of algorithm literacy. Ideally, an elaborated wholistic set of data research, practice, and policy impact evaluation will be achieved by combining these methodologies.

Reason for Study

Preparing and measuring fundamentals of algorithmic awareness and knowledge may at least limit potential discrimination, risks, censorship, biases, and privacy infringement, in computing outputs. The increasingly wide range of algorithmic decision-making compounded with a lack of literacy may "increase users' vulnerability to potential negative effects, both on the individual [and] also the societal level" (Dogruel, et al., 2021, Why study algorithm literacy?). The aim of quantifying Internet users' literacy will allow for further understanding if conclusions can be drawn from successfully high-scoring individuals and their autonomy in decision-making and preventative exploitation and manipulation.

The outcomes of studying users' algorithm literacy with validated scales will allow for execution of evidence-based policy interventions to strengthen users' critical evaluation and coping (Hobbs, 2020) behaviors to uphold their agency in navigating online ecosystems (Sundar, 2020). In addition to increasing transparency and accountability related to algorithms, the ability to determine when, where, what, and how algorithms affect their digital landscapes will crucially protect individuals. Additionally,

> "The mechanisms of algorithms that center around the collection and processing of personal and use-related information, the interplay between users and algorithms needs to be addressed" (Dogruel, et al., 2021, Dimension 2; Zarouali et al., 2021).

By developing a "set of reliable measures for use in research, practice, and policy evaluations based on a strong conceptual framework" (van Deursen, et al., 2016, p. 4), testing for algorithm literacy and Internet skills in the State of Hawai'i's population will shed light as to whether these measures are universally shared and equivalent outside of a European context.

Research Question

Algorithm literacy research is in its foundational stages or infancy. Forming substantial correlations, predictors, and outcomes of algorithm literacy help to assert its validity (Dogruel, et al., 2021). I examined and measured the State of Hawai'i's population in the context of algorithm literacy and Internet skills.

*RQ: What is the level of Algorithmic Literacy (Awareness and Knowledge) and Internet skills in Hawai'i Residents?*

My hypothesizes provide insight and validation to the interconnectedness of socio-demographic factors, Internet skills and algorithm literacy. These six hypotheses are associated with my research question.

"Men estimate their own skills higher than women and younger generations estimate their skills higher than older generations, except for that of Information Navigation skills" (van Deursen, et al., 2016, p. 24).

*H1: Males will exhibit higher levels of a) algorithm awareness, b) algorithm knowledge and c) Internet skills than females.*

"Operational and Information Navigation skills are stronger in older age groups than in younger groups" (van Deursen, et al., 2016, p. 32). "Access to broadband technology, or high-speed Internet access, has been associated with younger age" (Rains, 2008; Connolly & Crosby, 2014, p. 44).

*H2: Age will be negatively correlated with a) algorithm awareness, b) algorithm knowledge and c) Internet skills.*

"Based off of comparable literacy tests (Trepte et al., 2015; Cotter & Reisdorf, 2020), users with higher educational levels are significantly more confident for all skills" (van Deursen, et al., 2016, p. 24). "Access to broadband technology, or high-speed Internet access, has been associated with higher education" (Rains, 2008; Connolly & Crosby, 2014, p. 44).

*H3: Education level will be positively correlated with a) algorithm awareness, b) algorithm knowledge and c) Internet skills.*

Both awareness and knowledge about algorithms significantly predict higher reasonable decision-making in more skill-oriented scenarios (Dogruel, et al., 2021).

*H4: Internet skills will be positively correlated with algorithm literacy (awareness and knowledge).*

The dimensions of algorithm literacy are interrelated and have a procedural character, meaning more users will have a foundational awareness before a foundational knowledge (Dogruel, et al., 2021).

*H5: People will display higher levels of algorithm awareness than algorithm knowledge.*

"In the United States, research has shown that income is directly related to the adoption of information technology; the lower the income, the less often people access the Internet (Pew Research Center, 2013). Hsieh and colleagues (2011) have shown that the strongest predictor of the use of information technology is one's socio-economic status" (Jensen et al., 2010, as cited in Connolly & Crosby, 2014, p. 44). "Part-time, unemployed, and the retired population will indicate lower skill levels than those who are unable to work" (van Deursen, et al., 2016, p. 24). "For all skills, the full time employed and students indicate having the highest skill levels, with the exception of Information Navigation skills" (van Deursen, et al., 2016, p. 24).

