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The Problems of Information, Knowledge, and Truth: An Epistemological Thought Experiment with Implications for Information Literacy in the Era of Post-Truth

정보, 지식, 그리고 진실의 문제들: 탈진실 시대에 정보문해력에 관한 인식론적인 사고 실험과 함의

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ABSTRACT : People collectively understand and often use information and knowledge as terms in a variety of contexts without concern nor discussion of their many competing conceptual and theoretical definitions. The concepts of information and knowledge are intrinsically linked and suffer some of the same problems when scholars try to define them, especially when truth is a prerequisite. This theory paper presents a simple thought experiment that relates the reliabilist and truth-tracking analyses of knowledge with the physical and cognitive paradigms of information, respectively. The results of the thought experiment are discussed within the context of the Post-Truth era, with implications and applications for information literacy.

KEYWORDS : Theory of Knowledge, Philosophy of Information, Thought Experiment, Information Literacy, Post-Truth

요 약 : 인간은 정보와 지식이라는 용어를 집단적으로 이해하며, 서로 배치되는 개념적이고 이론적인 정의에 대해 주의하지도 토론하지도 않은 채, 다양한 맥락에서 두 가지 용어를 자주 사용한다. 정보와 지식이라는 개념은 내재적으로 서로 연결되어 있으며, 특히 진실이 전제조건이 되어야 할 때, 정보와 지식을 정확하게 정의하는 것은 쉽지 않다. 본 이론 논문에서는 지식에 관한 신빙주의 분석(reliabilist analysis)과 진실추적분석(truth-tracking analysis)을 각각 정보의 물리적인 패러다임과 인지적인 패러다임과 연결시키는 사고 실험을 전개한다. 이 사고 실험의 결과는 특히 탈진실의 시대적 맥락에서 정보문해력을 위한 적용과 함의를 중심으로 논의된다.

주제어 : 지식의 이론, 정보의 철학, 사고실험, 정보문해력, 탈진실

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Ⅰ. Introduction

The terms ‘information’ and ‘knowledge’ are collectively understood and used in a variety of everyday contexts without their users giving much consideration to nor debate about the various competing conceptualizations and justifications that make up the plethora of definitions of either of them as theoretical objects. For example, when a library user asks a reference librarian for information on a topic, what exactly does that mean? It could mean that individual is looking for specific content from a book, an article from a database, or a webpage on the internet. Or, perhaps, the library user wants the opinion of the reference librarian on where they should begin their own search for information after failing their own attempts at searching in the library’s complicated academic databases. In this case, the librarians’ guidance or information literacy instruction would be the information. Is the library user wondering about whether information is a physical or cognitive phenomenon? Probably not. Further, the reference interview is a process in which a librarian works to negotiate and understand the information needs of a library user to help them find the most useful and relevant information by retrieving said information from any number of information systems or sources (Markey 2015). However, the services provided by librarians to users and the systems designed to store, manage, and provide access to information are based on different paradigmatic perspectives of information a theoretical object. For example, in a reference interview, information exists as the thoughts of the library user (and the librarian), in the communications between the user and librarian, and as the information stored and retrieved from database. Nonetheless, when one commonly uses or asks for information, people generally understand what that person means and are unlikely to explore the theoretical implications unless they happen to Library and Information Science scholars or practitioners.

Similarly, the use of the term ‘knowledge’ or the capacity for knowing can be just as vague. One often says that they know something about a topic without positively asserting a justification. As an example, suppose basket weaving or basketry is the topic of discussion and Ken is an information user making knowledge propositions about said topic.[1] Ken claims to *know* a great deal about basket weaving. However, one must consider what this knowledge of basket weaving entails. Does Ken understand the art and science of making baskets himself via his own experience? Does Ken know how long to soak the reeds before bending them? Alternatively, Ken could be a historian who has spent years studying the practice of basket-weaving while never actually

1) The author’s mother used to weave baskets; sarcasm is not intended.

crafting a single basket. Does Ken have a collegiate degree in basketry? Ken could have cheated his way through basket-weaving school by buying prefabricated baskets and submitting them as his own work. Or worse yet, perhaps his professors, while experts in wicker basket weaving, poorly taught a course on vine basket weaving because it was up on the course rotation and the adjunct faculty member specializing in vine basketry quit their job due to poor treatment, low wages, and unfair labor practices, meaning Ken received lower quality education. How can Ken justify or demonstrate his said knowledge of basket weaving, and which way would be best? How does he know that the information he bases his knowledge claims on are accurate and true? Are these justifications reliable? Are these justifications the result of an internal cognitive process or the observations of external physical informative objects? As one can gather, knowledge is not so easily defined.

Aside from times in which Ken is competing in an underwater basket weaving contest, running for office, co-authoring an academic journal article, or writing a book on basketry, his knowledge of basketry will not likely be as closely scrutinized as seen above. In the philosophical and scientific realms of Epistemology and Library and Information Science (LIS), respectively, Ken's knowledge of basket-weaving and the information he uses to justify such knowledge can be examined critically in order to better facilitate the development of knowledge and the successful use and access of information. However, as mentioned above, both knowledge and information are concepts with multiple competing definitions within and across disciplines. The import of concepts and theories from other fields and disciplines into Information Science is not uncommon and has significant precedence (Pettigrew and McKechnie 2001). As discussed below, this theory paper looks to build or enhance conceptual connections between a branch of Philosophy known as Epistemology and LIS. The goal of this theory paper is similar to other theoretical or conceptual papers, such as Bates (1999; 2005; 2006), Budd (2001; 2005; 2011), Burnett (2015), Gross (2005), Dervin (1977), Hjørland (2002), Hollister et al. (2020) and others, in that it seeks to discuss the implications or applications of relevant or new theoretical concepts or to import concepts or theories that may be useful for scholars and practitioners in LIS. More specifically, this theory paper makes connections between two foundational theoretical paradigms of LIS and definitions of knowledge from Epistemology, and discusses potential implications for the concepts or notions of information, knowledge, and truth in the context of information literacy and the Post-Truth era. Additionally, this paper seeks to answer calls from Marsh and Yang (2017) for broader interpretations of information literacy as well as Budd's (2011) call for continued discourse on the role of truth

and meaning in definitions of information.

