

APPROVAL SHEET

Title of Dissertation: Supporting the Submission and Retrieval of Controversial Knowledge in a Deliberative, Decision-Making Context: A Case Study in the Maryland Legislature

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ABSTRACT

Title of Document: SUPPORTING THE SUBMISSION AND RETRIEVAL OF CONTROVERSIAL KNOWLEDGE IN A DELIBERATIVE, DECISION-MAKING CONTEXT: A CASE STUDY IN THE MARYLAND LEGISLATURE

Richard Isaac Goldman, PhD, 2011

Directed By: Professor Victoria Yoon, Information Systems

This dissertation aims to support the submission and retrieval of controversial knowledge in a deliberative, decision-making context. Controversial knowledge is knowledge that competes with other knowledge to influence a decision maker, such as knowledge about how to reform the health care system or knowledge about the interpretation of financial data, and is found in domains ranging from law, business, politics, military, and medicine.

Three research questions are asked: what is a conceptual model of the information needs and design parameters for a KMS to support the submission and retrieval of controversial knowledge in a deliberative, decision-making context? (RQ1); what is a formal representation of the conceptual model for such a KMS? (RQ2); and what utility does a prototype KMS based upon the conceptual model and formal representation provide? (RQ3).

The first question is answered through a document describing validated insights based on observations, document analysis, and interviews. It discusses the nature of controversial knowledge, the domain of the Maryland Legislature, the information desired about people and content, and design guides related to principles, challenges, features, and concerns about a system for supporting the submission and retrieval of controversial knowledge in the Legislature. An ontology based upon a translation of the conceptual model into OWL classes, object properties, and data properties is created as the formal representation to answer the second research question. Lastly, a working prototype is created using the conceptual model as a design guide, and the ontology as its knowledge representation. Demonstration videos of this system were shown to legislators and lobbyists who evaluated its usefulness through perceived usefulness questionnaires and open-ended discussions. The prototype was evaluated to be significantly useful along each of the usefulness factors examined. The prototype and these utility results answer the third research question.

These findings are significant. They establish the reality of controversial knowledge and support updating the taxonomy of knowledge types to reflect its existence. They provide a conceptual model, ontology, and prototype KMS for guiding the development of systems for supporting the submission and retrieval of controversial knowledge. Third, they demonstrate that supporting controversial knowledge has perceived utility.

SUPPORTING THE SUBMISSION AND RETRIEVAL OF CONTROVERSIAL
KNOWLEDGE IN A DELIBERATIVE, DECISION-MAKING CONTEXT: A
CASE STUDY IN THE MARYLAND LEGISLATURE

By

Richard Isaac Goldman

Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, Baltimore County, in partial fulfillment
of the requirements for the degree of
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1. Chapter 1: Introduction

1.1. Problem Context

The context for this research is knowledge that competes with other knowledge for acceptance by a decision maker. Examples of such situations abound, but three should suffice to demonstrate this context: business, law, and finance. When an executive must make a decision that impacts the direction and success of an organization, many interested parties will seek to influence that decision, ranging from the board of directors, to employees, to consultants, to customers, to fellow executives. The knowledge provided by these sources however is tainted by special interests, biases, disparate experiences, and other factors that will lead to disagreement, competition, and controversy. Similarly, the prosecution and defense in a legal setting present knowledge that competes over how a judge should understand the evidence, arguments, precedent, criticisms, and witnesses in order to decide a case. In a third instance, the knowledge provided by different analysts regarding the health of companies, validity of rumors, or estimated earnings compete to influence the market activity of a financial investor.

The term "controversial knowledge" is used in this dissertation to refer to knowledge that competes with other knowledge for acceptance by a decision maker. Controversial knowledge is neither equivalent to nor encompassed by beliefs, half-truths, assertions, opinions, arguments, or some other descriptor. Consider the following three examples. The opinion that liberty is worth dying for is not controversial knowledge, but an essay about the superior importance of liberty compared to safety is a controversial knowledge artifact. An argument that arises between two people about who should pay for a dinner

is not controversial knowledge, but each of their claimed knowledge about proper etiquette would be controversial knowledge. The assertion of a partially true or misleading statement, e.g. second hand smoke kills, is not controversial knowledge, but a medical study that supports or rejects this claim would be controversial knowledge. The differences here are that the instances of controversial knowledge are actually, not just potentially, in competition with some other knowledge, are examples of knowledge, based on experience, memory, thought, research, etc. and not just something that someone else might disagree with, and are complex, comprised of multiple, interconnected concepts, not simple statements or conclusions.

Controversial knowledge is in contrast to traditional instances of knowledge which have few, if any, alternative understandings, e.g. definitions in a medical vocabulary or how to repair a flat tire. Controversial knowledge is not necessarily wrong or purely subjective, but rather, controversial knowledge is like the reports of the fabled blind men describing an elephant. The complexity of the topic or decision, and the perspective of the observers leave different people with different, legitimate understandings, or controversial knowledge, that they wish to promote but which other knowledgeable people will not necessarily accept. Indeed, the controversial knowledge context generally entails a competitive deliberation process in which, on one hand, advocates present their knowledge, interact with each other and the consumers of the knowledge, in order to impact the decision. An example would be when lobbyists negotiate with opposing lobbyists and communicate with legislators. On the other hand, knowledge consumers and decision makers of the domain rely upon the available knowledge and their providers

in coming to a decision. A decision might be the guilt or innocence of a defendant, or the role of regulating auto emissions in controlling smog.

1.2. Problem

When knowledge competes with other knowledge, there are unique challenges and needs for the entire knowledge management process. This dissertation will focus on the submission and retrieval phase, but the sharing and distribution, and application and acquisition phases, as presented in (Dalkir 2005) have their own problems. When sharing and distributing controversial knowledge, problems arise regarding privacy and security controls that reflect the rules or expectations of the competition, measuring the trustworthiness of the content or provider, facilitating the ability to communicate with the author or provider of the knowledge, including the dispersed comments and evaluation of the knowledge, and identifying the multiple slight alterations or copies of the content. Similarly, when applying controversial knowledge, problems arise regarding how to integrate, understand, and analyze the multiple competing parts, how to choose "a winner," and how to present or teach the controversy. The sharing and application of controversial knowledge however are dependent and come after the knowledge has been provided and made retrievable, and so focusing on submission and retrieval is addressing a fundamental problem of controversial knowledge management.

The submission of controversial knowledge entails the active provision of controversial knowledge to a system or directly to controversial knowledge consumers. The submission of controversial knowledge is seen when experts and interested parties provide testimony

and documents to a panel, authors provide articles to a journal's call-for-papers on a controversial subject, or corporate officers provide their insights on a controversial business proposal. Retrieval entails actively searching and acquiring controversial knowledge from a repository or passively receiving automated rule-based alerts, news streams, or other push-based distribution avenues. Controversial knowledge retrieval is seen when pulling records from a legal database, conducting a literature review, or receiving email alerts from a journal about the publication of research with certain keywords. As for the context that this dissertation examines, a deliberative, decision-making context is one in which a controversial issue is formally and carefully thought about, researched, and discussed before eventually making a determination, resolution, or judgment about the issue. Examples of such contexts are academic panels, medical boards, courts of law, legislative bodies, or investigative commissions. This is in contrast to informal discussions, mock debates, public disputes such as might be featured in a newspaper, and other common situations where controversial knowledge is present, but is being submitted or retrieved by those without direct power and influence over a significant decision.

The competitive context of controversial knowledge introduces or augments problems to the submission and retrieval of knowledge. Whereas non-controversial knowledge may have multiple producers and versions, the objective nature of the subject means that a retriever need gather only one (or a few) instances in order to complete a task. In contrast, controversial knowledge has many producers and significantly different versions, meaning that a one-of-many retrieval approach is insufficient and that a more

expansive and comprehensive retrieval process is required. For example, a lawyer seeking to retrieve knowledge about a court's legal procedure can be satisfied by one of many available guides, but the same lawyer seeking to collect knowledge about the meaning and limits of a constitutional provision will need to gather (and integrate) many pieces of knowledge from legal opinions, cases, and policy analysis. Moreover, existing avenues for producers to submit this array of controversial knowledge often lead to non-ideal situations in which only those who have the time, energy, and money to gain experience and connections have access and are heard, leaving out novice or non-specialized individuals, irrespective of the potential quality of their controversial knowledge. This situation can be seen, for example, in the legislative process when comparing the access and attention given to professional lobbyists and average citizens. Of those who are heard, the common mediums of conveying controversial knowledge, namely oral, face-to-face, paper, and email communication, are too reliant upon human memory and emotional impressions and do not provide a structure for visualizing and understanding the competition in which the knowledge is engaged. An executive may have telephone calls, meetings, reports, and letters from controversial knowledge providers, and is liable to (unintentionally) give undue merit to friends, misremember conversations, or be overwhelmed by unstructured text.

On the flip-side, once controversial knowledge has been submitted and collected in a repository, additional needs and challenges occur as interested parties seek to retrieve that knowledge. The existence of multiple, competing knowledge instances requires the identification of the relationships and provision of meta-data to make sense of the

quantity of knowledge available. Given a set of controversial knowledge, consumers of controversial knowledge would presumably want to know more than the subject of content, but how content opposes, supports, or clarifies each other, the biases and overall reputations of providers, the objectives and agendas of the content, its rhetorical approaches, logical flaws, and evaluations, and other data useful for browsing, searching, sorting, and filtering the knowledge. For example, a journalist writing a story on whether single-payer health care is successful in countries employing it may end up having a repository of tens or hundreds of records, but in order to intelligently retrieve that knowledge may want to browse the content by whether it is positive, neutral, or critical of single-payer, search for types of information like impact on government budgets, be aware of identified logical flaws, or filter to only show content where the provider is non-partisan. Issues of trust and tracking also become more prominent with controversial knowledge. Consumers of controversial knowledge are sensitive to not being duped, misled, manipulated, or otherwise misplacing trust, and providers of controversial knowledge are sensitive to knowing how well their knowledge is competing, be it in terms of who is accessing it, the number of people retrieving it, the evaluation it receives, and other relevant statistics. A legislator, when reviewing collected controversial knowledge, has limited independent knowledge, and may struggle to know whether a retrieved "fact" is true, inflated, or unfounded, and the lobbyists providing controversial knowledge to legislators will want to know, for themselves and their clients, whether their contribution is being ignored or incorporated.

Existing knowledge management systems have been used to submit and retrieve controversial knowledge, but are not effectively designed for this use. Web forums are often used for discussions meant to facilitate providing and retrieving controversial knowledge, but they provide limited semantic structuring to the content, do not scale well, and are prone to abuse. Content Management Systems (Boiko 2005) offer useful features for creating, organizing, sharing, and publishing explicit controversial knowledge, but fail to provide a tailored set of meta-data that reflects the competitive context of the content being submitted and retrieved. Wikis are a popular knowledge submission and retrieval medium that are quickly edited, inherently collaborative, well organized, responsibly monitored, highly hyperlinked, and easily accessible, but are intended for presenting agreed upon knowledge, are prone to edit wars, and pushes the human providers and their reputations into the background. Argument mapping systems (Conklin 2006) are well-suited to taking unstructured, natural language conversations and structuring them into a collection of labeled node types connected by labeled edges, but this approach suffers from over-generalized node and link types, scalability issues, and minimal attention to the people, processes, and content of the controversy being mapped. These and some other systems, discussed and evaluated in Chapter 2, reveal a situation in which systems do exist for the submission and retrieval of controversial knowledge, but, they have shortcomings in their support for the submission and retrieval of controversial knowledge in a deliberative, decision-making context.

1.3. Research Questions

The overarching research question of this dissertation asks, “What is the design for a knowledge management system (KMS) that would improve the submission and retrieval of controversial knowledge in a deliberative, decision-making context?” Three specific research questions are then asked in order to address this overarching research question.

1) What is a conceptual model of the information needs and design parameters for such a KMS? (RQ1); 2) What is a formal representation of the conceptual model for such a KMS? (RQ2); and 3) What utility does a prototype KMS based upon the conceptual model and formal representation provide for submitting and retrieving controversial knowledge in a deliberative, decision-making context? (RQ3)

The first question focuses on theory building and intends to develop a conceptual, text-based model that incorporates how controversial knowledge is currently submitted and retrieved and how the primary consumers and producers of controversial knowledge would like it to be improved. This model would include features, principles, concerns, and challenges relevant to the design of a KMS for controversial knowledge, along with information about the concepts, attributes, relationships, and rules of the relevant actors, processes, and content to represent in the KMS. In terms of actors, these are people involved in producing and consuming controversial knowledge and engaging in the deliberation and/or decision-making, e.g. lawyers, experts, lobbyists, and assistants. Processes refer to actions related to the submission and retrieval of controversial knowledge, e.g. submitting a legal opinion, retrieving documents related to a case, or discussing a question with an expert. Content refers to the actual controversial

knowledge being submitted and retrieved, such as editorials, research reports, or draft proposals.