*H6: Income will be positively correlated with a) algorithm awareness, b) algorithm knowledge and c) Internet skills.*

## METHODS

### Study Design

This study assessed the competent understanding of "online environments that largely rely on algorithmic curation […] described as being algorithm *literate*", a combination of algorithm awareness and knowledge (Dogruel, et al., 2021, Why study algorithm literacy?). Combining the valid measure of algorithm literacy with Internet skills assessments (van Deursen, et al., 2016) allowed this study to address the aspect of "required knowledge and skills in navigating such algorithmic-curated online environments" (Dogruel, et al., 2021, Why study algorithm literacy?). Introducing the validated literacy measure from Dogruel et al., (2021) "captures internet users' knowledge and awareness about algorithm's use as crucial components of algorithm literacy from a generalized perspective" (Existing approaches toward studying algorithm literacy). I included items with varying levels of difficulty that were not contingent upon one another. Due to the nature of the scale's explicit item-response theory, I was able to "assess literacy independent of the specifically studied population, [more appropriately] the prevalence of knowledge about algorithms within different user populations" (Dogruel, et al., 2021, Existing approaches toward studying algorithm literacy). My approach focused on general algorithm literacy, a combination of awareness and knowledge. Thus, the scale allowed me to study the populations of the Hawaiian Islands. I used the most general survey responses to measure different user populations.

### Data Collection

My study aimed to gather a response size of 150 Internet users. The process by which utilized an online survey response method. Initially, I had planned to use a dual approach of

physical and online survey responses. However, due to COVID IRB restrictions, regulations, and time constraints, I adjusted my data collection to be exclusively online. To obtain a best possible representative sample of the population in Hawai‘i, I used an online survey platform, Qualtrics.

**Table 1**

*Descriptive Statistics for Hawai'i Internet Users (N= 141)*

| **Demographics** | N | % |
|---|---|---|
| ***Age*** | ***134*** | |
| 18-30 | 44 | 32.8 |
| 31-45 | 40 | 29.8 |
| 46-60 | 25 | 18.7 |
| 61+ | 25 | 18.7 |
| ***Zip Code*** | ***134*** | |
| Kaua'i | 9 | 6.7 |
| O'ahu | 120 | 89.6 |
| Maui | *2* | 1.5 |
| Hawai'i | 3 | 2.2 |
| ***Race*** | ***137*** | |
| White | 46 | 33.6 |
| Black or African American | 3 | 2.2 |
| Asian or Asian American | 48 | 35.0 |
| American Indian or Alaska Native | 1 | 0.7 |
| Native Hawaiian or other Pacific Islander | 20 | 14.7 |
| Mixed race | 14 | 10.2 |
| Other race or origin | 5 | 3.6 |
| ***Education Completed*** | ***140*** | |
| No schooling completed | 0 | 0.0 |
| High school diploma or GED | 6 | 4.3 |
| Associate's Degree (i.e. AA, AS) | 6 | 4.3 |
| Bachelor's Degree (i.e. BA, BS) | 66 | 47.1 |
| Graduate or professional degree beyond bachelor's degree | 62 | 44.3 |
| ***Income Last Year*** | ***134*** | |
| Less than $30,000 | 13 | 9.7 |
| $30,000 to less than $50,000 | 7 | 5.2 |
| $50,000 to less than $70,000 | 22 | 16.4 |
| $70,000 to less than $90,000 | 23 | 17.2 |
| $90,000 or more | 69 | 51.5 |
| ***Gender*** | ***139*** | |
| Male | 60 | 43.2 |
| Female/Other | 79 | 56.8 |
| ***Devices Owned*** | ***139*** | |
| 1 | 3 | 2.2 |
| 2 | 29 | 20.9 |
| 3 | 48 | 34.5 |
| 4 | 48 | 34.5 |
| 5 | 11 | 7.9 |

An online survey was conducted in the Hawaiian Islands over a period of two months in March and April of 2025. Data was collected from 177 responses. Responses from 36 submissions were removed due to incompleteness. Respondents who responded as Native Hawaiian or other Pacific Islander, whether exclusively or part of other racial groups, were classified as Native Hawaiian or other Pacific Islander only. The results are heavily skewed towards two aspects in particular, higher education and income. 90% of the survey respondents have a higher education degree, and most do not fall into the ALICE classification meaning Asset Limited, Income Constrained, Employed. These struggling households represent the growing number of families who are unable to afford the basics of housing, child care, food, transportation, health care, and technology. The collected median value of income is in line with median household income for the State of Hawai‘i, based on Hawai‘i Community Development Authority Annual Area Median Income (AMI). The time required to answer the survey questions was approximately 10 minutes. Table 1 summarizes the demographic characteristics of the respondents.

## Data Analysis

I used a quantitative approach by which I applied statistical methods such as correlation and regression models. I tested for correlation between demographic information, aspects of Internet skills, and algorithm awareness as independent variables while algorithm knowledge served as a dependent variable. I then linearly tested for correlation between operational, social, mobile, information navigation and creative Internet skills. I analyzed and visualized my data using the free and open statistical platform Jamovi (The Jamovi project, 2025).