One of the ultimate, ideal goals of LIS practitioners and scholars is to connect relevant and useful information efficiently and effectively to its intended user so that that user may synthesize that information into their knowledge. An understanding of the different definitions of information and knowledge may help facilitate this goal. As discussed below, the concepts of information and knowledge are intrinsically linked and suffer some of the same problems when scholars try to define them, especially when truth is a prerequisite. Many scholars argue that we are well into an era of "Post-Truth" given the ubiquity and overwhelming amount of mis- and dis-information, fake news, conspiracy theories, propaganda, as well as the rise of political and other ideologies that preference opinion over truth (Baer 2018; Cooke 2017; Lewandowsky, Ecker, and Cook 2017; Munger 2008; Poulakidakos, Veneti, and Fangonikolopoulos 2018; Salgado 2017). Like LIS scholars and practitioners, Epistemologists, philosophers focused on defining and analyzing theories of knowledge, are also concerned with truth. In this theory paper, the author employs a simple thought experiment to examine the reliabilist and truth-tracking analyses of knowledge from Epistemology, a branch in the field of Philosophy, through the lenses of the physical and cognitive paradigms of LIS, as interpreted by Raber (2003), to highlight connections between the fields, their similarities and differences, and strengths and weaknesses. The results of the thought experiment are discussed within the context of the Post-Truth era, with implications and applications for information literacy in particular. LIS scholars and practitioners argue that information and media literacy skills, and their effective instruction, are crucial parts of putting the Post-Truth era behind us (Cooke 2017; 2018a; 2018b; Craft et al. 2017; Murrock et al. 2018; Smith 2013; Tully et al. 2020). Following this discussion, the conclusion will discuss overarching themes and identify areas for potential research and future collaboration.

Ⅱ. Selected Literature Review

The selected literature review below supplies a brief introduction to two major theoretical paradigms of LIS research and to Epistemology. Considering scope and space constraints, the purpose of this selected literature is to provide context for the thought experiment and discussions later in the paper. Please see Ellis (1992), Raber (2003), and Bates (2010) for more in-depth examinations of definitions of information and major theoretical paradigms in LIS.

1. Physical and Cognitive Paradigms in LIS

Science as a concept and practice has evolved over the centuries. The ongoing discovery of new evidence and the development of new theories have changed our understanding of the world we live in (Chalmers 1999). Each field or discipline of science operates under a specific theoretical framework, or paradigm, that guides research goals and techniques with the intent of broadening and deepening the understanding of the world as seen by that discipline (Kuhn 1970). To Kuhn (1970), sciences develop and evolve by means of paradigmatic revolution. According to Kuhn (1970), paradigms consist of three parts: an unprecedented achievement, or exemplar; a supportive consensus in the academic community; a theoretical framework for guiding future research. This section briefly describes two of the prominent paradigms in LIS, as interpreted by Raber (2003), the physical paradigm and cognitive paradigm that will be used in the thought experiment below. While Raber (2003), and other information theorists such as Bates (1999; 2010) and Hjørland (2000), describe and discuss other major theoretical paradigms in Library and Information Science, it must be noted that the primary purpose of this paper is not to debate or refute different interpretations, definitions, or theories of information. Rather, the goal is to make conceptual connections between related two truth-focused analyses of knowledge and the perspectives of the cognitive and physical paradigms. Raber's (2003) presentations and interpretations of these paradigms were selected due to their accessibility; and two paradigms were selected, out of many, in consideration of space limitations and the reader.

Information Science as a discipline began to coalesce at the conclusion of Second World War. In 1945, Vannevar Bush called for the development of a means to organize, store, and retrieve the copious amount of information that resulted from years of war research. He postulated a device known as the "Memex" that would be able to achieve this goal. Bush's Memex was the conceptual precursor to modern computing and the internet. As such, information science began with a major emphasis on information retrieval. This initial perspective led to the development of the physical paradigm of information science. Under the physical paradigm, information exists as a material object with innate informative characteristics (Raber 2003). These informative characteristics of information are objective and can thus be understood as the same thing when interacted with by different users. The physical paradigm of information also implies that it is something that can be measured, collected, stored, managed, and retrieved much like other tangible objects. Through the physical paradigm perspective, information can be books,

computer files, or other physical or digital things.

Raber (2003) and Bates (2010) note that Shannon's mathematic theory of communication and Wiener's (1961) cybernetics are foundational theories in Information Science and are a core parts of the physical paradigm. Shannon's (1948) mathematical theory of communication does not directly define information but measures the amount of information in a message in binary bits (Bates 2010). Wiener's (1961) cybernetics focuses on the use of "feedback" or information that is used to inform and adjust biological processes. As seen in the thought experiment below, Wiener's ideas regarding biological feedback can be connected to the senses (i.e., sight, smell, hearing, taste, touch, etc.) of which most living organisms use to reliably collect information about the outside world.

Despite the usefulness of the physical paradigm for the purposes of information retrieval, systems, and management, it often does not often account for the user of information. As Raber states "[t]he physical metaphor's construction of 'information' as a theoretical object is not inadequate, but it is incomplete," (2003, 88-89). Brookes (1979) speaks on this weakness of the physical paradigm by calling for a "calculus of individuality" that can account for the differences in human responses to specific needs. Brookes sought to shift the focus of study from the systems to the users.

As such, the cognitive paradigm developed in response to the shortcomings of the physical paradigm. Under the cognitive paradigm, information exists as a situational theoretical object (Raber 2003). Information can be understood as a thought with a specific, subjective meaning within the mind of the user, and, as such, information exists as an intangible object that can be understood only in the context of the user's cognitive processes (Raber 2003). Schreider's (1970) semantic information theory and Pratt's (1977) image of information can be understood as being within the cognitive paradigm as both theories interpret information that causes internal changes to a user's knowledge and cognitive structures.

However, the cognitive paradigm cannot completely deny the physical characteristics of information as a theoretical object. Ellis (1992) suggests that information as a concept exists as an irreducible duality that considers both the physical and the cognitive aspects of information. Ellis goes on to state, "[t]he physical paradigm takes its primary focus the artefacts, whereas the primary focus of the cognitive paradigm is the people" (Ellis, 1992, 60). However, as alluded to previously, there are seemingly many paradigmatic drawn in the sands of LIS's desert. Raber (2003) goes on to characterize representation, relevance, social, and semiotic paradigms of

information. Additionally, Bates (2010) sorts conceptualizations of information into the seven categories that could be considered paradigmatic and identifies some multiple type definitions that span multiple paradigms (MacKay 1969; Dervin 1977; Buckland 1991; Bates 2005; 2006) as well as some that seek to deconstruct or deprioritize the importance of information (Day 2001; Frohmann 2004). While LIS scholars cannot seem to find a consensus on which of the paradigms provides a more complete understanding of information as a concept (Bates 2010; Raber 2003), life as a LIS scholar or practitioner goes on. Due to the dichotomous or, more accurately, fractious nature of information as a theoretical object, Information Science may not be considered a true science in the Kuhnian sense.