The developed conceptual model must then be represented formally so that a knowledge management system can understand and utilize it to support the submission and retrieval of controversial knowledge. As such, the second research question asks: What is a formal representation that represents the conceptual model of RQ1? The conceptual model provides high-level information in a format intended for use by people. In contrast, a functioning KMS based on the conceptual model requires a formal representation in a computer language that expresses the details of the model in a way that can be programmatically referenced and utilized as a data structure.

It is not known whether utility will be improved by basing a KMS on the conceptual model or the formal representation. It may be that people connected to controversial knowledge management agree that the conceptual model and ontology are valid, yet find a system based upon them to not add value in terms of its power to improve their submission and retrieval of controversial knowledge. As such, the third research question asks, “What utility does a prototype KMS that uses the conceptual model and formal representation provide for submitting and retrieving controversial knowledge in a deliberative, decision-making context?” By answering this question, researchers and practitioners can have a sense of the usefulness of the conceptual model, formal representation, and prototype system, and have a framework, or at least a starting point,

for evaluating future systems intended for the submission and retrieval of controversial knowledge.

1.4. Objective

This dissertation aims to develop three artifacts to answer the three research questions using the design science framework and the case study approach: 1) a conceptual model describing the concept controversial knowledge, the Maryland Legislature, the desired information to represent, and design considerations of a system for supporting the submission and retrieval of controversial knowledge in a deliberative, decision-making context, 2) a formal representation expressed as an ontology reflecting that conceptual model, and 3) an instance of a KMS based upon the conceptual model and ontology to measure its utility for improving the submission and retrieval of controversial knowledge in a deliberative, decision-making context . The conceptual model should accurately reflect the relevant features, principles, challenges, and concerns of a system for supporting the submission and retrieval of controversial knowledge, along with the concepts, properties, relationships, and rules relevant to representing the actors, processes, and content of the system. The formal representation of the conceptual model should contain both a detailed representation of the information desired, but also the structures needed in order to support the desired features of the system for the submission and retrieval of controversial knowledge. It should also be written in a mature ontology language capable of describing, in detail, the concepts, attributes, relationships, rules, axioms, processes, and other important aspects of a domain. The instance of the KMS should reflect the conceptual model and ontology and be able to support real-world,

domain-specific, content and processes related to the submission and retrieval of controversial knowledge. The KMS should be mature enough to test the utility of the ontology's representational structure, but need not have a mature interface, installation, documentation, or other aspects necessary for a deployable KMS.

1.5. Significance

The answers to this dissertation's research questions will provide a significant advancement in addressing the aforementioned problems of submitting and retrieving controversial knowledge in deliberative, decision-making contexts. The model developed in answering RQ1 is significant because it provides a grounded and validated picture for researchers and developers to understand and design systems for the submission and retrieval of controversial knowledge. Other fields of research can then incorporate and build upon this model, based upon the expertise and interests of a particular domain. This model could be used by Information Search and Retrieval researchers regarding models and systems that handle controversial information, by Information Visualization researchers regarding how to present a set of controversial knowledge, Artificial Intelligence researchers regarding the enabling of agents to understand how to provide and gather controversial knowledge, and Argumentation researchers regarding how arguments are provided and consumed in deliberative, decision-making contexts.

The formal representation, i.e. ontology, developed to answer RQ2 will provide the component necessary to improve the way that controversial knowledge is stored and

organized to support submission and retrieval. The developed ontology will enable the content and context of controversial knowledge to be stored electronically, which can be preserved better than paper and human memory, to ensure that those in the future will have less to guess about when it comes to understanding what occurred in the past on a controversial subject. In terms of integration, instead of having knowledge scattered across multiple systems and individuals (e.g. newspapers, research journals, experts, or practitioners), the breadth of the ontology will allow controversial knowledge to be centralized, meaning controversial knowledge producers will know where to place their products and consumers will know where to find them. Moreover, repositories of controversial knowledge can be searched not simply by tags, keywords, or full-text scans, but by the meta-data and semantic information defined by the ontology, e.g. only show knowledge that has been provided by those with expertise in a certain area, deals with economic issues, has a low level of controversy, and has been given a positive rating by others. Browsing of the knowledge space also becomes more powerful as this ontological structure will provide a wide range of dimensions with which to explore a body of knowledge on controversial subjects, e.g. browsing a medical ethics database by philosophical bias. The ability to treat controversial knowledge content by its parts in addition to its whole becomes possible through the detailed structure defined by the ontology. For example, instead of pulling up a list of documents and having to read them all for the parts of interest, a list of the reasons for and against supporting a decision could be extracted based on markup tags in those documents, or filters and alerts can be created to counteract information overload, e.g. notification to lobbyists when opposing knowledge is added to a repository regarding a bill.

The answer to RQ3 will be significant for providing an instance of a KMS tailored for the collection and retrieval of controversial knowledge and documenting its utility. The prototype system will provide a foundation upon which others may build to improve its interface, provide additional functionality, and mature the system for real-world use. The methodology used to evaluate the KMS will also establish a protocol that can be used for evaluating future systems. The design science methodology will be advanced by the example of its use in developing an ontology and KMS. Most importantly, the utility measures will be significant in assessing the value of developing tailored systems that pay attention to and incorporate the competitive context of controversial knowledge.

1.6. Scope

Several choices have been made in order to keep this dissertation's research both manageable and effective for answering its research questions. There are numerous deliberative, decision-making contexts that could be studied, from medicine to business to science, but this dissertation conducts a design science case study on the Maryland Legislature. The Maryland Legislature offers a domain where controversial knowledge is at the core of the knowledge being handled, has a shorter learning curve to understand compared to domains like law or medicine, has a greater level of public access, and its population is accessible as a Maryland resident and student at a Maryland public university. This dissertation will study a limited set of the actors, processes, and content of the Maryland Legislature. The actors who will serve as the population for this case study will be lobbyists and, legislators since they are the primary producers and

consumers of controversial knowledge. Legislative aids who also deal with controversial knowledge, legislative IT managers, since they will be more familiar with the current information systems available in the domain, and legislative librarians, who currently organize knowledge for the legislature, will be used as information sources, but are not the primary focus of the dissertation. There are several processes in the legislative domain, but focus will be given only to the submission of controversial knowledge by lobbyists, and the retrieval of controversial knowledge by legislators. Lobbyists also retrieve controversial knowledge and legislators do also provide controversial knowledge, but these are not their primary roles. In terms of content, since the focus of this dissertation is controversial knowledge, the content that will be studied will only be knowledge that competes with other knowledge, such as position papers, reports, political analysis, etc. and will not focus on objective knowledge like rule/law books, directories, process guides, etc. With respect to the KMS that will be developed, its scope will be limited to that of a prototype intended to demonstrate the application of the developed conceptual model and ontology for the actors, processes, and content identified in the case study related to the submission and retrieval of controversial knowledge in the Maryland Legislature. Issues of usability, stability, or efficiency will not be addressed. Additionally, the prototype KMS, like this dissertation, does not intend to address the sharing/distribution or application/acquisition phases of the knowledge management lifecycle. These phases of knowledge management, like other interesting actors, processes, and content outside the current scope of this dissertation, are left for future research.

1.7. Organization

The remainder of this dissertation will consist of a literature review in Chapter 2, a presentation in Chapter 3 of the research methodology used, a presentation in Chapter 4 of the three artifacts that resulted from the methodology, a discussion in Chapter 5 of the results, their limitations, and their significance, and finally, a conclusion and identification of future work in Chapter 6.

2. Chapter 2: Related Work

This dissertation learns from, builds upon, and integrates several fields of research. This literature review examines the related work in three sections. First, the basics of knowledge management are presented in order to understand the background of controversial knowledge submission and retrieval. Second, existing work relevant to the submission and retrieval of controversial knowledge are described, evaluated, and connected to this dissertation to clarify the contribution of this dissertation. Third, the actors, processes, content, and knowledge management systems of the legislative domain are discussed to improve understanding of this dissertation's domain of study. Together, this literature review is intended to provide the insight necessary to understand this dissertation and to demonstrate that it is grounded in existing streams of research, is addressing a significant problem, and advances the literature.

2.1. Knowledge and Knowledge Management

2.1.1. Knowledge

Controversial Knowledge (CK) is at the heart of this dissertation and directly relates to the concept of knowledge. Knowledge has been defined many ways over time and across disciplines. Cartesian philosophers have deemed knowledge to be "information in context," William James (James 1907) of the pragmatic school of thought summarized knowledge as "understanding based on experience," and (Berger and Luckmann 1990) in their treatise on the sociology of knowledge consider knowledge to be "the certainty that phenomena are real and that they possess specific characteristics." Reflecting the age of information technology, more recent definitions view knowledge as an encoded structure in one kind of system or another, e.g. physical structures like DNA, mental states of

belief, or language, that arguably help those systems to adapt (Firestone and McElroy 2003) or "the most valuable form of content in a continuum starting at data, encompassing information, and ending at knowledge (Gottschalk 2005). Dozens more definitions can be found, but these are sufficient to establish that knowledge is a dynamic concept which is open to interpretation. Despite these various definitions, all of which are acceptable, a single working definition is needed in order to guide this dissertation.

Stepping out of the philosophical or academic world, this dissertation defines knowledge as it is defined for colloquial usage. (Webster and Porter 1913) incorporates the several facets of knowledge. Knowledge is:

1. The act or state of knowing; clear perception of fact, truth, or duty; certain apprehension; familiar cognizance; cognition.
2. That which is or may be known; the object of an act of knowing; a cognition.
3. That which is gained and preserved by knowing; instruction; acquaintance; enlightenment; learning; scholarship; erudition.
4. That familiarity which is gained by actual experience; practical skill; as, a knowledge of life.

This definition is compatible with the aforementioned definitions from the literature and preserves a meaning that non-academic subjects of the legislative domain will already be familiar with and understand.

The types of recognized knowledge are also relevant in understanding the overlooked reality of controversial knowledge. (Alavi and Leidner 2001) examined knowledge

management literature from various fields and developed a taxonomic listing of knowledge types. This dissertation accepts these types of knowledge, but asserts the list mistakenly omits controversial knowledge, a real, but unexamined, type of knowledge. “Controversial knowledge” is defined in this dissertation as knowledge that competes with other knowledge on a subject. In comparison, the term "controversial knowledge" has been used in education literature to describe "knowledge about which there is acknowledged uncertainty and disagreement, though not necessarily acrimonious disagreement" (Nicholls and Nelson 1992), in library science in the Dewey Decimal System as DDC 001.9, under the larger category of knowledge, to categorize topics like Aliens, UFOs, Atlantis, Conspiracy Theories, Hoaxes, etc. (Whitson 2009), and in the policy decision-making arena regarding the nature of the specialized knowledge decision makers search for to support their decision-making (Liberatore 2001). This dissertation's definition is compatible with these understandings and is believed to encapsulate them all.

Controversial knowledge is related to and often misidentified simply as beliefs, assertions, opinions, or arguments. This is missing the proverbial forest for the trees. The differences among these concepts can be clarified by discussing an example of controversial knowledge. In this example, an executive must decide where to open a new factory. The mayor of a city is likely to approach the executive with the assertion that the factory should be built in the Mayor's city. The mayor, expresses his/her beliefs about how great his/her city is for a factory like the one in question, and provides a logical argument to support his/her opinion that his/her city is the best city for the factory. The

entirety of what is conveyed by the mayor is knowledge, which transcends terms like beliefs, assertions, opinions, and arguments. But after receiving this knowledge, several mayors will then follow and provide other knowledge. The executive is then faced with a lot of knowledge about possible sites for the factory, but there is a conflict/competition among the knowledge data he/she receives, regarding what is actually the best location for the factory.

Controversial knowledge, in contrast to traditional knowledge, is one or only a small number of understandings of a subject, which can be considered as objective or accepted knowledge. Similar to the dichotomy between tacit and explicit knowledge, e.g. tacit procedural knowledge and explicit procedural knowledge, knowledge types can be classified as either controversial or accepted knowledge. To elaborate this concept, the knowledge taxonomy table from (Alavi and Leidner 2001) has been presented in Table 1, on the following page, with an augmented column of examples of controversial knowledge.