## Measures

I used the validated Algorithm Literacy Scale from Dogruel et al. (2021) and Internet Skills measures from van Deursen et al. (2016).

Dogruel et al.'s (2021) dimensions served the purpose of continuing the goal of efficiently testing an objective algorithm literacy scale measuring general awareness and knowledge about algorithms in multiple populations.

### *Algorithm Awareness*

Users' algorithm awareness was measured with nine items, each measured on a dichotomous scale; are performed/are not performed or is used/is not used, with a don't know option. The item header examples, "algorithms are already being used in very different areas. Do you know which of the following functions are often performed by algorithms?" and "there is a large amount of data that can be used in the development and application of algorithms. Here you can see a selection of possible sources" containing items such as, "to create weather forecasts" and "smart speaker (e.g. Alexa)", respectively, were modified from Dogruel et al.'s (2021) study (Supplemental Material). The mean score for the algorithm awareness scale was 0.804 out of 1, the standard deviation was 0.244, and the Cronbach alpha was 0.816 (see table 2).

### *Algorithm Knowledge*

Algorithm knowledge was measured by a with nine items, each measured on a dichotomous true/false scale with a 'don't know' option. The item header examples, "what do you think algorithms do on the Internet?" and "you will now see some statements about algorithms, some of them are true, some are false" consisting of items such as, "algorithms

recognize that results, such as e.g., search results, are incomplete and automatically correct themselves" and, "I can influence algorithms with my Internet usage behavior," respectively, were modified from Dogruel et al.'s (2021) study (Supplemental Material). The mean score for the algorithm knowledge scale was 0.607 out of 1, the standard deviation was 0.204, and the Cronbach alpha was 0.569 (see table 2).

*Internet Skills*

Internet skills measured by five-skill dimensions (Operational, Information Navigation, Social, Creative, and Mobile) consisting of a three-item index for each category such as, "I know how to open downloaded files," "I find it hard to find a website I visited before," "I know which information I should and shouldn't share online," "I know how to design a website," and "I know how to install apps on a mobile device," respectively, were modified from van Deursen et al.'s (2016) study (Table 13). All items in the instrument used the Likert-type format consisting of response items used by Spitzberg's (2006) study that focused on truth claims: 'not at all true of me,' 'not very true of me,' 'neither true nor untrue of me,' 'mostly true of me,' and 'very true of me,' including a 'don't know' option suggested by van Deursen et al., (2016). The mean score for the Internet skills total scale was 4.07 out of 5, the standard deviation was 0.542, and the Cronbach alpha was 0.839 (see table 4). The mean score for the Internet skills operational subscale was 4.63 out of 5, the standard deviation was 0.593, and the Cronbach alpha was 0.741 (see table 4). The mean score for the Internet skills information navigation subscale was 4.07 out of 5, the standard deviation was 0.722, and the Cronbach alpha was 0.626 (see table 4). The mean score for the Internet skills social subscale was 4.29 out of 5, the standard deviation was 0.582, and the Cronbach alpha was 0.605 (see table 4). The mean score for the Internet skills

creative subscale was 2.91 out of 5, the standard deviation was 1.210, and the Cronbach alpha was 0.834 (see table 4). The mean score for the Internet skills mobile subscale was 4.43 out of 5, the standard deviation was 0.662, and the Cronbach alpha was 0.634 (see table 4).

(See items list in APPENDIX)

*Demographic Variables*

A standard set of demographic variables such as gender, age, race, education, income, zip code and device ownership were measured.

## RESULTS

Algorithmic awareness and algorithmic knowledge differences (H5) were explored by means comparison 2 (see table 2). The relationship between Internet skills and algorithm literacy (H4) was measured with a correlation matrix (see table 5). Demographic and socioeconomic disparities between important concepts; education (H3), income (H6), gender (H1) and age (H2) were examined by conducting a linear regression analysis and multiple correlation matrixes.