The foundational physical and cognitive paradigms of LIS were selected as a frame of reference and interpretation for the thought experiment and discussion presented in Section III because their perspectives share similarities with the foci as well as strengths and limitations of the foundational analyses of knowledge described below. More specifically, the physical paradigm is paired with the reliabilist theory of knowledge and the cognitive paradigm is paired with the truth-tracking analysis of knowledge. Further description and discussion about these connections can be found in Section III.

2. Epistemology or Theory of Knowledge

Epistemology, a branch of Philosophy, suffers a similar condition. Epistemology is the philosophical study of knowledge and is concerned with different definitions or theories of knowledge (Steup and Neta 2020). This includes various requirements for the suitable justification of a belief, the limits of knowledge and human understanding as well as defense against skeptical hypotheses that suggest that one cannot know anything. Epistemology seeks to determine how one can successfully have or obtain knowledge.

While Epistemology is not a science, its principle theoretical object, knowledge, is the subject of much continued debate, much like information[2]. Given space and scope limitations, this theory paper will focus on some of the discussions and analyses of knowledge that have resulted from contemporary debates within the fallibilist camp of philosophers. Fallibilist theories reject the

2) It should be noted that Philosophy of Information also exists as its own branch of Philosophy (see Floridi 2002, 2004a, 2004b, 2008, Dodig Crnkovic and Hofkirchner, 2011). While the author will discuss this later, it is not the main focus of this article.

requirement that one must have certainty to have knowledge (Rysiew 2020). As a key case, Descartes relies on the existence of a surely good and just god in order to have certain knowledge of the world beyond the truth that he exists as a thinking thing (Thomson 2003). This infallibilist account of knowledge seems to have extremely high requirements for knowledge. Certainty as a condition for knowledge seems to be unattainable; Descartes only achieves a sense of certainty by appealing to the existence of a good God (Thomson 2003). The existence of a God to ensure that our knowledge is certain and true is not an option for religious skeptics, agnostics, atheists, etcetera, nor for those who recognize different or multiple deities. Skepticism can easily generate ways in which one cannot have knowledge of the external world (Rysiew 2020). The skeptical argument often takes on the form of an evil demon which, unbeknownst to you, tricks you into believing something false or instills reasonable doubt. Even without evil demons, many of our everyday life experiences can show the difficulty of the pursuit of knowledge.

This problem of certainty requirements within infallibility accounts of knowledge has led some philosophers to consider analyses of knowledge with weaker conditions. The fallibilist solution to this problem requires a weakening in the standards used as conditions or requirements for knowledge, or a way to obtain knowledge without the constraint of certainty (Rysiew 2020). However, any such analysis of knowledge needed to have a standard in which false beliefs could not be considered as knowledge. One such analysis is the "traditional" analysis of knowledge.

The "traditional" analysis of knowledge states that one can have propositional knowledge if and only if (IFF) one believes that proposition, the proposition itself is true and that one is justified in believing the proposition. For instance, I know that there is a computer because I believe that there is one, there really is a computer there, and I am justified via my senses which can see, hear, and touch it. Gettier (1963) illustrates the conditions of the traditional analysis in the following schematic[3]:

"S knows that P IFF

(i) P is true,

(ii) S believes that P, and

(iii) S is justified in believing that P." (121)[4]

3) Gettier cites that Plato's accounts of knowledge from *Theaetetus* 201 & *Meno* 98 could be interpreted as the "traditional" analysis.

4) 'S' can be interpreted as subject or Someone; 'P' denotes the propositional knowledge claim; 'IFF' is the acronym for "if and only if," a one way only logical function.

According to the traditional analysis, knowledge of a proposition, P, is a justified true belief that P. P could be anything from the proposition that I know that I see a chair to the claim that I know how to weave baskets.[5] The justification condition (iii) is meant to be sufficient in ruling out the possibility of a belief being luckily true. Most philosophers would argue that a belief that is true due to epistemic luck does not count as knowledge (Ichikawa and Steup 2018). This analysis is fallible in the sense that one can have knowledge without certainty as long as one has some kind of justification and one cannot have knowledge without justification or due to chance.

However, Gettier (1963) famously challenged of this traditional analysis of knowledge and ignited what likens to a paradigm shift for fallibilist epistemological analyses of knowledge. The three conditions of the traditional analysis claim to be necessary and sufficient for knowledge. It is obvious, or perhaps intuitive, to consider the first two propositions as necessary because knowledge must at least be a true belief. Gettier (1963) challenges the sufficiency of the justification condition of the traditional analysis. In a thought experiment with two different scenarios, Gettier demonstrates how a justified true belief may not be considered to be knowledge. However, it should be noted that his critique does not want to claim that knowledge is not or cannot be a justified true belief because the notion that knowledge as only a true belief does not sit well. Again, his argument suggests that a justified true belief does not necessarily count as knowledge.

Gettier cases (Ichikawa and Steup 2018) are designed to show that I can have a justified true belief and not have knowledge. The cases rely on the language of the propositions to create scenarios in which a justified true belief does not count as knowledge. The sample Gettier-style case in the next section will help to explain what his argument entails. However, there are a few considerations and assumptions that the reader must understand before moving through the next sections. As mentioned above, in order to have knowledge, regardless of its justification, it must be a true belief (Ichikawa and Steup 2018). Intuitively, a belief cannot be considered as knowledge unless it is at least true. On the other hand, information does not always have such a requirement; it can exist as either true or false information. The truth value of information will have an influence on whether the justifications for knowledge are strong enough to defeat the skeptical hypothesis, that you cannot know anything. The author will return to the relationship between information and knowledge and discuss the importance of truth in Section IV.

5) As well as Ken, anyway.

Ⅲ. Thought Experiment and Discussion

1. A Brief Primer on Thought Experiments

Thought experiments are common and used throughout philosophy, science, the arts, education, and many other academic and other contexts (Brown and Fehige 2019; Horowitz and Massey 1991; Moue, Masavetas, and Karayianni 2006; Stuart, Fehige, and Brown 2018). Like information and knowledge, there are a variety of definitions and approaches to thought experiments amidst ongoing debates in the Philosophy literature (Brown and Fehige 2019; Cooper 2005; Galili 2007; Norton 1996). Through a comparison and analysis of several characterizations of thought experiments, Galili (2007, 12) defines them as "a set of hypothetico-deductive considerations regarding phenomena in the world of real objects, drawing on a certain theory (principle or view) that is used as a reference of validity." Galili (2007, 20) argues that thought experiments are not only useful for arbitrating connections between theoretical and empirical contexts, but are all useful for the "developing, clarifying, and critiques of theoretical conceptions." Kuhn (1964) argues that thought experiments are integral parts of scientific revolutions or paradigm shifts because they can lead to changes in conceptual thinking. Thought experiments are often presented using a written narrative and sometimes include diagrams or illustrations (Brown and Fehige 2019).