As can be seen, a variety of knowledge instances exist which share the common bond of being knowledge that competes with other knowledge. Yet, none of the existing knowledge types represent this controversial aspect. This dissertation therefore builds on existing literature regarding the taxonomy of knowledge by identifying and studying controversial knowledge.

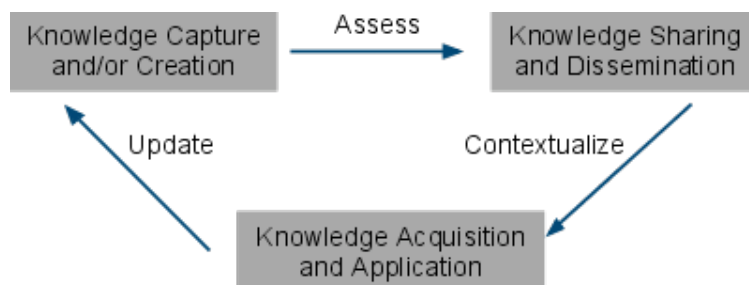
Table 1: Knowledge Taxonomies and Examples. All but the right-most column are from (Alavi and Leidner 2001)

Knowledge Type	Definition	Non-Controversial Example	Controversial Knowledge Example
Tacit	Knowledge is rooted in actions, experience, and involvement in specific context	Best means of dealing with specific customer	Best way to campaign in an election
Cognitive_tacit:	Mental models	Individual's belief on cause-effect relationships	Knowledge of how an org. "really works"
Technical tacit:	Know-how applicable to specific work	Surgery skills	Knowledge of marketers of how to persuade
Explicit	Articulated, generalized knowledge	Knowledge of major customers in a region	A research paper written by a special interest
Individual	Created by and inherent in the individual	Insights gained from completed project	Knowledge about one's importance or effectiveness
Social	Created by and inherent in collective actions of a group	Norms for inter-group communication	Norms and attitudes of a counter-culture
Declarative	Know-about	What drug is appropriate for an illness	Knowledge entailing Taiwan as part of China
Procedural	Know-how	How to administer a particular drug	Knowledge on how to fix the health care system
Causal	Know-why	Understanding why the drug works	Knowledge about why ulcers form
Conditional	Know-when	Understanding when to prescribe the drug	Knowledge about when to wean babies
Relational	Know-with	Understanding how the drug interacts with other drugs	Knowledge about a link b/w cell phones and brain tumors
Pragmatic	Useful knowledge for an organization	Best practices, business frameworks, project experiences, engineering drawings, market reports	Market analyses from different firms

2.1.2. Knowledge Management

Like knowledge, knowledge management has numerous definitions. Indeed, at least 72 published definitions of good quality were identified via an informal survey conducted in (Dalkir 2005). Of these, this dissertation adopts the definition developed by (Davenport 1994) that knowledge management is the "processes of capturing, distributing, and effectively using knowledge." This definition is chosen because it best reflects the knowledge management lifecycle model developed by (Dalkir 2005) from an analysis and integration of existing lifecycle models. In this model, presented in Figure 1, there are three stages: knowledge capture and/or creation, knowledge sharing and dissemination, and knowledge acquisition and application. The intent of knowledge management is to support these three stages and thereby have a positive impact on the people, processes, products, and organizational performance of an organization (Becerra-Fernandez, González et al. 2004).

Figure 1: Knowledge Management Cycle (Dalkir 2005)



In order to adequately provide the support and positive impact, the type of knowledge being managed must be understood and its particularities represented. For instance, declarative and procedural knowledge will share common management needs since both

are instances of knowledge, but each will have unique requirements, e.g. the ability to robustly represent sequences for procedural knowledge is not necessarily relevant to declarative knowledge. This logic applies to controversial knowledge and indicates the need to understand and appropriately represent this type of knowledge.

2.1.3. Knowledge Representation

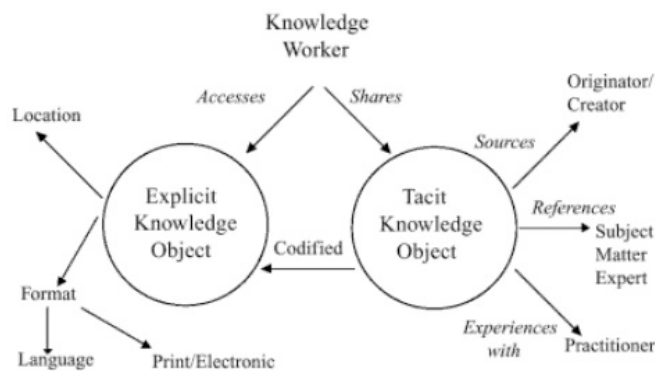
Knowledge representations are used to symbolically encode/represent, in a tangible way, the knowledge that resides in people's minds. They have five main roles: a surrogate for a real-world entity or action, a set of ontological commitments regarding how to think about the world, a fragmentary theory of intelligent reasoning, a medium for pragmatically efficient computation, and a medium of human expression (Davis, Shrobe et al. 1993). Research into knowledge representation has produced a progression of representation schemes, each with greater or specialized expressive power (Baader 1996), i.e. what can be said in a language and how concisely it can be said. Knowledge representation approaches include predicate logic/calculus, designed to model assertions, conclusions, and inferences; rules, designed to support if-then patterns; semantic nets/maps, designed to handle associations through nodes and links; and frames, designed to define and describe the attributes of specific real-world entities (Reichgelt 1991).

Additionally, description logic integrates frames, semantic networks, and formal logic in order to create a representation system that adds better description capability to predicate logic and better reasoning capability to frames and semantic networks (Baader, Calvanese et al. 2003). The description logic itself has then been used as the basis of languages for

constructing an ontology, designed to model that which exists in an entire domain (Sowa 2000).

Of the aforementioned knowledge representation approaches, two appear of suitable expressive power for representing controversial knowledge: semantic nets (aka knowledge, cognitive, or concept maps) and ontologies. Knowledge maps use nodes and links between nodes in order to symbolically represent a reality. Along with objective facts, knowledge maps are apt to include subjective aspects such as views, perceptions, judgments, hypotheses, and beliefs (Dalkir 2005). An example of a cognitive map is presented in Figure 2.

Figure 2: An Example of a Concept Map (Dalkir 2005)



Knowledge maps have three main features conducive to controversial knowledge: flexibility, relationships, and visualization. There is no limit to the number of nodes or links, and so as a controversy grows or the understanding to be represented increases, so can the knowledge map. Competition is highly interactive and interconnected, so the ability to represent the many and far-reaching relationships between aspects of

controversial knowledge is essential. Controversy is also complex and can be difficult to follow. By providing a visual representation, knowledge maps can facilitate improved comprehension of the competing knowledge through human image processing. Relevant to this dissertation, these positive attributes of knowledge maps have been recognized and applied in the areas of Issue Based Information Systems (Kunz and Rittel 1970) and argument mapping (Buckingham Shum 2003). These systems and their limitations as a means of controversial knowledge management are discussed in detail in the following section 2.1.

Without disregarding these features, this dissertation will be using an ontology to represent controversial knowledge. An ontology uses concepts, attributes, relationships, grammars, and other modeling constructs to develop an explicit, formal specification of a subject or domain (Gruber 1993). Like maps, an ontology is flexible, supports complex relationships, and can be presented as a visual map. Unlike maps, an ontology is able to represent and enforce rules, types, and other domain modeling concepts, and are more suited to not only represent a whole domain, but to build systems off of that understanding. Indeed, several knowledge management systems are use an ontology as their representation mechanism (Fensel 2002; Golbeck, Fragoso et al. 2003; Maedche, Motik et al. 2003). An ontology and its application for controversial knowledge collection and retrieval are discussed further in Section 2.6.

2.2. Research Relevant to Controversial Knowledge Submission and Retrieval

In addition to the background of knowledge and knowledge management, this dissertation's methodology and artifacts will incorporate and connect with work from several fields, namely:

- Issue Based Information Systems (IBIS)
- Collaborative Commenting Systems
- Argumentation
- Dispute Resolution
- Rhetoric
- Content Management
- Ontology

This section will summarize the relevant theory and applications of these fields, identify strengths and shortcomings with respect to controversial knowledge management, and discuss its connection to the objectives of this dissertation.

2.2.1. Issue Based Information Systems

2.2.1.1. Description of Issue Based Information Systems

Issue Based Information Systems (IBIS) are the earliest, still active attempt at controversial knowledge management. The concept of IBIS was first introduced in (Kunz and Rittel 1970). According to Kunz and Rittel, IBIS "are meant to support the coordination and planning of political decision processes" through the representation of topics, issues, questions of fact, positions, arguments, and model problems. The process

as described by them begins with the structuring of an originally unstructured problem or topic during a "trigger phase." A dialog then develops around this topic or its subtopics in which issues are raised and challenged, and arguments developed. Additionally, questions of fact are raised, directed to experts, or retrieved from a documentation system. These answers are introduced as issues in the conversation that can be questioned and discussed. This dialog continues until the opponents are convinced or a decision is made through a formal decision procedure. This interactive process allows participants to "form and exert their judgments incessantly, developing more structured pictures of the problem and its solutions." Moreover, IBIS is intended to "stimulate a more scrutinized style of reasoning which more explicitly reveals the arguments,...to help identify the proper questions, to develop the scope of positions in response to them, and assist in generating dispute."

This process description introduces several concepts central to IBIS. Topics are defined as "a crude organization principle for denoting the foci of concern." For example, "What should we do about the broken copy machine?" Issues "are the organizational 'atoms' of IBIS-type systems." Issues have the form of questions, are created from controversial statements, are specific to particular situations, and can be raised, argued, settled, ignored, or substituted. Four types of issues are enumerated: factual issues, e.g. "Is X the case?", Deontic issues, e.g. "Shall X become the case?", Explanatory issues, e.g. "Is X the reason for Y?", and Instrumental issues, e.g. "Is X the appropriate means to accomplish Y in this situation?". Issues have relationships to other issues as either direct successors, generalizations, or relevant analogies. Positions are statements assigned to

issues. Questions of fact are "requests for information which are not assumed to be controversial. Doubting the credibility of an answer leads to an issue." Lastly, model problems are scientific or managerial models meant to deal with whole classes of problems, e.g. cost-benefit models.

Along with this general description of a system and its purpose, instruction is given by Kunz and Rittel into the structure of a such a system. An IBIS should contain the following subsystems:

1. An issue bank of active, settled, abandoned, and latent issues
2. An evidence bank containing questions of fact and their answers if available
3. A handbook containing the set of model problems
4. A topic list
5. An issue map (i.e. a knowledge map) to graphically represent the relationships between issues, questions of fact, positions, and other node types
6. A documentation system to support search and analysis, indexing, and browsing

Similarly, four information exchange processes are to be supported, documented, and coordinated by IBIS:

1. between the participants (e.g. opinions, expertise, reference to previous questions and decisions, similar questions, etc.)
2. with the experts about specific questions
3. from documentation systems (for literature in support of a position, for factual reference, etc.)
4. with the client or decision maker (directives, quest for decisions, reports, etc.).

identification, browsing, searching, and indexing. Visualization is improved through the use of icons, color coding, custom images, and the ability to condense parts of a large map into a single map node. Support for multiple users is provided through user accounts, password protections, and association of each node or link to a user. The banks of issues, evidence, and maps are provided through SQL database linking and exportation, enabling collaboration independent of shared time and space. Detailed help files and tutorials for how to use the system are also provided. Overall, Compendium is a feature rich tool that effectively implements the IBIS guideline.

Due to its versatility and power, Compendium has been applied in several ways relevant to this dissertation. (Conklin 2006) uses Compendium in order to map dialogue during meetings to "build shared understanding of wicked problems." (Ohl 2006) demonstrates the use of Compendium for policy decision-making by representing the Iraq invasion debate, and public submissions to the South East Queensland Regional Draft Plan e-Consultation forum. KorteQ Ltd, a knowledge management consulting firm, have used Compendium to represent the decision rationale and processes of their clients (Adler 2006). Several other applications of Compendium are presented in (Sierhuis 2006) but these three are sufficient to demonstrate that Compendium has been used to provide a solution in contexts where controversial knowledge is being handled.