**Table 2**
*Scale Reliability for Algorithm Literacy in Hawaii Internet user population (N=141)*

| Scales | Mean | SD |
|---|---|---|
| **Algorithm Awareness (Cronbach's alpha = 0.816)** | **0.804** | **0.244** |
| Algorithms are already being used in very different areas. Do you know which of the following functions are often performed by algorithms? (3) | | |
| To create weather forecasts | 0.707 | 0.457 |
| To make product recommendations | 0.950 | 0.219 |
| To create financial news (stock markets) | 0.721 | 0.450 |
| There is a large amount of data that can be used in the development and application of algorithms. Here you can see a selection of possible sources. (6) | | |
| Smart speaker (e.g. Alexa) | 0.900 | 0.301 |
| Smart TV | 0.871 | 0.336 |
| Wearable computing devices such as activity trackers, heart rate monitors | 0.900 | 0.301 |
| Electronic payment (credit-, debit cards) | 0.736 | 0.443 |
| Cell Phone Towers | 0.614 | 0.489 |
| Computer Games | 0.836 | 0.372 |
| **Algorithm Knowledge (Cronbach's alpha = 0.569)** | **0.607** | **0.204** |
| What do you think algorithms do on the Internet? (2) | | |
| Algorithms recognize that results, such as e.g., search results, are incomplete and automatically correct themselves[1] | 0.214 | 0.412 |
| Algorithms can develop themselves in a completely different direction from that for which they were created | 0.493 | 0.502 |
| You will now see some statements about algorithms, some of them are true, some are false. (7) | | |
| I can influence algorithms with my internet usage behavior | 0.936 | 0.246 |
| The database used by an algorithm is not decisive in determining its quality[1] | 0.286 | 0.453 |
| When searching for a job online, job offers displayed may vary from person to person despite the same search entry | 0.829 | 0.378 |
| Algorithms are able to think like human beings[1] | 0.593 | 0.493 |
| Algorithms are independent of government censorship[1] | 0.557 | 0.499 |
| For some media companies, content that is repeated regularly (e.g., traffic reports) is already written by algorithms | 0.707 | 0.457 |
| Humans are never involved when algorithms are used[1] | 0.850 | 0.358 |

Note: [1]Indicates item is reverse-coded. Responses of 'Don't know' were assigned equal weight to an incorrect response of 0. A correct response was assigned a 1.

**Table 3**
*Paired Samples T-Test for Algorithm Awareness and Knowledge (N=141)*

| | Statistic | df | p |
|---|---|---|---|
| **Student's t** | **11.3** | **138** | **< 0.001*****|

Note: * p < .05, ** p < .01, *** p < .001.
H: Algorithm awareness ≠ algorithm knowledge.

Table 2 and 3 supported hypothesis 5 representing a significantly higher mean score of 0.804 for algorithm awareness verses a 0.607 mean score for algorithm knowledge, as shown in the paired samples t-test (11.3, < 0.001). The validation of these measures prove that algorithm awareness may be easier to comprehend than algorithmic knowledge. The higher comprehension of algorithm awareness also shows a higher comprehension of algorithm knowledge. Scores for algorithmic awareness reflected a more comprehensive understanding by a broad audience than algorithmic knowledge did.

**Table 4**
*Scale Reliability for Internet skills*
*in Hawaii Internet user population (N=141)*

| Scales | Mean | SD |
|---|---|---|
| **Internet Skills (Cronbach's alpha = 0.839)** | **4.07** | **0.542** |
| *Operational (3) (Cronbach's alpha = 0.741)* | *4.63* | *0.593* |
| I know how to open downloaded files | 4.77 | 0.484 |
| I know how to use shortcut keys (e.g. CTRL-C for copy, CTRL-S for save) | 4.38 | 0.998 |
| I know how to bookmark a website | 4.72 | 0.611 |
| *Information Navigation[1] (3) (Cronbach's alpha = 0.626)* | *4.07* | *0.722* |
| I find it hard to find a website I visited before | 4.36 | 0.795 |
| I find it hard to decide what the best keywords are to use for online searches | 4.16 | 0.889 |
| I get tired when looking for information online | 3.70 | 1.146 |
| *Social (3) (Cronbach's alpha = 0.605)* | *4.29* | *0.582* |
| I know which information I should and shouldn't share online | 4.16 | 0.762 |
| I am careful to make my comments and behaviors appropriate to the situation I find myself in online | 4.44 | 0.659 |
| I know how to change who I share content with (e.g. friends, friends of friends or public) | 4.26 | 0.898 |
| *Creative (3) (Cronbach's alpha = 0.834)* | *2.91* | *1.210* |
| I know how to design a website | 2.64 | 1.426 |
| I know how to create something new from existing online images, music or video | 3.24 | 1.378 |
| I would feel confident putting video content I have created online | 2.85 | 1.399 |
| *Mobile (3) (Cronbach's alpha = 0.634)* | *4.43* | *0.662* |
| I know how to install apps on a mobile device | 4.70 | 0.665 |
| I know how to download apps to my mobile device | 4.70 | 0.643 |
| I know how to keep track of the costs of mobile app use | 3.91 | 1.192 |

Note: Internet Skills Scale ranges from 1 = Not at all true of me to 5 = Very true of me. 'Don't knows' were recoded as a 3 = 'Neither true nor untrue of me'. [1]Indicates item is reverse-coded.

Table 4 shows good reliability for the Internet skills and associated subscales. The mean score of 4.07 suggests a high comprehension of Internet skills on average. The creative skills scored lower on average than the other assessed skills. Van Deursen et al., (2016) suggested rewording the information navigation skill subset to prevent reverse-coding for negative responses.