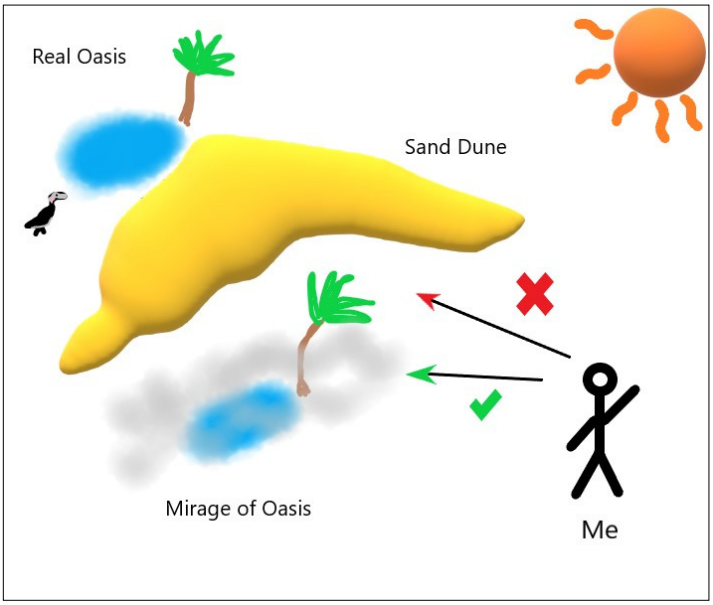
The simple thought experiment below uses a narrative, first-person perspective to ease understanding and to center the reader on a singular knowable viewpoint (Ludwig 2007). A digitally drawn figure, in the style of Dervin and Frenette's (2003) rendition[6] of a person facing an information gap, provides a visual representation of the case. The case considered in the next section is based on and meant to be analogous to Gettier's (1963) Fake Barn example.

2. A Gettier-Style Case: Through the Desert Alone

To begin, let us say that I was abandoned, alone, in the middle of a desert. I have only been out here for a short time, but I decide to wander around to find some shade. I see something in the distance that appears to be an oasis; an observation which I take to be true. As mentioned earlier, I have only been out for a short time; I am not dehydrated yet, so I have no reason to

6) Dervin and Frenette's "A Gappy Situation" can be viewed here: 〈https://commons.wikimedia.org/w/index.php?curid=12240882〉 [cited 2020. 11. 20].

think that the oasis is illusion due to failing faculties. Therefore, I have no reason to doubt my senses and claim to know that there is an oasis in the desert that I am in. However, the object of my perception, unbeknownst to me, really is a mirage. Although, it just so happens that a real oasis is hidden behind a sand dune which happens to be just behind the mirage, as depicted in Figure 1.



〈Figure 1〉 A Crappy Situation: Alone in the Desert

I clearly believe that there is an oasis in the desert. That belief is a true belief since there actually is an oasis in the desert. My justification for believing this belief is reasonable because I have no reason to doubt my senses yet. Even though I think that I know that there is an oasis, I do not actually know because my justification is misdirected to a mirage and the truth of the matter is only due to chance, not my justification.

This scenario acts to eliminate the justification condition as sufficient to avoid “lucky” knowledge. As with Gettier’s sample cases, my sample case was dependent on its design to create a justified true belief that would not count as knowledge. My justification involves my senses and does not dispel any luck in the situation. This sample case, in similar fashion to Gettier’s Fake Barn case, shows that a justified true belief does not necessarily count as knowledge.

As one can see, my attempt at justification failed due to misinterpretation of information. The

thought process used to justify my senses as being trustworthy was correct, but the information used to make that claim was flawed. I had incomplete and inaccurate information about the oasis, the mirage, and the sand dune. The informative content of the oasis and the mirage was true considering their respective definitions. Nonetheless, my knowledge proposition was false due to both luck and misinterpretation of information. The following sections will discuss two proposed solutions, the reliabilist theory of knowledge and truth-tracking analysis of knowledge, to the problem identified by Gettier (1963). Connections between how information can be interpreted by these solutions and how they relate to the physical and cognitive paradigms are also discussed in the next section.

3. The Reliabilist Theory of Knowledge and the Physical Paradigm

As mentioned above, one way of resolving the Gettier problem involves changing the justification claim of the traditional account of knowledge. Again, the reliabilist theory of knowledge replaces the justification condition of the traditional analysis to claim that my belief in a proposition is brought about by a reliable belief forming and/or sustaining process. A general schematic for a reliabilist theory of knowledge can be generated from Goldman (1975; 1979; Goldman and Beddor 2016):

S knows that P IFF

(i) P is true,

(ii) S believes that P, and

(iii) S's belief in P is the result of a reliable belief forming and/or sustaining process.

A belief forming or sustaining process is reliable when it *tends* to produce true beliefs — not luckily true beliefs — rather than false beliefs. These processes can be cognitive alone or based on experiences interpreted internally to some extent. Processes in the mind like reflection, abstraction, and inference can lead one to form beliefs. Testimony from a source that was reliable in the past could also be considered justifiable.

Additionally, sensory experience, their perceptions, and recalled memories of sensory experiences can spawn belief as well. Referring to my Gettier-style case above, it is clear that I presuppose that my mental capacities and sense perceptions are reliable sources (because I was not yet dehydrated, I thought my sight was reliable) to justify my belief that there is an

oasis in the desert. If I had thought that my senses were not reliable, I would not have justification. Reliabilist theory allows me to have a reason for my beliefs by accepting reliable belief-forming and sustaining processes rather than more stringent forms of justification that may not be attainable. A reliable belief-forming process should avoid the Gettier problem by not allowing me to gain reasons that would lead to a justified true belief. Or, to put it another way, a reliable belief forming process would not give me reason to think that the situation would lead to knowledge.

While the justification of a reliable belief forming process involves a thought process to determine its validity, it can also be thought to rely on a physical perspective of information; particularly when relying on one's senses (sight in the case above). Senses are used to translate the perceptions of the external physical world into the cognitive of the realm. In a sense, pardon the pun, one's senses are only as good and reliable as the objects in the world you interact with. Buckland's (1991) notion of information as thing stipulates that all things have innate informative characteristics. As such, the underlying assumption of this analysis of knowledge is that the objects one encounters in the external world are objectively informative and true. Information could be in the form of anything from books or documents, including the texts and images within them, to sound vibrations to trees or baskets or a smell, like the distinct, divisive aroma of hongeo-hoe (홍어회, a South Korean dish from the Jeolla province made with fermented skate fish). Deeming the senses as a reliable belief forming and sustaining process, this interpretation of reliabilist theory could be interpreted within the physical paradigm since the senses are usually a reliable source of information about and from things in the outside, physical world. Of course, this interpretation could also connect with the cognitive paradigm as it is the mind must process information from the senses and determine their reliabilist.[7] However, since the information sensed from things in the external world are used to demonstrate knowledge in the thought experiment above, the physical paradigm works better for the sake of this discussion.