2.2.1.2.2. Rationale and bCisive

[Rationale](#) and [bCisive](#) are two commercial IBIS developed by Austhink which add several features beyond those of Compendium and an improved user interface. Both

introduce broader and more specialized sets of node types. Rationale provides specialized nodes for reasoning (e.g. contention, co-premise), bases (e.g. assertion, expert opinion, law), and teacher tools (e.g. Great Work!, Refinement Needed); and bCisive provides specialized nodes for exploring options (e.g. situation, fix, requirement), testing hypotheses (e.g. positive result, assumption), reason analysis (e.g. contention, compound reason), evaluation (e.g. accept, recommended), tasks (e.g. task, date, assigned to), and sources (e.g. publication, personal experience). Along with new node types, each node's strength can be expressed as strong/solid, weak/shaky, or nil and templates are provided that represent starting points for different kinds of maps, e.g. problem solving, essay planning. A particularly powerful feature is the incorporated text processing engine that can generate explanatory or summary natural language text based on the labels, text, and node types of a map, e.g. a paragraph about why a decision was made. Lastly, the interface of the maps is improved through manual and algorithmic alignment and spacing, and well designed graphics. Both of these tools have been used in practical settings. Rationale is primarily used by students and educators in order to teach critical thinking, reasoning, taxonomy creation, and other skills (Austhink 2008). bCisive on the other hand is marketed towards the business world where it is used to represent the contents of meetings and produce post-meeting reports, think visually while brainstorm or planning, or engage in problem solving (Austhink 2008).

2.2.1.2.3. Internet-Based IBIS

Several systems have been developed that use the internet to add additional features and move away from the presumption that participants are located in a common physical

space to the presumption that participants in a deliberation are distributed in both space and time and have little if any knowledge of the other participants. One feature-rich example is the Deliberatorium (later named the Collaboratorium) developed at the MIT Center for Collective Intelligence (Klein and Iandoli 2008; Iandoli, Zollo et al. 2009). It makes important contributions by including interactive feedback about nodes in the form of ratings and comments along with discussion mediums for participants in the form of a chatroom and forum. Also, this system augments the standard, normally exclusive use of a concept map visualization with a hierarchical presentation of the nodes that can be browsed. TruthMapping.com offers a categorized, searchable portal of topics to which new premises, corollaries, deductions, and conclusions are contributed by members, each element of which other members can rate and submit either that they agree with it or submit a critique (TruthMapping.com 2009). DebateWise.com is a similar system, but instead of elements in a logical flow, content is split simply between affirmation and rejection of a question (Debatewise 2009). Users contribute one sentence summary statements along with longer explanations that support or reject the claim of a statement. Users can then vote on which side, yes or no, they favor. ProCon.org is a non-profit that researches controversial topics and presents its findings in “a balanced, comprehensive, straightforward, and primarily pro-con format.” DebateGraph.org is also a general purpose catalog of deliberations, but offers more detailed node types compared to other websites and uses a more visually appealing and interactive explorer and map visualizations for its contents (Debategraph 2009). Argumentations.com is unique in its use of stories, timelines, and location to structure and organize elements in its database (Argumentations.com 2007). Lastly, the newest addition to internet-based IBIS is

Dispute Finder from Intel Labs (Intel 2009; Ennals, Trushkowsky et al. 2010) which augments a standard portal with a Firefox internet browser plugin that integrates IBIS with internet browsing. When browsing the internet, users can select text from a website and catalog it in the Dispute Finder system as either supporting or disputing a claim, or simply mark that a claim made on the page is disputed. This information, collected from all its users, is then applied to not only construct a summary of a debate on a topic, but to notify plug-in users when they are browsing the internet if any of the content of a page being viewed is disputed and if so, the details of that dispute. While none of these systems is perfect or applied in industrial settings, each demonstrates useful features for representing and managing controversial knowledge via the internet.

2.2.1.3. Evaluation of Issue Based Information Systems

The IBIS approach has many strengths for the representation and management of controversial knowledge. First, it provides support for the entire knowledge lifecycle. Controversial knowledge can be represented in the knowledge map, shared with co-workers or internet users by emailing files, using a central database, or presenting at a group meeting, and applied by knowledge consumers to improve their understanding and decision-making on controversial issues by interacting with the map. Moreover, it has made inroads with business and academia regarding the need and value of using computer systems in controversial situations. IBIS has also proven to be flexible and versatile, allowing issues from a variety of domains to be represented and specialization through custom node and link types, processing engines, or visualizations. Indeed, an array of features which controversial knowledge management systems can incorporate

are developed and demonstrated within the IBIS framework, such as browser plug-ins or automated natural language presentations of structured encoded knowledge. Lastly, the notion of representing controversy as links between nodes has advanced thinking away from unstructured natural language and allowed for the use of visual reasoning of knowledge maps.

With respect to collection and retrieval, IBIS provides a structured way of submitting knowledge and insights to a repository map in the form of documents, video, links, and text snippets attached to the map. These maps can then be browsed or searched to retrieve the encoded insights. Moreover, these tools are beyond prototypes and have been used in real-world settings.

The IBIS approach also has many weaknesses both in its theoretical conception and its implementations with respect to controversial knowledge management. At the theoretical level, IBIS are essentially repositories of discussions and not intended to support secondary aspects to controversies like voting, representing knowledge about the people and politics involved, or enforcing procedural rules. These are left for human users to either handle through external means (e.g. memory, meeting facilitators) or represent through nodes in a map (e.g. a note node connected to a decision node stating that the decision is/was made by a plurality vote). Further, IBIS does not seem concerned with the needs for computers to process the knowledge represented. Artificial Intelligence processing by user agents or specialized software requires a greater level of semantic encoding than what the IBIS framework requires. It may be represented that a text

fragment is a pro-statement, and a human user knows the larger meaning of that term, but a computer would need to be instructed about its semantic relationship to questions, references, decisions, people, and other concepts. Lastly, its insistence on the use of a map data structure may have been advanced at the time, but as discussed in Section 2 regarding knowledge representation, ontologies offer the same functionality of maps along with greater expressive power through the additional ability to comprehensively and robustly represent the concepts, attributes, relationships, grammars, and other modeling constructs of a domain.

Regarding implementations of IBIS, some or all of these suffer from four major shortcomings. First, there are few evaluations of the usability and performance of the systems developed. Two exceptions are (Tate, Buckingham Shum et al. 2006) which builds a system based on Compendium for personnel recovery teams that includes simulations and a basic feedback questionnaire, and (Twardy 2004) which demonstrates the positive effect of the Rationale argument mapping approach in teaching critical thinking. It's not clear what the utility of IBIS is in contexts rich in already explicit controversial knowledge like the legislative domain. Second, the design of how to represent arguments, facilitate deliberation, or improve decision-making lacks research rigor and adds little, if any, contribution to theory. Node and link types are generic, and don't incorporate the range of known sub-types, e.g. "rhetorical," "information request," or "leading" as types (or properties) of question nodes that would be expected of a rich representation of controversy. Similarly, existing research into effective deliberation or decision-making that might improve resolving controversial knowledge situations are not

incorporated. Third, large scale situations present several problems. When maps consist of hundreds or thousands of nodes and links, which is common for complex controversies like global warming or health care reform, it is impossible to legibly fit it all on a standard computer screen and requires extensive visual scanning. Some have used a hierarchical list as a solution, but this results in analogous problems of scanning long lists to find the desired node and having to repeatedly expand and drill-down through high-level nodes to find the detailed node desired. Identifying who contributed what elements in a map is also poorly supported. Few systems however have had the luxury of having been applied to such difficult problems or achieving a large contributor base, but nonetheless, issues of scalability remain and are to be expected in real-world controversial knowledge management settings like the legislative process. Lastly, these systems are primarily geared towards representing text. Nodes are essentially place holders for written natural language phrases. Support for audio, video, and documents is minimally provided through hyperlinks to the content and identification of that node as audio, video, or a document. Multimedia and PDF documents are now commonplace containers of knowledge and tailored representations are needed.

The collection and retrieval of controversial knowledge is affected by several of the aforementioned weaknesses, but is particularly impacted by IBIS' weak representations related to actors, processes, and content. The people submitting and collecting the encoded knowledge are largely ignored, with aspects such as bias, reputation, power relationships, and access privileges not represented in the system. In political and competitive contexts, this information is crucial. Aspects of the collection and retrieval

processes such as deadlines when content must be submitted, how and who can retrieve what content, or where or how submissions should be placed or organized are not supported. These are common needs in real-world domains of controversial knowledge collection and retrieval, such as law or government. In terms of content, the common reliance on documents appears targeted for replacement by mapping, and so structures for common document templates, e.g. position paper, committee report, etc., and domain specific content parts like "financial note" or "political leadership position" do not exist. IBIS is also a general purpose system, not tailored to any specific domain's details or requirements for collection and retrieval.

2.2.1.4. Relationship to this dissertation

As mentioned in the introduction to this section, IBIS is a forerunner of controversial knowledge management. This dissertation therefore inherits several advantages, insights, and tasks from this work. As a pioneering research area, IBIS has produced inroads, both in academia and within industry, for research into the use of information technology for improving how controversial topics are handled. In order to progress farther down this road, this dissertation plans to incorporate five objectives based upon analysis of the existing, related work in IBIS.

1. Use an ontology as the knowledge management representation structure instead of a semantic map
2. Evaluate the usability and effectiveness of the eventual knowledge management system

3. Incorporate research from the related areas of argumentation, dispute resolution, rhetoric, and content management
4. Provide detailed, domain-tailored representations of the actors, processes, and content of controversial knowledge
5. Examine the array of functionality developed in IBIS implementations for inclusion in dissertation's artifacts

The first objective is intended to advance beyond the limited semantic network knowledge representation scheme and is achieved by developing a model around concepts, properties, relationships, rules, and other ontology-friendly modeling constructs. The second is being done to more effectively show the value of a/the specialized KMS for controversial knowledge collection and retrieval and will be done through a simulation with a qualitative feedback interview, questionnaire, and observation of the KMS developed based upon the ontology using legislators, lobbyists, and authentic domain content. The third goal of incorporating disparate research relevant to controversy and decision-making is to benefit from existing research and will be reflected by enumerating in the ontology, unless deemed irrelevant or undesired upon investigation, certain topologies about persuasive approaches, logical fallacies, dispute resolution stages, hard-problem solving, and other foundations discussed in the following sections. The fourth is meant to add depth to existing content structures and will be the result of a detailed case study of the legislature whose domain-specific insights will be modeled but also abstracted away from. The fifth is performed in order to benefit from the insights of IBIS developers and will be performed after compiling a list of desired

functionality based upon the case study and reviewing existing IBIS systems for solutions. The achievement of these objectives will not only advance controversial knowledge collection and retrieval, but can improve and challenge IBIS theory and implementations.

2.2.2. Collaborative Commenting Systems

2.2.2.1. Description of Collaborative Commenting Systems

Collaborative Commenting Systems utilize collaborative, interactive, Web 2.0 technologies to facilitate providing input about some explicit type of information. This explicit type of information can be a document such as a group report, a data set such as the readings from a measuring instrument, a webpage such as a blog, an image such as a proposed layout, or most any digital content. These systems support interactive collaboration through user accounts, dynamic web pages, and interfaces for visitors to add information. Stakeholders interested in the content item are identified by their username, provide their input through text-based comments, and these comments are dynamically updated on the website. These comments are organized into threads of a back-and-forth conversation about the entire content item or particular aspects of the content item. Overall, collaborative commenting systems provide a mechanism for individuals in a community to meaningfully augment content with their own input in the form of comments.

Collaborative commenting systems differ from IBIS in that they are content focused, not issues focused. IBIS organizes information around explicit issues and questions such as

“Ways to improve troubleshooting” or “How can this bug be fixed?”, whereas collaborative commenting systems center around a particular piece of explicit information, such as a document. Further, IBIS organizes and presents its information in the form of a graph linking all the individual pieces of information, whereas collaborative commenting systems use threads that present information in a more linear, hierarchical fashion. What these both share are the intent to facilitate a community of people electronically providing information about a complex topic in a more organized, interactive, and effective fashion.

2.2.2.2. Examples of Collaborative Commenting Systems

2.2.2.2.1. Website Comment Module

The most basic type of collaborative commenting system is seen in websites that provide the option for visitors to add a text comment about the item viewed. For example, adding a comment about a video watched on YouTube, a news article or opinion piece on the New York Times website, a blog post, a Facebook posting, or a picture on Flickr.