**Table 5**

*Correlations between IS, AA, and AK in population survey of Hawaii Internet Users (N= 141)*

| Variable | IS | AA | AK | AL |
|---|---|---|---|---|
| Internet Skills | - | | | |
| Algorithm Awareness | 0.062 | - | | |
| Algorithm Knowledge | 0.392*** | 0.415*** | - | |
| Algorithm Literacy | 0.287*** | 0.792*** | 0.862*** | - |

Note: * p < .05, ** p < .01, *** p < .001

Table 5 supports hypothesis 4. High algorithmic literacy correlates with high Internet skills. Although, algorithm awareness and Internet skills did not show correlation, algorithm knowledge and Internet skills did significantly. A combined metric of algorithm awareness and algorithm knowledge into algorithm literacy proved significant and confirms my hypothesis. This table also provides insight that individuals that score higher on algorithmic awareness measures also score higher on algorithmic knowledge. The lack of significance between Internet skills and algorithm awareness may suggest that the pathway between Internet skills, algorithm awareness and knowledge is more complex than originally proposed. There may also be sample size restriction on the algorithm awareness response section.

**Table 6**

*Correlations between Demographics, IS, AA, and AK in population survey of Hawaii Internet Users (N= 141)*

| Variable | Internet Skills | Algorithm Awareness | Algorithm Knowledge | Algorithm Literacy |
|---|---|---|---|---|
| Education | 0.006 | -0.054 | -0.001 | -0.021 |
| Income | -0.088 | -0.002 | -0.012 | -0.010 |
| Gender | 0.177* | 0.088 | 0.260** | 0.243** |
| Age | -0.374*** | 0.013 | -0.105 | -0.043 |
| Native Hawaiian and Pacific Islander | -0.024 | 0.032 | -0.049 | -0.025 |
| Devices | 0.130 | 0.003 | 0.065 | 0.035 |

Note: * p < .05, ** p < .01, *** p < .001

**Table 7**

*Correlations between Demographics in population survey of Hawaii Internet Users (N= 141)*

| Variable | EDU | INC | GEN | AGE | NHPI | DEV |
|---|---|---|---|---|---|---|
| Education | - | | | | | |
| Income | 0.158[1] | - | | | | |
| Gender | -0.058 | 0.041 | - | | | |
| Age | 0.251** | 0.363*** | -0.100 | - | | |
| Native Hawaiian and Pacific Islander | 0.029 | 0.015 | -0.243** | -0.059 | - | |
| Devices | 0.126 | 0.290*** | -0.094 | 0.115 | 0.043 | - |

Note: * p < .05, ** p < .01, *** p < .001

[1]Indicates item approaches significance p < .10

**Table 8**

*Correlations between IS short scales and demographics in population survey of Hawaii Internet Users (N= 141)*

| Variable | OP | INF | SO | CR | MO |
|---|---|---|---|---|---|
| Education | 0.173* | 0.084 | 0.002 | -0.088 | -0.089 |
| Income | -0.047 | 0.177* | -0.048 | -0.223** | -0.106 |
| Gender | 0.214* | 0.167* | -0.041 | 0.177* | 0.057 |
| Age | -0.360*** | -0.064 | -0.138 | -0.391*** | -0.347*** |
| Native Hawaiian | -0.130 | -0.109 | 0.034 | 0.017 | 0.024 |
| Device | 0.172* | 0.053 | 0.122 | 0.059 | 0.108 |

Note: * p < .05, ** p < .01, *** p < .001

**Table 9**

*Linear Regression Predicting Algorithm Knowledge (N= 141)*

| **Variables** | **Value** | **Standardized Beta** | ***p*** |
|---|---|---|---|
| Intercept | -3.691 | | 0.010 |
| Awareness | | 0.469 | < 0.001*** |
| Internet Skills | | 0.392 | < 0.001*** |
| Education | | 0.023 | 0.752 |
| Income | | -0.021 | 0.786 |
| Gender | | 0.160 | 0.036* |
| Age | | 0.075 | 0.381 |
| Native Hawaiian | | -0.025 | 0.732 |
| Devices | | 0.028 | 0.716 |
| F | 11.5 | | < 0.001 |
| $R^2$ | 0.442 | | |
| Adjusted $R^2$ | 0.404 | | |

Note: * p < .05, ** p < .01, *** p < .001

Table 6, 7 and 9 give concrete evidence not supporting hypotheses 3 and 6. For hypothesis 3, there was no correlation between higher education and Internet skills (see tables 6 & 9), as a whole, nor higher scores for algorithm literacy with higher education. However, higher levels of education were significant to operational Internet skills, alone. For hypothesis 6, my study significantly confirmed the Pew Research Center's (2013) findings that income does directly relate to adoption of communication information technologies (0.290, < 0.001; Table 7). My findings also show significance (0.363, < 0.001; Table 7) between older respondents and higher income. However, there are no correlations between higher income and either Internet skills nor algorithmic literacy. For Internet skills, this may be due to the fact that younger individuals have a higher propensity for skills, yet make less than older individuals.