Relatedly, reliabilist theory is not without weaknesses. Many of the belief forming or sustaining processes that I think are reliable might not be. Reliable sources are only so because they *tend* to produce true beliefs. There is no guarantee that reliable sources will always generate true beliefs. Skeptics could point this out and insert that an evil demon, or another skeptical device, is merely tricking me into believing that my belief forming processes are reliable (Goldman and Beddor 2016). If I cannot rule out that an evil demon is currently tricking me into thinking that my

7) Goldman and Beddor (2016) describe other interpretations of reliabilist theories of knowledge that are focus more specifically on reliable cognitive processes.

belief-forming processes are reliable, I cannot have knowledge. I might not even be able to determine if a process is reliable enough to determine that there is not an evil demon; this problem is similar to the one that led Descartes into his methodic doubt. If I am unable to reliably form true beliefs, then I will not be able rule out the possibility that my beliefs are "luckily" true. This problem is similar to the problem when considering the justification condition of the traditional analysis of knowledge.

This issue of level of reliability can also be seen in information retrieval research. The Cranfield experiments led by Cleverdon evaluated the effectiveness of information retrieval (IR) systems at providing relevant information based on search queries (Cleverdon 1972; Jones 1981). Cleverdon used recall and precision as measurements to evaluate the reliability of the information retrieval (IR) systems to retrieve relevant information. Cleverdon found that recall and precision often had an inverse relationship (Cleverdon 1972; Jones 1981). IR systems would be pointless if they could not effectively retrieve the information stored within them. This research served as an early exemplar for the physical paradigm.

Similarly, ignoring relevant information to the contrary may result from choosing a reliable source over the correct source. Hypothetically, let us say that I had reflected on my predicament and recognize that due to the situation my senses were not appropriately reliable, but disregarded it thinking that my sense of sight was more reliable than reflecting on my situation; in the case above, perhaps I was more dehydrated than I thought, or my eyes were too dry or limited by the glaring light of the sun. The reliabilist would likely say that my belief forming process is not reliable because I might have better reason to choose one belief forming process over another but mistakenly choose a competing process simply because I am too trusting of the first processes' effectiveness at producing true beliefs. However, with the reliabilist theory I could know something even if I have good reasons to believe that something does not seem quite right as long as I use a reliable process. I might not be able to distinguish which source is more reliable in general or which reliable process to use in the given situation. Again, skeptics could claim that you could easily be tricked by an evil demon at this decision point too.

Despite the drawbacks, general reliabilist theory can be considered useful as a fallibilist analysis of knowledge. It can be used to gain knowledge, but, due to the restraint imposed by the nature of reliability, certainty cannot be considered as a condition of knowledge. Since reliability depends on a belief forming process that only *tends* to generate true beliefs, certain knowledge is not attained by this method. As such, other analyses of knowledge are needed to obtain certain knowledge.

4. The Truth-Tracking Analysis of Knowledge and the Cognitive Paradigm

Nozick's (1981) "truth-tracking" analysis of knowledge offers another solution to the Gettier problem by replacing the justification premise of the traditional analysis with two counterfactual premises. The first counterfactual states that if a proposition is false then I would not believe the proposition. The second counterfactual states that if the proposition is true, I would believe the proposition. These counterfactuals can be considered intuitive; they are straight forward in a way that most would agree upon. By satisfying the counterfactuals, I would be able to "track the truth" and see how it affects the analysis on the whole. Nozick's scheme can be understood as follows:

S knows that P IFF

(i) P is true,

(ii) S believes that P,

(iii) If P is false, S would not believe P,

(iv) If P is true, S would believe P.

Again, let us return to examine the Gettier-style case from above with the tracking analysis. I know that there is an oasis in the desert only if there truly is an oasis in the desert and I believe that there is an oasis in the desert. If there was no oasis in the desert, then I would not believe there to be one. If there is an oasis in the desert, then I would believe that there is an oasis.

Due to the counterfactuals, the truth of the proposition determines whether I can have knowledge or not. The counterfactual, "If there was no oasis then I would not believe that there was one" turns out to be false. This would then contradict the first two premises and collapse the argument. I cannot have knowledge of a false proposition. The tracking analysis is sensitive to the truth of the proposition about the external world rather than my reasons for my beliefs.

However, this is a loophole in the tracking analysis because it appears to handle only ordinary propositions about the external world. When the tracking analysis is implemented on the anti-skeptical proposition that I know that I am not being deceived by an evil demon it fails to track the truth of the proposition. If it was false that there was no evil demon deceiving me then I would not believe there was no evil demon deceiving me. However, the skeptical hypothesis of the evil demon entails that I cannot know whether an evil demon is deceiving me. The truth of

this proposition cannot be tracked because my belief that I am or am not being deceived by the evil demon does not affect there being an evil demon via the tracking analysis.

Similarly, if there was no evil demon then I would not believe that I am being deceived by one. I could certainly believe that an evil demon is deceiving me if there was not one. This and the consideration just above are results of the truth-tracking analysis' rejection of Closure. "Closure is the epistemological principle that if S knows that P is true and knows that P implies Q, then, evidentially speaking, this is enough for S to know that Q is true," (Dretske 2005, 13). The tracking analysis appears to reject skepticism by rejecting Closure. A closure based skeptical argument like the evil demon hypothesis would state that because I do not know that I am not being deceived by an evil demon and thus, I cannot have knowledge.

Information plays its role in this analysis of knowledge as the conclusions gained from the two counterfactual premises. These two premises are the result of cognitive and logical processes. While the knowledge proposition can be based in the external and physical world, it is up to the user to internally deduce the truth value of the premises and make the judgment that a suitable justification has been achieved. This likens to the sense-making approach developed by Dervin (1999). According to Dervin (1999), sense-making involves the use of information to bridge a gap in cognitive understanding. Ideally, the two counterfactual statements are meant to aid the information user and knowledge seeker in making sense of the encountered information by ridding uncertainty from their minds. Similarly, Kuhlthau (1993) conceptualized learning as a constructive process that includes a sequence of actions which progress from uncertainty to understanding. Kuhlthau claims that feelings of uncertainty initiate the information search process, "[u]ncertainty is a cognitive state which commonly causes affective symptoms of anxiety and lack of confidence," (1993, 347). It could easily be argued that uncertainty leads to both the search for information and the quest for knowledge. Belkin's (1980) states that information needs often arise from anomalous states of knowledge.