These basic commenting modules offer the ability for people to submit their knowledge, opinions, and reactions to content; however, it is limited in several regards which other collaborative commenting systems try to address.

2.2.2.2.2. Reflect

Reflect is a free, open-source extension for website comment modules that supports the reflection and restatement of comments (Kriplean, Toomim et al. 2011). The challenges addressed by Reflect are twofold. First, individual comments, as well as the thread of comments, can become lengthy and difficult to read. To address this, Reflect allows

users to provide bullet points summaries of the post. Authors can verify these summaries / re-statements and readers can read the summaries as well as the original post for further details. Second, commentators are often unsure whether they have been understood, and so Reflect allows and encourages readers to re-state parts of a post or an entire post in their own words. These restatements can be reviewed and revised by the author to identify and reduce misunderstandings. Overall, Reflect aims to improve commenting by “showing that someone is listening, helping avoid conflicts that stem from misunderstandings, helping other readers find takeaways in long discussions, and building community through a new way of interacting.” (Website). A screenshot showing some of its abilities is provided in Figure 4.

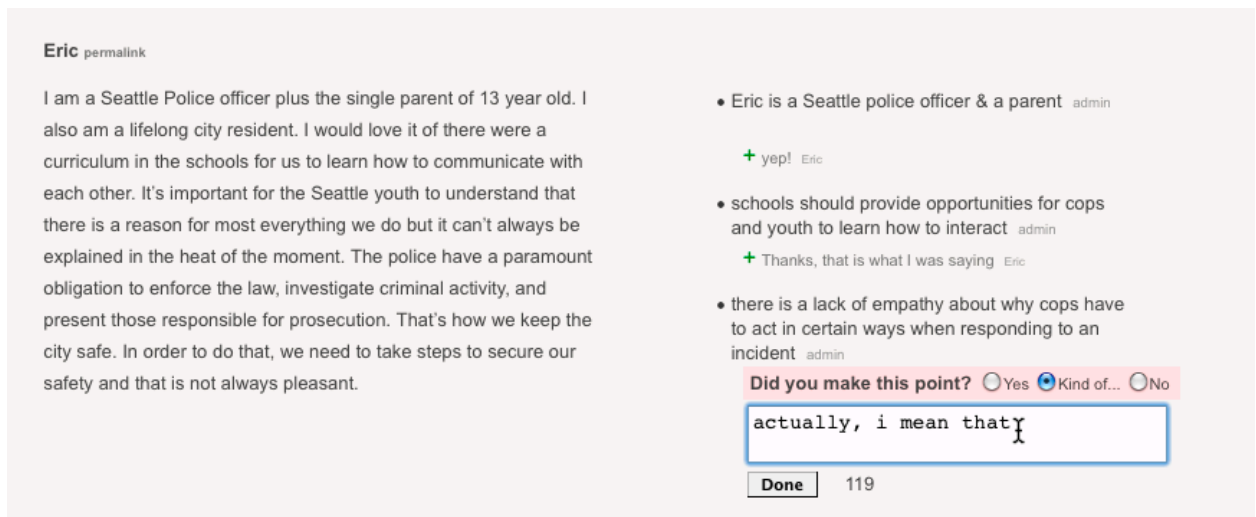


Figure 4: Screenshot of Reflect interface

2.2.2.2.3. Hylighter

Hylighter is a robust system for groups of people through their web browser to collaboratively comment on documents, ranging from HTML pages, Office documents, and images (Lebow 2010). Amongst its many features are the ability to visualize through

color-code who has commented on parts of a document, to have comment threads around particular pieces of content, e.g. a word, sentence, paragraph, or image, to provide descriptive tags and status information for comments that can be used for searching, sorting, and filtering, to have profiles of the people providing comments, to have URLs for each comment to support linking to them, and to have custom layouts for reviewing comments about a document. An example screenshot of Hylighter is provided in Figure 5.

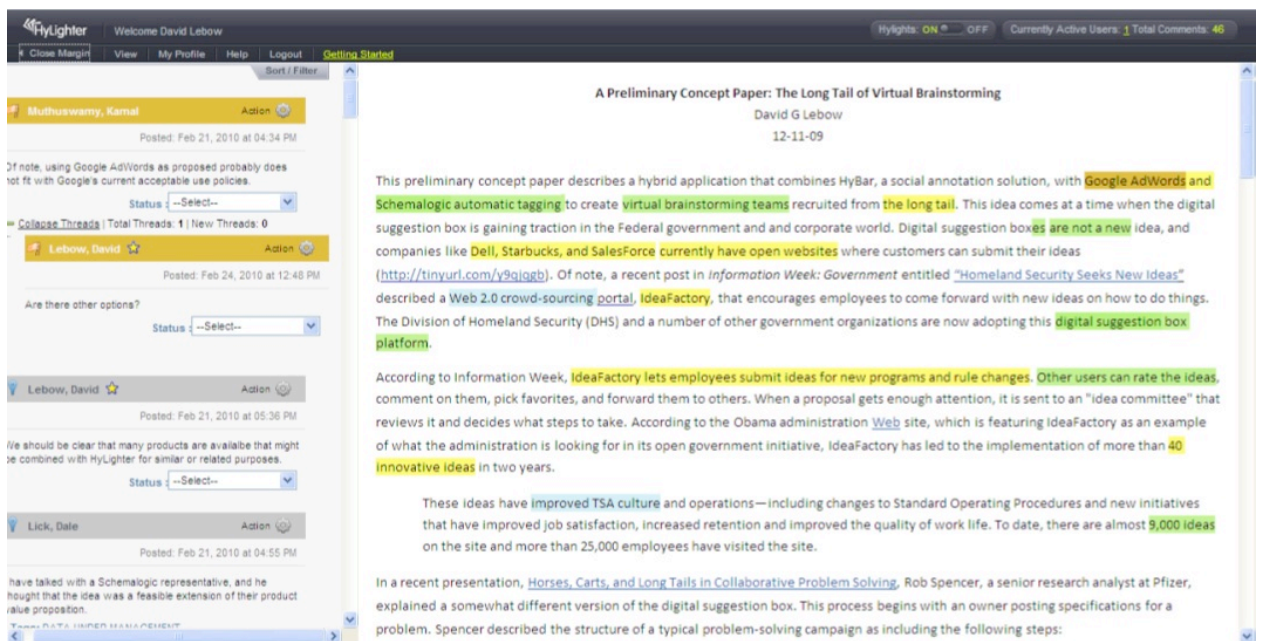


Figure 5: A screenshot of Hylighter

2.2.2.2.4. CommentSpace

CommentSpace is a collaborative commenting tool designed for collaboratively commenting solely on visualizations of data (Willett, Heer et al. 2011). In addition to features for data visualization, it allows users to add and remove, link, tag, search and filter comments (Figure 6).

address important aspects like their role, expertise, or reputation. Second, while comment types are supported, these systems do not have built-in, detailed knowledge of the types of content and comments. For example, types of questions like rhetorical questions or information questions are not known, and users are freely allowed to enter types, making these systems prone to irregularities and redundancies in its repository of types, e.g. information question and informational question. Third, these systems are generic and not tailored to any particular controversial domain. The particular needs and constraints of how courts, businesses, legislatures, or research institutes process controversial knowledge and comments are not directly addressed.

This dissertation inherits from this work however a sense of the importance of comments and augmenting information to documents, not just linking to other documents. Further, this research will aid collaborative commenting systems by identifying relevant information to store in user profiles, what content types are pertinent to represent, and what design constraints exist in a controversial knowledge context.

2.2.3. Argumentation

2.2.3.1. Description of Argumentation

Arguments are an inherent aspect of controversy and are the subject of the field of Argumentation. Argumentation is defined by (Eemeren, Grootendorst et al. 1996) as "a verbal and social activity of reason aimed at increasing (or decreasing) the acceptability of a controversial standpoint for the listener or reader, by putting forward a constellation of propositions intended to justify (or refute) the standpoint before a rational judge."

Three schools of Argumentation are presented in this section that offer useful references

for this dissertation and demonstrate the concerns of Argumentation research.

Argumentation concerns itself with understanding the structure of arguments. The Toulmin model provides an abstract, generalized structure intended to describe all arguments (Toulmin 1958). This model, pictured in Figure 7, stipulates six parts of an argument, three essential and three auxiliary. As a requirement, an argument consists of data, warrants, and claims. Data are the evidence used and a claim is the conclusion or assertion of the argument. A warrant provides the justification between some set of data and a conclusion. Supplementary to these parts are backing, rebuttal, and qualifier. Backing refers to a justification in support of a warrant whereas claims are modified through rebuttals, which present an exception to a claim, and qualifiers, which express the certainty or force of a claim.

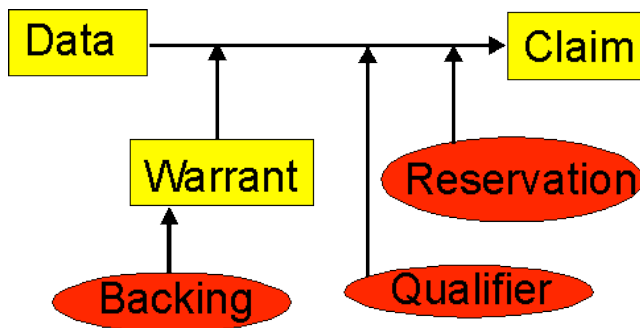


Figure 7: The Toulmin Argument Model

The purpose and types of arguments are also examined. The exemplar of this work is The New Rhetoric (Perelman and Olbrechts-Tyteca 1969). Of its many contributions, The New Rhetoric identifies the goal of arguments as not the establishment of universal, objective, logical truths but as "securing the adherence of those to whom it is addressed, it is, in its entirety, relative to the audience to be influenced." The importance of the

subjective nature of argument validity/acceptability, and the audience in the choice of an argument's data and presentation has become a central tenet of Argumentation research. The New Rhetoric also contributes an extensive catalog of argument techniques and a classification system for them: "quasi-logical arguments" that use formal reasoning, "arguments based on the structure of reality" such as cause-and-effect, "the relations establishing the structure of reality" such as metaphors or models, "the dissociation of concepts" such that negative aspects are detached to improve the perceived quality of a primary idea, and "the interaction of arguments" such as through amplification of a particular idea (Perelman 1982).

Argumentation research also develops processes for improving argumentation. The theory of pragma-dialectics sees argumentation as a critical discussion that should aim to produce a reasonable resolution to a difference of opinion (Eemeren and Grootendorst 1984). Towards this end, those engaged in argumentation are advised to go through four stages: "confrontation" in which the participants establish that there is a conflict and what exactly it is about, "opening" in which the rules to be followed are determined, "argumentation" in which arguments amongst the parties are exchanged, and "conclusion" in which participants decide what has been resolved. Further, ten rules are established for the argumentation phase in order to improve the chances of a reasonable resolution (Eemeren and Grootendorst 2004). These include such guides as the "freedom rule," ensuring that participants are not prevented from supporting or criticizing a position and the "unexpressed premise rule," which prevents a participant from either

disowning an implicit premise of theirs or falsely asserting as a premise that which has not been expressed by an opponent.

2.2.3.2. Applications of Argumentation

Argumentation has applications as well as theory relevant to an ontology for controversial knowledge management. The ability to visualize and interact with knowledge is a common feature of knowledge management and argument visualization research supports this. Argument visualization "is a presentation of reasoning in which the evidential relationships among claims are made wholly explicit using graphical or other non-verbal techniques (Conklin 2003)." The foundations of argument visualization are presented in (Kirschner 2003) along with descriptions of computer supported argument visualization applications geared towards teaching critical analysis and argumentative writing, supporting deliberation, understanding complex debates, and publishing academic works to improve debate. Of relevance to an ontology for CKM are applications of Argumentation to supporting computer agents. The ASPIC consortium applies argumentation theory to develop a platform consisting of a logical language, methods to analyze arguments, and a protocol for dialog amongst agents (Amgoud, Bodenstaff et al. 2006). The details and approach used by this system to support argumentation amongst agents offers insights into how to represent the argumentation aspect in this dissertation's ontology. Thirdly, researchers have used argumentation theory to better model and teach domain-specific argumentation, demonstrating the feasibility of an ontology to represent the argumentation aspect of controversial knowledge. Examples of application domains are law (Marshall 1989; Ashley 1990; Maccormick 1995; Carr 2003), medicine (Shankar and Musen 1999; Fox and Modgil

2006), politics (Barry 1990; Myers 1999; Sniderman and Theriault 2004), and mathematics (Aberdein 2006; Inglis, Mejia-Ramos et al. 2007).