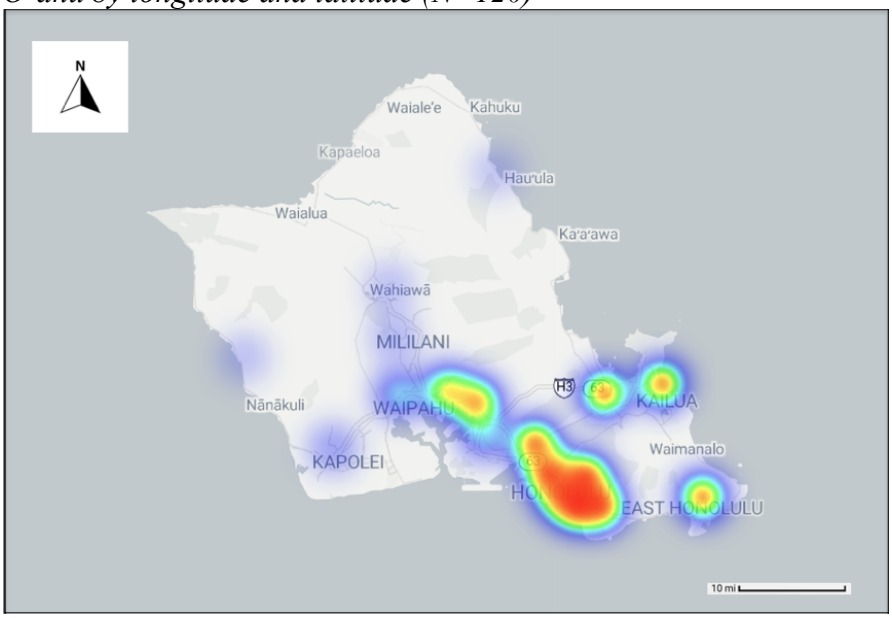
Tables 6, 8 and 9 do support hypothesis 1. For hypothesis 1, there was significant correlation for both, algorithm literacy and Internet skills, being higher in males than women (see table 6 & 9). Looking at the subscales of Internet skills and gender show significance between men having a greater estimation of their skill capacity than women respondents in operational (0.214, < 0.05; Table 8), information navigation (0.167, < 0.05; Table 8) and creative (0.177, < 0.05; Table 8). The significance of the Least Squares Regression predicting algorithm knowledge as the dependent variable (see table 9) shows algorithm awareness (0.469, < 0.001), Internet skills (0.392, < 0.001), and gender (0.160, < 0.05) as independent variables significantly supporting higher algorithm knowledge outcomes. The lone demographic determining algorithm knowledge was gender, positively correlating with males having a stronger understanding of algorithm literacy than females.

Table 6, 7, 8 and 9 support hypothesis 2 for a negative correlation between age and Internet skills, however does not support a negative correlation between algorithm literacy and

age (see table 6 & 9). These findings may mean that although youth have greater estimation of their Internet skills than older generations, literacy is not significantly affected by age. In young people, understanding the skills required for Internet participation does not lead to a greater algorithm literacy. This may have been the case due to a significant correlation between higher education and older age (see tTable 7). Broken down between the subscales of Internet skills show significance between youth having a greater estimation of their skill capacity than older respondents in operational (-0.360, < 0.001; Table 8), creative (-0.391, < 0.001; Table 8), and mobile (-0.347, < 0.001; Table 8). There was no significance for information navigation nor social Internet skills.

**Map 1**

*Intensity heat map showing algorithm literacy collected on O‘ahu by longitude and latitude (N=120)*




Note: Red indicates higher algorithm literacy.
Blue indicates lower algorithm literacy.

Map 1 shows the geographic distribution of algorithmic literacy using longitude and latitude. The higher concentration of algorithm literacy is distributed in town near Honolulu, ‘Aiea, Hawai‘i Kai, Kailua, and Kāne‘ohe. Lower scores were reported out of town in Kapolei, Wai‘anae, Hau‘ula, Mililani, and Wahiawā.

## DISCUSSION

The data collected from my online survey proved effective in providing more insight and connected validation to select socio-demographic factors, Internet skills, algorithm awareness and algorithm knowledge. The ability to access technology is the first step to overcoming barriers that are formed while using the Internet. Now, a lack of knowledge in how to use and retrieve the technology's information are expanding inequities into a third-level digital divide. My research's goal of creating evidence-based policy interventions to strengthen users' critical evaluation and coping behaviors to uphold their agency in navigating online ecosystems can reduce this growing disparity. The importance of interplay between users and algorithms, the mechanisms of algorithms that center around the collection and processing of personal and use-related information, need to be recognized and utilized in how we approach social media entertainment and content.