As mentioned above, the truth-tracking analysis seems to handle ordinary world propositions but fails to track the truth when considering the skeptical hypothesis. However, it can seem that the skeptical argument always finds the means to disrupt any attempts to see if I can have knowledge about the external world. The tracking analysis accomplishes this by not even being able to handle the skeptical hypothesis. I can have knowledge via the tracking analysis, just not knowledge that can directly defeat skepticism. This vulnerability makes the truth-tracking analysis a fallibilist approach in that it can grant us knowledge and weed out false beliefs without relying

on certainty because the skeptical threat is ignored or not directly addressed. Certain knowledge cannot be gained from the truth-tracking analysis because it is not designed to prove the proposition that the skeptical argument is false.

5. Summary

The Gettier-style case above, Through the Desert Alone, demonstrates that one can have a justified, true belief and still not qualify as having knowledge given the traditional analysis of knowledge. The discussion focusing on connections between the reliabilist theory of knowledge and the physical paradigm argues that information from the real world collected via the senses can be a reliable way to gain knowledge. Using a physical paradigmatic perspective, information is an objective, quantifiable thing with characteristics that can be determined via the senses. Since the senses are usually a reliable source of information, the physical paradigm's notions of information can work with the interpretation of the reliabilist analysis to attain knowledge. The discussion focusing on connections between the truth-tracking analysis and the cognitive paradigm argues that one can gain knowledge with information that satisfies the counterfactuals beliefs. Using a cognitive paradigmatic perspective, information is a subjective, internal thought of an individual. Since the counterfactual beliefs are subjective, internal thoughts of an individual, the cognitive paradigm's notions of information can work with the truth-tracking analysis to attain knowledge. However, as they are both from the fallibilist perspective, either theory or analysis can produce knowledge — but cannot guarantee certain knowledge — through reliable information sources or via cognitive processes that accept true information and reject false information. As mentioned above, both analyses also require truth to have knowledge, which is not always a requirement for information. The next section will explore the implications of truth in relation to information, knowledge, and information literacy.

Ⅳ. Information, Knowledge, & Truth: Implications for Information Literacy in the Post-Truth Era

Information and knowledge are often conceptually connected as part of a continuum known as the Knowledge Hierarchy or as DIKW (Data-Information-Knowledge-Wisdom). According to

Wallace (2007), the knowledge through the hierarchy can be interpreted as a conglomeration of information.[8] Earlier, Ackoff (1989, 3) describes the relationships in another intuitive way, “An ounce of information is worth a pound of data. An ounce of knowledge is worth a pound of information. An ounce of understanding is worth a pound of knowledge.” Bates (2010) argues that while this interpretation of the DIKW relationship relates to common, everyday usage and understanding, it needs further refinement and theoretical expansion to be more helpful in the research context. While that may be the case, the analyses above suggest that information is related to knowledge not only as an order of magnitude, but rather as a justification: to know something, your knowledge must be supported by *true* information from a reliable source or information that satisfies the counterfactuals, at least as far as the above analyses are concerned. However, both the general reliabilist theory and truth-tracking analyses of knowledge require a true belief for there to be knowledge. When it comes to different definitions or theories of information, however, truth may or may not be necessary. In fact, truth as a requirement for information has been debated in Philosophy of Information and in Library and Information Science for some time (Budd 2011; Floridi 2002; 2004a; 2004b; 2008; Dodig Crnkovic and Hofkirchner 2011).

Dretske (1981), however, argues that information must be true. Dretske (1981, 44) defines information as “that commodity capable of yielding knowledge, and what information a signal carries is what we can learn from it. everything I say to you is false, then I have given you no information. At least I have given you no information of the kind I purported to be giving.” He continues (1981, 45), “Information is what is capable of yielding knowledge, and since knowledge requires truth, information requires it also.” As a philosopher, Dretske is appealing to the notions of knowledge discussed above. As Bates (2010) describes, both Fox (1983) and Derr (1985) both offer propositional or logical definitions of information that aim for truth. However, Fox (1983) argues that someone can still be informed about a false proposition, as part of the communicative process of informing, but that the result would be misinformation, not information. Floridi’s (2004a) definition of “strongly semantic information” requires truth in addition to being based on meaningful and well-formed data and that false information cannot be classified as information at all.

In the context of the Post-Truth era, these issues of truth relate to the ideas of misinformation

8) While there are several potential concepts that serve as precursors to the Knowledge Hierarchy, also known as DIKW, Wallace primarily attributes the idea to various works authored by Mortimer J. Adler. (Wallace, 2007, 13).

and disinformation as well. Cook (2017) notes that both misinformation and disinformation can be categorized as information which lacks completeness, accuracy, or clarity. Cook (2017) points to Karlova and Lee (2011, 3), who argue that misinformation can be "true, accurate, and information depending on the context." In relation to the Gettier problem and thought experiment above, I may be misinformed about the location of the oasis in the desert, but it would still be true that there was one in the desert due to luck or the larger context. Disinformation differs from misinformation because of its intent, which is to purposefully mislead, manipulate, or deceive (Cooke 2017). Disinformation is introduced by skeptics to an individual's analysis of knowledge via the evil demon hypothesis, which suggests I could be tricked by the evil demon into believing something was true when it was actually false, or perhaps that my senses were more reliable than they actually were. Again, the analyses of knowledge and the truthfulness and intent of information are subject to contextual factors. The author hopes to explore the implications of misinformation and disinformation as it relates to the analysis of knowledge in future work.

More recently, Budd (2011, 7) proposes a definition of information as a "meaningful communicative action that aims at truth claims and conditions." Budd (2011) argues that when information is communicated, the senders and receivers must consider both meaning and truth. In the context of information retrieval, Budd (2011) argues that most people want to find meaningful and true information, but when people seek false communicative acts, they are not seeking information and will not be able satisfy truth or provide adequate meaning. While Budd (2011) notes that meaning and truth are contextual, Lingard (2013) argues that Budd's interpretations of meaning and truth are too strict and that the truth and meaning are properties of information that exist on intersecting continua of truth and meaning. From this, Lingard (2013) identifies five categories of information: (1) nonsensical information that lacks both truth and meaning; (2) incomprehensible information that has truth but not meaning; (3) deceptive information, or disinformation as stated above, that has meaning but lacks truth; and (4) "sensical" information has both truth and meaning; and (5) the "uninforming," which exists in near the middle of the two continua, where the truth and meaning of information are not yet known. Through the analyses above, only incomprehensible information and sensical information could be useful for attaining knowledge because they are true. If something in the uninforming category is later found to be true, then it could be used for knowledge. Lingard (2013) argues that according to Budd (2011), only "sensical" information that has both truth and meaning could count as information, making it too restrictive. However, incomprehensible information is unlikely to be reliably evaluated or able to satisfy the counterfactuals

based on the analyses of knowledge above, and it otherwise seems awkward to suggest that incomprehensible information could be used to satisfy the requirements for knowledge without also understanding context. Information literacy could be useful for figuring out truth and meaning, as well as intent and context, allowing an individual to eventually gain knowledge.