2.2.3.3. Evaluation of Argumentation Research

Argumentation research provides meaningful insights into the structure, purpose, types, and process of arguments, a crucial element of understanding controversial knowledge and supporting its collection and retrieval. Its theories are robust enough to support both casual as well as formal argumentation situations. Moreover, its applications support human sense-making, argumentation amongst computer agents, and understanding of domain-specific argumentation. In addition to these strengths, there are also limitations with regards to controversial knowledge collection and retrieval.

While attention is given to the content of arguments and the process of argumentation, aspects of the people engaged in the argument, such as their biases, perspectives, reputations, expertise, and other human aspects are not detailed in models or systems of argumentation. Its theoretical models are also too abstract. Identifying the structure of arguments as minimally consisting of data, warrant, and claim is similar to identifying that sentences are constructed of at least a subject and a verb. While true, the power of language and argumentation is in the array of sub-types and stylistic structures. There are many types of warrants and ways that they can be stylistically connected to data and claims. A cataloging and definition of these sub-types and structures would be useful for organizing and providing templates for explicit controversial knowledge. At the application level, two weaknesses stand out. First, insights given into how to improve the process of argumentation do not appear embedded in computer argumentation support

systems. Instead, this is left to human guides to enforce through non-technical means. Second, there is a lack of effectiveness studies. It is not clear that the models developed actually provide utility to those engaged in the argumentation process, let alone the submission and accessing of controversial knowledge.

2.2.3.4. Relationship to this dissertation

This dissertation incorporates Argumentation research as a guide for understanding argumentation in the general case before dealing with arguments encoded as part of controversial knowledge in the specific domain of the Maryland Legislature. This understanding will be utilized in performing the content analysis of explicit controversial knowledge from the case study domain. Coding guides will reflect the Toulmin model's high-level structure of arguments and the New Rhetoric's emphasis on the audience of an argument. When examining and evaluating the processes of controversial knowledge collection and retrieval, the guides of pragma-dialectics will be used to see what is present or missing, and how its guides might be incorporated in the eventual artifacts of a model, ontology, and KMS. The analysis of Argumentation theory and its application also leads to the recognized need for this dissertation to evaluate the utility of the artifacts for representing explicit arguments in controversial knowledge content, better represent the actors involved in arguments, and provide more detailed knowledge about the sub-types and sub-structures of arguments.

2.2.4. Dispute Resolution

2.2.4.1. Description of Dispute Resolution

Controversial knowledge exists, and is submitted or retrieved, in the context of a dispute amongst competing parties, and part of this competition is the determination of a winner,

i.e. an outcome. Dispute resolution studies how to move from a conflict to a decision. As expressed in Figure 8, there is a general process through which disputes are resolved. At first, the competing parties negotiate amongst themselves, e.g. union and management sitting down together and trying to work out a new contract. In the case that a resolution does not emerge, a third-party mediator is introduced that can facilitate the process, e.g. a specialist from the National Labor Relations Board. Should this also not result in an acceptable agreement amongst the parties, the negotiator then puts forward a recommended resolution, which can range from being a suggestion open for rejection, e.g. a recommended contract stipulation, to being a legally binding outcome, e.g. the decision of a judge. For these three stages of dispute resolution, an array of theories, guides, and technologies have been developed.

Figure 8: Dispute Resolution Process (ECODIR 2003)



Negotiation is a common and difficult activity in which natural, instinctive behaviors are often counter-productive. Research has therefore examined how to improve the process by training people, aiding them with technology, or replacing them with computer agents. Several guides to being a better negotiator have been developed (Miller and Colosi 1989; Karrass 1993; Shell 2006; Lewicki, Barry et al. 2007), but the most

prominent is the Harvard Negotiation Project's "Getting to Yes" system (Fisher, Ury et al. 1991; Fisher and Ertel 1995). At the center of this system are four methodological insights: "separate the people from the problem," "focus on interests, not positions," "invent options for mutual gain," and "insist on using objective criteria." In addition to guides for people to learn and apply, negotiation research has made use of computers to aid human negotiators through Negotiation Support Systems (Antrim 1987; Jelassi and Foroughi 1989; Anson and Jelassi 1990; Meister and Fraser 1994; Bellucci and Zeleznikow 1998; Kersten and Noronha 1999; Turel and Yuan 2007). An exemplar of a Negotiation Support System is SmartSettle (Thiessen, Loucks et al. 1998; Thiessen and Soberg 2003) which enforces a custom negotiation process, makes counter-offer and resolution suggestions through a value maximization algorithm based on user-determined priorities and desires, and encourages structured and natural language interactions between negotiating parties. Automated negotiation takes the next step by having computer agents act as the negotiators (Sandholm and Lesser 1995; Beam and Segev 1997; Jennings, Faratin et al. 2001; Rahwan, Kowalczyk et al. 2002; Bartolini, Priest et al. 2005; Tamma, Phelps et al. 2005; Tung and Lin 2005; Buttner 2006; Resinas, Fernandez et al. 2006). These agents elicit from their constituents goals, values, priorities, and other information deemed relevant for negotiation, uses a pool of strategies based on the context of the negotiation, communicates with other agents and their environment based on an agreed protocol, and reports back to their constituents when necessary. These agents have been applied in online auctions, business to business e-commerce, and online consumer marketplaces (Maes, Guttman et al. 1999).

Building on negotiation research in which the parties involved are at a peer level, the literature on mediation focuses on how to be a third-party with authority that actively contributes to the creation of a resolution. Several guidebooks for effective mediation have been produced based on theory and case studies (Folberg and Taylor 1984; Moore 2003; Picker and American Bar Association. Section of Dispute Resolution. 2003; Schwarz 2005; Goldberg 2007). These guides cover a range of topics such as planning for a mediation session, mediation strategies, active listening, reaching settlements, dealing with uncooperative parties, understanding the legal aspects and domain specific aspects of the dispute, best practices of particular dispute contexts, and lessons learned from studied cases. Along with training guides, mediators are aided by technologies. (Conklin 2006) explains how to serve as a mediator through dialogue mapping with the Compendium IBIS, specialized services like The Mediation Room (Ross 2008) or the [Electronic Consumer Dispute Resolution \(ECODIR\) Project](#) (ECODIR 2003; Solovay and Reed 2003) offer online systems for mediators to control, communicate, and monitor negotiations, and systems like Family_Winner (Bellucci and Zeleznikow 2005) support mediators in family law disputes. On the flip side, mediators are also used to aid negotiation support systems by serving as technical support, educators of participants in effective negotiation, and human faces to the negotiation process being enforced by the system (Katsh and Rifkin 2001; Lodder and Thiessen 2003).

The recommendation phase is particular to the mediator, but its decision-making aspect applies to all parties involved and each phase of dispute resolution. Of interest to this dissertation are insights into making decisions regarding "hard problems" that are

complex, have inherent uncertainty, have interconnected and interdependent parts, and have multiple conclusions based on multiple perspectives (Clemen 1996). These are also known as "wicked problems" (Rittel and Webber 1973; Conklin 2006). The field of decision analysis (Raiffa 1968; Clemen 1996) offers insights into how to approach these types of problems. A textbook model of the decision analysis process is presented in Figure 9 from (Clemen 1996). As this flowchart reflects, effective decisions result from a goal directed, iterative process of understanding the problem, weighing alternatives based on explicit models, and judging the robustness of the decision. The challenge is how to perform this process, to which a number of notable works offer direction (March and Heath 1994; Clemen 1996; Hammond, Keeney et al. 1999; Garvin and Roberto 2001; Nutt 2002; Russo and Schoemaker 2002; Bennett and Gibson 2006; Gunther 2008). Moreover, while these works address difficult decision-making in the general case, insights are needed for specific domains. Domain-specific descriptive and proscriptive decision analysis research has emerged in the fields of medicine (Detsky, Naglie et al. 1997; Hunink 2001; Sonnenberg and Fennerty 2003; Sox 2007), law (George and Epstein 1992; Sorensen, Goldman et al. 1995; Flemming, Holian et al. 1998; Ringquist and Emmert 1999), government (Sabatier and Whiteman 1985; Peterson 1995; Steinbruner 2002; Ko 2006), ethics (Trevino 1986; Guy 1990; Kidder 1996; Loe, Ferrell et al. 2000), environmental ecology (Maguire and Boiney 1994; M. and R.P. 1995; Kiker, Bridges et al. 2005; Mendoza and Martins 2006), and business management (Brown, Kahr et al. 1974; Goodwin and Wright 1993; Smith and von Winterfeldt 2004; Davis 2005).

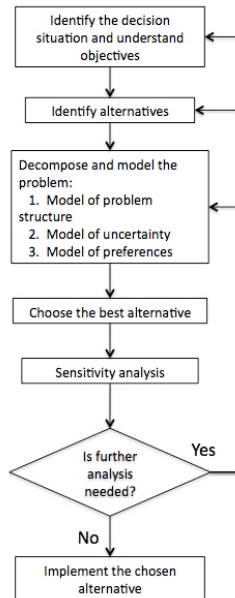


Figure 9: A Decision-Analysis Process Flowchart (Clemen 1996)

2.2.4.2. Evaluation of Dispute Resolution Research

Research into Dispute Resolution has successfully developed theories, guides, and technologies to support negotiation, mediation, and recommendation. Dispute resolution research contributes important insights into how controversy can be resolved but does not adequately deal with the role of controversial knowledge in the process. Dispute Resolution processes rely on participants knowing or figuring out what is wanted, what the values and priorities are, what the uncertainty or probabilities are, the acceptability of arguments or suggestions, and other subjective factors. For example, in a labor dispute, the union has to figure out what they ideally want in the contract, how important and adjustable each stipulation is, what the likelihood is that a contract change's expected utility will be achieved, and whether management's criticism of worker output or estimates of future revenues are accurate. All of these tasks rely on controversial knowledge, such as the diverse experiences and insights of workers, knowledge about the

results of the previous contract and effective strategies used in that negotiation, or evaluation reports about worker effectiveness and managerial quality. How this knowledge is to be effectively collected, represented, stored, and accessed is side-stepped and assumed in order to elaborate what to do once these challenges have been resolved.

2.2.4.3. Relationship to this dissertation

This dissertation seeks to develop an ontology to support controversial knowledge collection and retrieval, and an important aspect of these activities is applying controversial knowledge to resolve disputes. Towards this goal, Dispute Resolution research has identified: heuristics and insights to incorporate, e.g. focusing on interests instead of positions; a proscriptive model of the decision process to encourage, i.e. Figure 9; sub-tasks to support, e.g. determination of costs, values, and priorities; and technologies with which to integrate, e.g. SmartSettle or The Mediation Room. Additionally, Dispute Resolution research provides guidance for studying the legislative process, which can be seen as an instance of a dispute resolution system. As such, the dispute resolution process of Figure 8 will be used as a potential structure for understanding and representing phases in the legislative process and their interaction with controversial knowledge. Similarly, the decision analysis flowchart of Figure 9 will be used to guide questions into what knowledge/information legislators use or would like to have in making their decisions, i.e. what controversial knowledge lobbyists should ideally submit. It is desired that the resulting artifacts will provide a useful structure for submitting and retrieving controversial knowledge that will facilitate knowledge-based dispute resolution.