The data collected has shed light as to show these measures are universally shared understood across transposed contexts here in the pacific. Among the highly educated and high-income survey respondents collected, there are significant results that men have higher algorithm literacy and Internet skills than women, Internet skills and algorithm literacy go hand-in-hand, the recognition of foundational awareness and working functional knowledge of algorithms are distinct from one another, and a strong correlation that places youth having higher Internet skills than the elderly. Even amongst highly educated and device accessible Hawai‘i residents, gender and age show a digital divide. I did not find deep social inequality in Hawai‘i from my study and that may be due to a lack of ALICE populations, however the divide may be furthered between gender and technology in algorithm awareness and algorithm knowledge even with equal access to devices and digital spheres. In Hawai‘i, those who lack significant skills and resources in

algorithmic literacy risk even further socioeconomic division in the state. As a result, my study makes an important contribution to digital divide and inequality research.

The confirmation of algorithm awareness and algorithm knowledge noted previously by scholars was confirmed. There is plausible evidence supporting that greater algorithmic literacy and Internet skills one has may help defend against damaging media effects and improve health outcomes. Internet skills unexpectedly did not show significance with algorithm awareness. There is a necessity for intervention with older age groups to build up Internet skills. Although age did not determine algorithmic knowledge, Internet skills are a determinate for higher algorithmic literacy.

I can use these essential findings to further study and suggest how policy can conscientiously navigate the planning of transparency and accountability related to algorithms, their ability to determine when, where, what, and how algorithms affect their digital landscapes, and the deployment of broadband infrastructure with and within communities. Education can reason an equilibrium between physical deterministic implementation and sociotechnical developments. A buildup of digital skills and algorithm comprehension while deploying Hawai‘i’s broadband infrastructure will inevitably create a stronger, composed, and well-equipped constituency.

The incorporation of workshops developing Internet skills and algorithmic knowledge for age and gender disparities will benefit the State of Hawai‘i. The improvement of Internet skills will lead down the pathway toward an increase in algorithmic literacy. The possibility to concurrently rollout algorithm workshops while statewide funding for broadband and infrastructure is being deployed will help to benefit women and the elderly. While the progress of innovation and technology continue to surmount new levels, as a community we need to take

into consideration the populations on island that are digitally susceptible to growing digital spaces. The more cognizant of algorithm use and function Hawai‘i residents are, the more understanding of how they work, function and exist. This will create a stronger workforce, creative workspace, and adept environment that will pay dividends to our businesses and future local graduates. The loss of two critically large groups of demographics, women and the elderly, to a failing digital divide will cause difficulties for many parts of our communities. Predators and dangerous artificial intelligence will severely effect retirement communities, elections, and children. In the case of Hawai‘i, employment of digital equity is paramount to the Transpacific Undersea Cable Project deployment. The State of Hawaii is centering itself between the continental U.S. and East Asian countries. The commitment of wiring itself into the connective seafloor will profoundly shape the information, social, and technological underpinnings of growth and development in-between the regions. While we prepare to grow our connective outreach as a state, in a highly critical time in the Indo-Pacific, I urge our state offices to consider incorporating funding, recourses, and manpower into addressing a burgeoning and potentially crippling future digital divide.

A few implementations this research may be incorporated into are:

1. The Hawai‘i State Broadband Office (HBDEO), Connect Kākou, C&C of Honolulu Office of Economic Revitalization, and UH Broadband Equity, Access, and Deployment (BEAD) Program should require organizations awarded RFPs for infrastructure deployment to partner with Community Anchor Institutions, which are existing community organizations or public spaces that may provide access and support services to underserved populations.

    1.1. Reinstate and fund the Freely Associated States (FAS) Digital Navigator Program.

1.2. Continue negotiating partnerships with NGOs and public companies such as: Northstar Digital Literacy and Microsoft offering digital skill badges for customer service and other online skills.

1.3. Create high school curriculum research focusing on including algorithm literacy studies into course material and syllabi. This work can also be transposable to an older context in libraries and other community anchor institutions.

2. Implementation of a digital public service announcements (PSA) campaign, possibly similar to ‘please kōkua’ COVID PSAs, may improve Hawai‘i resident conscientiousness towards algorithm understanding, impact in growing digital spaces, and functions when users are online.

2.1. The employment of a short Instagram reel campaign series of PSAs showing examples, foundational skills, resources, facts and directions targeted to inform women and the elderly will create impact for attentive audiences empowering the user-algorithm interplay engine.