Budd (2011) argues that information seekers should be able to assess information in relation to meaning and truth, and this ability is teachable. Many LIS scholars and practitioners note that information and media literacy skills and their instruction are critical components in overcoming the challenges posed by the Post-Truth era (Cooke 2017; 2018a; 2018b; Craft et al. 2017; Murrock et al. 2018; Smith 2013; Tully et al. 2020). Julien (2016, 126) defines information literacy as a "set of skills, knowledge, and attitudes required to access information effectively, efficiently, and ethically." Julien notes that information literacy itself has a wide variety of similar, yet competing definitions (2016, 126) expands on that definition to add that information literacy should also "include how to interpret and evaluate and information, and how to use it to make meaning across a range of contexts: in-decision making, in creative activities, in daily life, and in the workplace." While the link between information seeking and information literacy is intrinsic, Julian and Williamson (2011) note that is has been understudied. If information literacy is intended to enable people to evaluate and make meaning of information and to use it in ethical ways across a variety of contexts, then perhaps information literacy should be concerned with assessing truth as well.

Truth as a requirement for knowledge and information seems intuitive, but as the case, analyses, and scholars above point out, truth itself can be contextual. If truth is too contextual, is true information too much to ask for? The Association of College & Research Libraries' (2016) new Framework for Information Literacy ACRL's (2016) framework, arguably one of the most influential information literacy standards, makes no appeals for truth. Rather, the ACRL's (2016) has stirred controversy, in part, due to its heavy focus on context or relativism (Baer 2018). Baer (2018) argues that the ACRL's frame, "Authority is Constructed and Contextual," in the Post-Truth era may grant too much flexibility if be (mis)interpreted to allow communities to determine what sources are authoritative or credible based on their views rather than based on truth, which could lead to further political polarization, among other issues. Baer (2018) also warns that we need to better understand the impact of social identity and worldviews have on how people evaluate and use information. Lewandowsky, Ecker, and Cook (2017) warn that research on misinformation should account for political, societal, and technological perspectives. In this vein, another paper by the author and colleagues (Hollister et al. 2020) explores how

Terror Management Theory, a theory from social psychology, could be used to explore the impact of psychosocial factors and cultural worldviews may influence information behaviors.

A poignant example of this can be seen in the politicization of responses and behaviors amid the ongoing COVID-19 pandemic. In the US, Democrats and Republicans have large differences of opinions about wearing masks and the severity of the pandemic in health, economic, and justice contexts (Pew Research Center 2020). While the pandemic is devastating on its own, the accompanying "infodemic," the flood of mis- and disinformation spread through both traditional and social media, is making problems worse (Apuke and Omar 2020; Zarocostas 2020). Complicating this further, is that people may prefer information sources that agree with what already think, leading to confirmation bias, as coined by Nickerson (1998), as well as actively avoid information that challenges or critiques their worldview (Golman, Hagmann, and Loewenstein 2017). The incorporation of critical theory into information literacy may help people to more effectively analyze, critique, and understand the social and cultural structures related to information use and access (Elmborg 2006; Cooke 2017; Tewell 2015). Smith (2013; 2014) argues that critical information literacy skills are important for political agency, especially among young people. In general, information literacy and media literacy skills can play a significant role in combating fake news, mis- and dis-information, propaganda, conspiracy theories, and social injustice (Craft et al. 2017; Cooke 2017; 2018a; 2018b; Marsh and Yang 2017; Murrock et al. 2018). UNESCO (2013) argues that media and information skills are critical for human rights and to build peaceful, fair, and knowledge-based societies.

Apuke and Omar (2020) identified altruism and information seeking as the largest predictors for social media users sharing fake news about COVID-19. This suggests that while their intentions were likely good, they may have lacked the information literacy skills needed to access the resource's truth, to identify its political purpose, or to understand the meaning or consequences of sharing "information" may lead to negative health outcomes for anyone who encounters it on their feeds. Furthermore, preserving their worldview via confirmation bias or information avoidance may have made the truth too difficult to handle or accept cognitively or affectively.

Now, let us circle back to the analyses of knowledge above. Relating to the reliabilist theory of knowledge, lacking information literacy skills may deprive users of a reliable means of seeking and evaluating information sources needed to gain knowledge. Similarly, if one's worldview devalues or prevents information literacy skills, satisfying the truth-tracking counterfactuals may not be a priority or possible, resulting in untrue beliefs or sustaining of an untrue belief despite

or in spite of evidence of the truth. Here, again, when social, affective, contextual factors become apparent, we reach limitations of the both the physical and cognitive paradigms and analyses or definitions of knowledge focusing on an individual's knowledge. Within the social spaces of online games, players often rely on the information literacy skills of others, leveraging different skill levels and areas of interest to find, share, and evaluate information together, resulting in collective information literacy (Martin and Steinkuehler 2010). Similarly, while individuals can use knowledge for their own benefit, to solve problems, and gain wisdom, greater human knowledge at the societal level may not be attainable if individuals cannot share knowledge or understand the knowledge of others. As such, social epistemology focusing on the definition and analysis of knowledge in relative, subjective social contexts must be considered (Ashton et al. 2020). Budd (2001) explores the development and different interpretations of knowledge and knowing in LIS in great depth but takes a different philosophical approach than the one presented in this paper. While conceptual and theoretical disagreements exist, theoretical or conceptual work that focuses on building the foundations of LIS is important for advancing the field (Bates 2001; 2005; 2006; 2010; Budd 2001; Hjørland 2002). Indeed, multiple theoretical and conceptual understandings are needed to understand knowledge, information, and information literacy. Given the diversity, ubiquity, and importance of information throughout the overlapping contexts in our own and each other's lives, we must move past the Post-Truth era to seek and value truth if we want to continue to build shared knowledge. Given the contextual nature of truth, that task will be difficult, but abandoning truth may have negative consequences for information and knowledge.