2.2.5. Rhetoric

2.2.5.1. Description of Rhetoric

Controversial knowledge, due to its competitive context, is commonly submitted with the intent to persuade. Rhetoric is the study of "the ways in which signs influence people (Brummett 2006)." These signs can take the form of writings through essays, images through photographs, movies through film, sounds through radio, sensations through emotions, and other mediums. From these studies, the field of rhetoric has produced guides for effective persuasion, examined the usage and dynamics of rhetoric, developed a scientific methodology and structure to rhetoric, and cataloged sound and unsound logic arguments. Rhetorical manuals for effectively influencing others date back to ancient Greece (Quintilian 1921; Cicero 1954; Aristotle and Roberts 2004) and a plethora of modern books have been written by academics aggregating research (Fisher and Shapiro 2005; Gass and Seiter 2007; Goldstein, Martin et al. 2008; Cialdini 2009) and by practitioners sharing insights developed through experience and study (Carnegie 1982; Maxwell and Dickman 2007; Mortensen 2008; Borg 2009). These works cover a range of topics such as the use of emotion, reputation, logic, appearance, relationships, favors, word choice, and self-interest. Along with proscriptive work, descriptive attention has been given to areas such as the rhetoric of cultures (Molan 1997; Lu 2004; Richardson and Jackson 2004; Braun 2005; Brummett 2006), the rhetoric surrounding political issues (Hawdon 2001; Marshall 2002; Heald 2003; Parry 2003; Lawler and Schaefer 2005; Ferguson and Marso 2007), resistance to persuasion (Ahluwalia 2000; Sagarin, Cialdini et al. 2002; Tormala and Petty 2002; Taber and Lodge 2006), and the influence of factors

such as attractiveness (Chaiken 1979; Pallak 1983), mood (Hullett 2005), humor (Smith and Voth 2002; Young 2008; Waisanen 2009), and emotion (Tiedens and Linton 2001; Brader 2005; Briñol, Petty et al. 2007). At the analytical level, rhetoric has developed formal methodologies for studying rhetoric (Brock, Scott et al. 1989; Wood and Kroger 2000; Schiffrin, Tannen et al. 2001; Gee 2005) and identified explicit structures of rhetoric (Daradoumis 1996; Taylor and Donald 2004; Taboada and Mann 2006). Along with the neutral or positive ways signs persuade, rhetoric has examined the abuse of persuasive techniques (Huff 1993; Pratkanis and Aronson 2001; Larson 2009) and incorporated logic as a means to guard listeners and keep arguments grounded in truth, reason, and reality by establishing rules (Weston 2009) and insights into how to identify true, fallacious, and misleading lines of reasoning (Kelley 1998; Downes 2006; Kahane and Cavender 2006).

2.2.5.2. Evaluation of Rhetoric

Rhetoric offers insights into the persuasion aspect of controversial knowledge, but these insights have not been transferred to systems for the collection and retrieval of controversial knowledge. From a technology standpoint, the knowledge about rhetoric has not been encoded in a way that computers can understand. Rhetorical Structure Theory (Mann and Thompson 1988) starts down this path by mapping the parts and relationships of rhetorical text and developing algorithms to summarize and generate natural language text. The scope of Rhetorical Structure Theory to structuring text however leaves it without contextual representations for aspects such as the actors involved or the processes of which it is a part. Similarly, a robust taxonomy of logical

terms, e.g. types of fallacies or valid lines of argument, exist in the literature, but have not been represented in a computer understandable format or meaningfully incorporated into a system. The knowledge and capability is there to allow a piece of text in a digital document to be marked as a False Dilemma from a comprehensive list of known fallacies, but this has not been done. Similarly, knowledge about effective persuasion has not been developed into wizards or tools to aid controversial knowledge producers as they submit their knowledge, or controversial knowledge consumers as they try to organize and retrieve the rhetoric collected.

2.2.5.3. Relationship to this dissertation

Research from the field of Rhetoric, similar to the role played by Argumentation research, will provide a background education into how language is used to persuade. This learning will be reflected in content analysis, interviews, and enumerations. The coding guides for analyzing available controversial knowledge content from the Maryland Legislature will ask analysts to pay attention to the sort of appeals made in a document (e.g. fear, logistical constraints, etc.) and perceived rhetorical abuses (e.g. misleading statistics, logical fallacy, etc.). Interviews will be guided by Rhetoric when discussing with legislators and lobbyists what influences them. In particular, they will be asked about what they'd like to know about submitted rhetoric, the common rhetorical approaches they've seen (good and bad), and their perceived ability to influence or their openness to be influenced. Enumerations will come into play in the dissertation's artifacts by manually compiling an extensive, though not exhaustive, listing of logical proofs and fallacies and persuasive tactics and factors based on the literature. This said,

this dissertation does not intend to be a mature investigation of rhetoric (in the legislative process), as the actual focus is not about how rhetorical content influences, but simply how rhetorical aspects might impact or be used to improve how controversial knowledge is collected and retrieved.

2.2.6. Content Management

2.2.6.1. Description of Content Management

Controversial Knowledge is often made explicit in the form of research papers, position papers, proposals, editorials, news articles, emails, recordings of oral communication, etc., all of which are examples of content that could be incorporated into a content management system (CMS). Content is rich information that is wrapped in simple data (Boiko 2005). This information is explicitly encoded in some medium, i.e. text, images, audio, video, etc., and is structured, formatted, and intended to be put to use. This simple data is appended to information to provide the context and meaning of the information and is referred to as meta-data. For instance, an audio recording of a committee hearing is information with associated meta-data regarding it such as the legislation discussed, the date it was recorded, search tags, or the attendees present. This committee audio recording content could be a piece of content of a legislative committee's content management system. Indeed, another way to look at content is as the granular information that is used to construct a content repository, which is the database at the center of a CMS (White 2005). A content management system supports the passage of electronic content through its lifecycle (Gu and Pullman 2009) and correspondingly consists of four main subsystems for: creation and editing, repository and versioning,

workflow and routing, and deployment and operations management (Nakano 2002). Along with the features alluded to by the titles of these subsystems, CMS also handles such things as security, archiving, destruction, authentication, roles, indexing, and collaboration (Boiko 2005; White 2005). Content Management has been applied in several ways (Boiko 2005), most notably in connection with complex website development (Hackos 2002; McKay 2004; VanDyk 2008), library systems (Budd and Harloe 1997; Rich and Rabine 1999; Eden 2008), document management (Sutton 1996; Bielawski and Boyle 1997; Saffady 2007), knowledge management (Hasanali, Leavitt et al. 2003; Dalkir 2005; Keyes 2006), electronic commerce (Cunningham 2002; Boiko 2005; Schneider 2008), academic publishing (Lancaster 1995; Oppenheim, Greenhalgh et al. 2000; Mackenzie Owen 2007), and portals (Collins 2003; Sullivan 2004; Townsend, Riz et al. 2004).

2.2.6.2. Evaluation of Content Management

Content Management offers a useful framework for handling instances of explicit knowledge, but its potential for controversial knowledge collection and retrieval has not been fully realized. Of relevance to these activities, content management systems and principles have been used to construct legislation tracking systems and legislative portals, online political news and analysis publications, law libraries, and research databases for accessing research regarding complex issues. What is primarily lacking in both content management theory and application is representations and support for the competitive context of controversial knowledge content in its corresponding meta-data and workflow. Meta-data currently represents such things as authorship, dates, ratings, and keywords which apply to any sort of content, but does not provide specialized structures

for the controversial aspects of actors, content, and processes. Actors have reputations, such as biases, goals, or backgrounds, power attributes, such as leadership positions, influence, or voting rights, and negotiation characteristics, such as amenability to negotiation, means of persuasion, or leverage which could potentially be useful meta-data to include. Content could be augmented with meta-data identifying the claims, ideas, requests, and issues of content, the argument types used, the levels of controversy it contains, and links to competing content, evaluations, and subject material. Process meta-data can be attached to content by linking content to the input and output content from the same process, providing time metrics such as how long content has been at each stage of a process, listing the relevant actors and overseers of the process the content is involved with, identifying the past, present, and necessary future stages of the content, and referencing guides and help resources to the process with which the content is involved. The workflow component of Content Management has traditionally focused on managing the progression of content from draft to publication (White 2005) but is neither technically nor theoretically limited from incorporating the workflow of the larger domain or context in which the content exists. For controversial knowledge, the workflow can be used to represent and manage the overall context of a competitive, deliberative system. The roles, rights, and duties of its actors can be encoded and enforced, dispute resolution processes can be supported, and desired flows of communication can be encouraged. By incorporating controversial knowledge collection and retrieval needs into its meta-data and workflow, Content Management can be a main component of how controversial knowledge is submitted, organized, and accessed.

2.2.6.3. Relationships to this dissertation

Controversial Knowledge collection and retrieval entails the handling of a large and diverse set of content and Content Management provides insights into how this can and should be done. These insights will be utilized to describe existing human and computer content management systems in the legislative domain related to controversial knowledge and identify possible improvements. These findings will be encoded in a conceptual and formal model of the actors, processes, and content connected to controversial knowledge collection and retrieval that can be incorporated into content management systems.

Along with the aforementioned meta-data structures and workflow models for controversial contexts that are currently lacking, the artifacts developed by this dissertation will enable the creation of specialized forms for adding or commenting on controversial content, e.g. submitting and reacting to position papers, writing and revising legislation, or providing and analyzing research, templates for publishing controversial content, e.g. layouts for publishing legislation online along with the surrounding controversial knowledge content, and applications of the sub-parts of controversial content instead of the entirety, e.g. filtering to display just the supporting statements included in a repository of committee testimony. Indeed, Content Management provides generic theory that must ultimately be adapted and constructed for specific needs and contexts. As such, by developing artifacts that represents the actors, processes, and content for controversial knowledge collection and retrieval and incorporates lessons from the content management practices of a state legislative organization, this dissertation as a byproduct facilitates the improved application of content management to domains with controversial content.

2.2.7. Ontology

2.2.7.1. Description of Ontology Research

An ontology is an explicit specification of a conceptualization (Gruber 1993; Gruber 1995), i.e. a definition of the concepts, relationships, vocabulary, constraints, and other distinctions that are relevant for modeling a domain and applying the representation (Gruber 2008). Ontologies vary in many ways, but particularly with respect to their scope. Upper ontologies limit themselves to meta, generic, abstract and philosophical models that can be used across a range of domains whereas domain ontologies are specific to a given context, problem, or subject and have limited transferability (SUOWG 2003). Ontologies can consist of concepts, attributes, facets, taxonomies, relations, functions, axioms, and instances, which are expressed and encoded through ontology languages, of which there are several (Su and Ilebrekke 2002; Corcho, Fern et al. 2003). The current standard-bearer and popular ontology language is the Web Ontology Language (OWL), developed and promoted by the World Wide Web Consortium (Horrocks, Patel-Schneider et al. 2003; Dean and Schreiber 2004; Lacy 2005). The development of ontologies is studied by the sub-field of ontology engineering (Gómez-Pérez, Fernández-López et al. 2004; Staab and Studer 2004). Far from there being a single, accepted methodology (Jones, Bench-Capon et al. 1998; Corcho, Fern et al. 2003; Pinto, Martins et al. 2004), a range of acceptable approaches exist, such as those based upon software engineering (Nicola, Missikoff et al. 2009), collaboration (Holsapple and Joshi 2002), induction from text (Buitelaar, Cimiano et al. 2005), learning (Zhou 2007), the context of an enterprise (Blomqvist, Ohgren et al. 2006), and the needs of novices (Noy and McGuinness 2001). Ontology evaluation is a similarly important and unsettled

topic (Gómez-Pérez 2004; Brank, Grobelnik et al. 2005; Hartmann, Spyns et al. 2005), with recent work focusing on evaluations through rankings (Alani, Brewster et al. 2006; Tartir and Arpinar 2007), domain data (Brewster, Alani et al. 2004), task performance (Porzel and Malaka 2004), test queries (Seipel and Baumeister 2004), collaboration (Supekar 2005; Cantador, Fernández et al. 2006), Wikipedia categories (Yu, Thom et al. 2007), and automation (Völker, Vrandečić et al. 2005). These ontology engineering processes are facilitated by several tools, with features ranging from visual modeling, language syntax assistance, validation and consistency checking, reasoning, evaluation functions, and domain-specific improvements (Lambrix, Habbouche et al. 2003; Denny 2004; Mizoguchi 2004). Of these, the Protege platform (Noy, Fergerson et al. 2000; Gennari, Musen et al. 2003; Noy, Crubezy et al. 2003) stands out as the most mature, comprehensive, extensible, and popular ontology engineering tool.

2.2.7.2. Relevant Applications of Ontologies

Of relevance to this dissertation are applications of ontologies for knowledge representation and management, and ontologies developed related to controversial knowledge collection and retrieval. Ontologies have come to play a central role in Knowledge Management by serving as an effective mechanism for knowledge representation by allowing tacit mental models of an organization, process, or subject to be richly and explicitly expressed (Heijst, Schreiber et al. 1997; Sowa 2000). Once encoded into an ontology, it can then be used to support several abilities, such as reasoning, knowledge visualization, content management, and knowledge-based systems (Staab, Studer et al. 2001; Abecker and van Elst 2004; Mika, Iosif et al. 2004; Meyer

2008; Zilli 2009). With respect to controversial knowledge management, ontologies have been developed for modeling arguments, such as the Proof Markup Language (da Silva, McGuinness et al. 2006), SEURAT's Argument ontology for software engineering (Burge and Brown 2008), the DILIGENT Argumentation ontology for ontology engineering (Tempich, Pinto et al. 2005), and the Argument Interchange Format (Chesevar, McGinnis et al. 2006) to support argumentation between computer agents. Ontologies have also been developed that focus on specific domains where controversy and deliberation are prominent, such as the legal (Visser and Bench-Capon 1998; Benjamins, Contreras et al. 2004; Breuker, Valente et al. 2004), legislative (Van Engers, Kordelaar et al. 2000; Boer, Engers et al. 2003; Costilla, Palacios et al. 2005), and medical (Pisanelli 2004; Stevens, Wroe et al. 2004; Dieng-Kuntz, Minier et al. 2006; Williams and Hunter 2007) domains.