## CONCLUSION

Certain limitations need to be considered. There are few Internet skills studies done around the globe (Eurostat) with even fewer comparable data existing in terms of algorithm literacy (Petrovčič, et al., 2024). I did not collect a representative sample size of Hawai‘i residents across all demographics, particularly education and income, which may have prevented other correlations to be significant. This may have impacted my results in comparison to other researchers that have found other resource divides negatively impacting one’s opportunities. My project lacked funding, which reduced the likelihood of incorporating populations that are deemed ALICE individuals, preventing my study from further findings impacting deeper social inequalities in Hawai‘i. There may be some inconsistencies in usage of Internet skill scales and subscales in my analyses. Algorithms need to be considered when policymakers are making efforts to improve digital spaces.

Now and continually, Internet users will need to contend with the growing curated environments before them. The effects of this content are ubiquitous and continues to grow in both online and offline contexts. Aiming for interventions for the elderly and women, initiatives which formerly have been seen as non-disadvantaged groups, are still experiencing relatively low levels of Internet skills and algorithm knowledge, respectively towards their counterparts. As growing online domains become common necessities, truly comprehending algorithmic curation to a level that is critical for both coping with online environments on an individual level and for raising the public’s understanding of potential risks and benefits that decision-making bring for society in general (Petrovčič, et al., 2024). The propensity to notice data being extracted is no longer enough to prepare our communities, when the capacity for generative and predictive processes continue to emerge and organize our data.

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## APPENDIX

**Table 1.a.**

*Correlations between IS short scales in population survey of Hawaii Internet Users (N= 141)*

| Variable | OP | INF | SO | CR | MO |
|---|---|---|---|---|---|
| Operational | - | | | | |
| Information Navigation | 0.303*** | - | | | |
| Social | 0.340*** | 0.357*** | - | | |
| Creative | 0.452*** | 0.345*** | 0.286*** | - | |
| Mobile | 0.479*** | 0.268** | 0.371*** | 0.553*** | - |

Note: * p < .05, ** p < .01, *** p < .001

**Table 1.b.**

*Spearman Correlations between IS subscales, AA, AK, and AL (N= 141)*

| Variable | OP | INF | SO | CR | MO |
|---|---|---|---|---|---|
| Algorithm Awareness | 0.174* | 0.039 | 0.011 | 0.061 | -0.018 |
| Algorithm Knowledge | 0.290*** | 0.223** | 0.207* | 0.346*** | 0.275** |
| Algorithm Literacy | 0.300*** | 0.180* | 0.142[1] | 0.247** | 0.159[1] |

Note: Correlation values represent Spearman's rho.
* p < .05, ** p < .01, *** p < .001
[1]Indicates item approaches significance p < .10
Algorithm literacy consists of algorithm awareness and knowledge scales together.

Algorithm Awareness Scale

Algorithms are already being used in very different areas. Do you know which of the following functions are often performed by algorithms? [Are performed] / [Are not performed] / [Don't know]

1. To create weather forecasts
2. To make product recommendations
3. To create financial news (stock markets)

There is a large amount of data that can be used in the development and application of algorithms. Here you can see a selection of possible sources. [Is used] / [Is not used] / [Don't know]

1. Smart speaker (e.g. Alexa)
2. Smart TV
3. Wearable computing devices such as activity trackers, heart rate monitors
5. Electronic payment (credit-, debit cards)
6. Cell Phone Towers
7. Computer Games

Algorithm Knowledge Scale

What do you think algorithms do on the Internet? [True], [False], [Don't know]

1. Algorithms recognize that results, such as e.g., search results, are incomplete and automatically correct themselves
2. Algorithms can develop themselves in a completely different direction from that for which they were created

You will now see some statements about algorithms, some of them are true, some are false. [True], [False], [Don't know]

1. I can influence algorithms with my internet usage behavior
2. The database used by an algorithm is not decisive in determining its quality
3. When searching for a job online, job offers displayed may vary from person to person despite the same search entry
4. Algorithms are able to think like human beings.
5. Algorithms are independent of government censorship
6. For some media companies, content that is repeated regularly (e.g., traffic reports) is already written by algorithms
7. Humans are never involved when algorithms are used

Internet Skills

To what extent do the statements below describe your Internet skills:

Operational

1. I know how to open downloaded files
2. I know how to use shortcut keys (e.g. CTRL-C for copy, CTRL-S for save)
3. I know how to bookmark a website

Information Navigation

1. I find it hard to find a website I visited before
2. I find it hard to decide what the best keywords are to use for online searches
3. I get tired when looking for information online

Social

1. I know which information I should and shouldn't share online
2. I am careful to make my comments and behaviors appropriate to the situation I find myself in online
3. I know how to change who I share content with (e.g. friends, friends of friends or public)

Creative

1. I know how to design a website
2. I know how to create something new from existing online images, music or video
3. I would feel confident putting video content I have created online

Mobile

1. I know how to install apps on a mobile device
2. I know how to download apps to my mobile device
3. I know how to keep track of the costs of mobile app use