Ⅴ. Conclusion & Future Directions

As seen in the thought experiment and discussion above, the physical and cognitive paradigms as well as the reliabilist and truth-tracking analyses can yield information and knowledge, respectively, but there are contextual complications or requirements related to truth. These contextual complications or requirements also have implications for information literacy, especially if an individual ultimately seeks and evaluates information in attempt to attain knowledge while avoiding untruth, misinformation, or disinformation. While LIS scholars and practitioners do not have to deal with evil demons per se (though the impacts of dis-, mis-information, fakes news, and propaganda are quite frightening and real), librarians and information scientists should be aware of the different

interpretations of knowledge and information. As seen above, a single definition of knowledge cannot always defeat the skeptical hypothesis. Similarly, it seems that no single paradigm can account for all the aspects or definitions of information (Bates 2010; Raber 2003). If an individual wishes to know something, they must be able to internally or externally justify their reasoning using information. As such, LIS scholars, educators, and practitioners would do well to continue conducting their work and research through a variety of the different paradigmatic or theoretical lenses to piece together a more complete picture of information and information literacy as phenomena.

Julian (2016) argues that librarians have adopted information literacy as one of their key concepts, treating it as a prized credential but also as an imperative educational goal for libraries to promote information literacy in the communities they serve. Julian (2016) and Mackey and Jacobson (2014) note that there are a variety of similar but competing definitions of information literacy. Mackey and Jacobson (2014) argue that information literacy is a meta-literacy in that both information and information literacy are critical in so many contexts and for the development and practice of other literacy skills. Elmborg (2006, 198) argues that the "real task for libraries in treating information literacy seriously lies not in defining it or describing it, but in developing a critical practice of librarianship — a theoretically informed praxis." Continuing, Elmborg argues, "With this philosophical evolution, libraries can no longer be seen as value-neutral cultural space, and librarians cannot be defined as value-neutral information providers. Librarians will be involved with the daily struggle of translation between the organized conceptions of knowledge and the efforts of all students to engage that knowledge" (2006, 198). As Budd (2011) remarks in sharing his definition and theory of information as requiring meaning and truth, ongoing study and debate related to theories or concepts are difficult but should be pursued.

Given the complex, interrelated nature of information, knowledge, and truth, LIS practitioners, researchers, and educators could mutually benefit from interdisciplinary research and collaboration with epistemologists and other philosophers. While Philosophy is not a scientific discipline, its ideas have made an impact on evolution of science and its methods (Chalmers 1999; Thomson 2003). Interdisciplinary collaboration and cooperation may lead to a deeper understanding of each discipline involved. The concepts of information and knowledge transcend all fields of study. Bates (1999) emphasizes this point by noting that Information Science acts as a meta-science that deals with the artifacts of other sciences as well as acts a support to develop and influence the professional practice of the field. As such, an interdisciplinary approach is not an alien concept. Indeed, the import of theories and concepts from other disciplines into Library and Information

Science is not uncommon (Pettigrew and McKechnie 2001).

Since information and knowledge are metaphilosophically linked, the definitions of each concept may benefit from analyses through different philosophical and theoretical perspectives. LIS practitioners, researchers, and educators may benefit from applying philosophical analytical tools and approaches like thought experiments to conceptualize information or information literacy in new ways. Flierl (2017) conducts a thought experiment to explore the relationship between information literacy and learning in higher education contexts, arguing that information literacy must be connect with disciplinary learning and that academic librarians should understand and employ theories of learning. Stephens and Clement (2012) find that thought experiments facilitate discussion and between instructors and their students and amongst the other students and promote sense making while learning about the sciences. Symbolic logic can be useful developing logical reasoning and critical thinking skills for evaluating arguments or analyzing theoretical concepts, as seen in the schematics for the knowledge definitions above (Klenk 2008). For example, thought experiments could be devised to explain how people can come to believe in something untrue based on contextual, misleading, or deceptive information and students could theorize about the types of information that would be needed to obtain facts or truth, and then practice or demonstrate information literacy skills to seek and evaluate the information they need to attain knowledge. Symbolic logic can allow individuals to evaluate the soundness of an argument using neutral statements in a way that could avoid potential perceptions of bias, which may be important in the highly sensitive or politicized environment we find ourselves in. In the examples above, the belief “P” is a placeholder for any belief statement. In the context of a thought experiment or activity, the instructor can assign different truth values for different statements and students can apply logical operations to see if the argument holds or not without focusing on a particular topic or subject. The author hopes to explore and develop more specific applications of philosophical analytical tools and thought experiments for the purposes of information literacy instruction in future work.

However, Shpeizer (2018) warns having cognitive skills to analyze arguments and make inferences is meaningless without also having a worldview or outlook that values and consistently applies those skills. Recalling the truth-tracking analysis, this suggests that LIS practitioners, researchers, and educators should promote a worldview that values truth and beliefs that accepts truth and rejects untruth when it is revealed. However, instilling such a worldview and information literacy instruction, in general, face some hurdles. Gross and Latham (2012) found that college

students sometimes think they are more information literate than they actually are. Saunders, Severyn, and Caron (2017) found that while students in the US do learn about information literacy in high school, the skills are not effectively carried over to college. Hutchison (2020) argue that school librarians have a critical role to play in information literacy education and combating fake news. Harley (2001) argues that information literacy and critical literacy instruction for first-year college students is more effective if they are related to students' everyday lives. Similarly, Marsh and Yang (2017) argue that information literacy must be considered more broadly, and that information literacy instruction should be shown to be useful across contexts. Cooke (2017) advocates for information literacy instruction across all ages in both traditional and nontraditional learning spaces. However, Rosman et al. (2016) found that students with less developed epistemic beliefs — beliefs about the nature of knowledge — were less likely to understand the value of information literacy. Librarians, school or teacher librarians, and other LIS educators that incorporate philosophical analyses or thought experiments into their instruction, learning activities, or assessments, may help their students or learners in their respective communities to develop a worldview in which evaluating information, seeking truth and rejecting untruth, and building knowledge are the accepted and expected norms.

As Raber states, "[i]nformation exists in a borderland between text and content, between consistency and contingency, between social convention and social conflict, between synchrony and diachrony, between message and meaning" (2003, 253). Leveraging the strengths and overcoming the weaknesses of the various definitions, concepts, theories, and paradigms are necessary to build more complete knowledge in Library and Information Science. As such, LIS practitioners, researchers, and educators must continue to be willing to navigate and explore the grey areas around these difficult and complex concepts in new ways. Information, knowledge, truth, and information literacy should remain topics of ongoing debate and study because it remains unlikely that any singular definition or approach to defining or applying these concepts or skills will be universally effective nor sufficient and, as should be clear given the current state of the world, the stakes for the future are high.

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