2.2.7.3. Evaluation of Ontologies

Ontologies have been demonstrated to be a good representation mechanism to support Knowledge Management. Professional tools and languages have been developed for building ontologies and an array of acceptable methodologies for engineering and evaluating ontologies are available. There is solid ground to justify and enable the building of an ontology for use in Controversial Knowledge Management, but more remains to be built upon this foundation. Existing ontologies to support argumentation lack rich representations of the actors, content, and processes of the deliberative systems to which the argument is a part, and these ontologies have limited empirical grounding and evaluation. Similarly, those ontologies designed to model and support domains with

inherent controversial knowledge are limited in that they are domain or problem specific without abstractions for other contexts, and do not fully address the actors, processes, and content of the domain. With respect to methodologies for ontology development, available approaches offer useful, high-level processes and insights, but a specialized process or example is not available for effectively and efficiently developing an ontology of the actors, processes, and content for controversial knowledge collection and retrieval in a particular domain. Ontologies have great potential, but detailed ontologies for controversial knowledge collection and retrieval and a guide for their development are missing.

2.2.7.4. Relationship to this dissertation

This dissertation has as an aim to construct an ontology, i.e. a formal representation, that represents the actors, processes, and content useful to support controversial knowledge collection and retrieval. Towards achieving this objective, ontology research provides necessary insights into methodology, content, language and tools, and abstractness.

While this dissertation will be using the Design Science framework, it will also be guided by the Rapid Ontology Development process of (Zhou 2007). The aforementioned argumentation and legislative ontologies will serve as comparable ontologies to learn from when constructing the ontology. The OWL ontology language and the Protege ontology development environment will be used to construct the actual ontology. This single ontology will contain both domain specific constructs as a domain ontology and high-level abstractions presumed useful to other domains in its upper ontology constructs.

The outcome of this dissertation will feedback into ontology research by providing a

grounded, validated ontology for controversial knowledge collection and retrieval that can be extended, evaluated, and used by ontology researchers. Similarly, those seeking to develop an ontology for controversial knowledge collection and retrieval in another domain will have an example to learn from and upper ontology constructs they can apply.

2.3. The Legislative Process

2.3.1. Description

2.3.1.1. Legislative Process

A legislature is "an organized body having the authority to make laws for a political unit" (Merriam-Webster Inc. 1996). In the federal system of local, state, and national governments that comprise the United States of America, examples of legislatures are the Congress of the United States, the House and Senate of individual states, and City Councils of individual cities. These bodies are established and structured by Constitutions, which establish such factors as what can be legislated, the size of the body, the number of votes needed for passage of legislation, and how membership in the body is determined. Additionally, legislatures are checked by an executive body with veto power and a judicial body that can determine the constitutionality of laws. The process of how legislatures consider bills and enact laws is referred to as the legislative process (California 2009). Within this process are many actors, sub-processes, and content.

2.3.1.2. Actors

The legislative process is comprised of many people with specialized and interconnected roles in the legislative process. Legislators are members of a legislative body and the central actors in the legislative process. They sponsor/introduce legislation, serve in leadership positions and committees, vote on legislation, advocate for their constituents and legislative agenda, and receive requests regarding their activity from constituents, special interests, and other legislators or political leaders (McDonough 2000; Rosenthal 2004; Reeher 2005; Davidson, Oleszek et al. 2007). Supporting legislators are legislative staffers, who handle details such as scheduling, following and engaging in the legislative process, fielding communication with and the needs of constituents, and tasks related to the committees on which a legislator serves (Musca 1986; Garraway 1996; NCSL 2006). Lobbyists are a diverse group of people who seek to influence legislators and other actors in the legislative process in the direction of their special interest. Lobbyists range from citizens communicating their desired vote on a bill or their (controversial) knowledge about it to their legislator, to representatives of non-profit organizations seeking to support civil liberties, to advocates hired by corporations to seek loopholes or protections in a coming regulation (Heinz 1993; Rosenthal 2001; Victor 2003; DeKieffer 2007). Constituents are the individuals, families, organizations, businesses, and leaders of a polity which a legislator is tasked to represent, regardless of whether or not they voted in favor of the legislator. Legislators are reliant upon their votes for reelection and are often used by lobbyists as a means to influence legislators (Barry 2000; Birch 2007; Mezey 2008). Acting as guides and advisers to the legislative process are parliamentarians, who route legislation to appropriate committees and answer whether actions are acceptable

under the procedural rules of the legislative body (Nickels 2000). A similarly supporting role is played by the staff of the legislative service office, which provides "legal, fiscal, committee, research, reference, auditing, administrative, and technological support to the members of the legislature and its committees" (DLS 2009). Examples of its many roles are the writing of legislation based on a legislator's request, archiving of records related to each bill from each session, researching topics relevant to legislation, and publicizing legislative activities and schedules. Observing and reporting on the legislative process are journalists. Journalists provide news, research, opinion, and insider insights to constituents, special interests, and legislators via mediums such as print, radio, and the internet (Armstrong 2004; Gillmor 2006; Kovach and Rosenstiel 2007).

2.3.1.3. Processes

The overarching legislative process has minor variations and is largely consistent within polities of the United States. The Maryland Legislature, which is the legislative body that this dissertation will study, is outlined in (Maryland 2007). Legislation, aka a bills or a proposed law, is sponsored by a legislator based on his/her own interests or input from constituents, the Governor, government agencies, legislative committees, study commissions, special interest groups, lobbyists and professional association, or whomever. Each bill is limited to a single subject, must be written in the style and form of the Maryland Annotated Code (Maryland 2005), and meet other constitutional standards. To ensure these are satisfied, bills are drafted, i.e. written, by trained staff in the Department of Legislative Services (DLS) based on direction from the legislator about its intent.

Once drafted, the legislation is placed by the legislator "into the hopper" by filing it with the Secretary of the Senate or the Chief Clerk of the House of Delegates. It is then assigned a unique identification number, e.g. Senate Bill (SB) 123, approved and codified by DLS, and printed for its "first reading" in the house in which it was introduced, i.e. the Senate or House of Delegates. A first reading entails publicly stating in its house the legislation's number, title, and assigned standing committee. Standing committees, e.g. the Senate Finance Committee or the House Environmental Matters Committee, are assigned to each legislator and are tasked with reviewing legislation of a cohesive subject matter assigned to them by the Senate President or House Speaker. Each committee is further organized into sub-committees with increased focus and expertise on a given subject, e.g. the Education Subcommittee of the Senate Ways and Means Committee. The committee review process entails several important aspects. During this phase, a fiscal analysis discussing legislation's expected costs, revenues, and economic impact is attached to it by DLS; a public hearing is held for it, scheduled and publicized by DLS, in which interested parties, e.g. legislators, constituents, and lobbyists, speak about the proposed legislation; private deliberations and negotiations are held between committee members; and amendments are proposed and voted upon by committee members. The final stage of the process is a vote, in which each committee member's vote is recorded, to label the legislation as favorable (with or without amendment), unfavorable, or without recommendation.

The legislation, having been "voted out of committee" is then returned to the house as a whole, accompanied by a report of committee action, for its "second reading." This

second reading is the time for amendments to be offered by any legislator and voted upon, or for a committee action to be reversed. The result is legislation, with any adopted amendments, authorized by the presiding officer of the house to be printed for its "third reading." The third reading, aka the floor vote, does not allow for amendments, but only a recorded vote in the legislation's house of origin for the purpose of deciding if the legislation will be passed, based on a majority vote, or rejected. Should the legislation pass, it is sent to the other legislative chamber, i.e. from House to Senate or Senate to House, for its first reading and committee review.

The legislative process in the second chamber is identical to that of the first, with the exception that amendments may be heard during both the second and third readings. If no amendments are made in the second chamber, the legislation is brought to a floor vote to be passed or rejected. When amendments do occur in the second chamber, the legislation is returned to the house of origin to decide whether to accept or reject the amendments. If agreed to, the legislation is voted on as amended in the second house and, if passed, is reprinted, aka "enrolled" with the amendments and submitted to the Governor. Should the originating house reject the amendments, the second house may be asked to remove the new amendments. If the second house refuses, either chamber may request the creation of a conference committee, consisting of three legislators from each chamber appointed by the Senate President and the House Speaker, to resolve the differences between the House and Senate versions of the legislation. This committee produces a recommendation report and submits it to each chamber, which can vote to accept or reject it. In the event that the report is accepted, the legislation is voted upon by

each house, but if rejected, the legislation is also rejected.

Legislation that clears both chambers is submitted to the Governor for approval or veto within twenty days following adjournment of a legislative session. The Governor may veto such bills within thirty days after presentation. If approved, the legislation becomes law. If vetoed, the legislation fails unless three-fifths of each chamber vote to override the veto.

This high-level description of the legislative process mentions a few of the many rules and schedules that fully govern the legislative process. The complete rules of the House and Senate are reviewed and adopted at the beginning of each session and published by the Secretary of the Senate and the Chief Clerk of the House. These rules address aspects of the legislative process such as ethical relationships with lobbyists, how different types of legislation, e.g. resolutions, budget bills, constitutional amendments, are to be processed, parliamentary procedure, what records are to be kept, and how leadership and officer assignments are conducted. Schedules are determined by the leadership of each chamber and individual committees. These address when legislation must be introduced, when it will receive its first, second, and third readings, when committee meetings for each bill will be held, and deadlines for when votes and other decisions must be made.

2.3.1.4. Content

The legislative process entails the production and consumption of a variety of content. At the center of the process is legislation, with its various versions and amendments.

Connecting to legislation are the position papers submitted by stakeholders, research conducted by the Legislative Services office, lobbyists, or others, typed testimony and recordings from committee hearings, and other documentation pertinent to understanding the legislation. Additionally, content is created from communication processes, such as emails between legislators, publications from political leadership, letters from constituents, multimedia presentations from lobbyists to educate or persuade, audio recordings of telephone messages or conversations from constituents, or webpages created by interested organizations to advocate, inform, or monitor. Official publications in such forms as rule books, directories, schedules, parliamentary decisions, and news bulletins, along with the stories, articles, editorials, and other works of journalists covering the legislative process comprise another significant source of content. Relevant content to understand the unofficial aspects of the legislative process are also found behind the scenes of public content, such as the strategy, agenda, and internal reports of lobbyists, unpublished notes and research of journalists, or political reports and internal records of individual legislative offices and legislative leadership.

2.3.2. Knowledge Management Systems in the Legislative Process

Knowledge Management Systems have been applied in order to meet the needs of actors and facilitate the legislative process. Legislatures have used systems such as bill tracking systems which encompass knowledge about the flow of legislation and updated information about where legislation is in that process (Griffith 2001; Järvenpää, Virtanen et al. 2006; Maryland 2009); electronic directories that apply knowledge of geography, congressional districts, and current legislators to direct a constituent to their appropriate

representative (Johnson 2004; Maryland 2009); and tutorials with explicit knowledge about aspects of the legislative process such as testifying at committees (Dakota 2009; Maryland 2009; Washington 2009), reading legislation (Washington 2005; THOMAS 2009; UK 2009), or lobbying legislators (Connecticut 2008; Bass 2009; Oregon 2009). Publications covering politics and government have employed content management systems to integrate the knowledge they provide; to enable searching and browsing of that knowledge; to facilitate sharing of content by email, links, social networking sites, or other mediums; to improve the visualization of legislation, and to automatically recommend or alert members to relevant content (CQ 2009; Politico.com 2009; TheHill.com 2009; Assogba, Ros et al. 2011). Lobbyists have adopted Knowledge Management in the form of desktop software and websites that facilitate the pushing out of knowledge about issues, positions, research, organizing activity, and legislative status and the pulling in of knowledge from supporters (Emerson 2005; Commerce 2009; PIRG 2009). Sharing of knowledge is also supported in the legislative process through non-electronic means, such as meetings, trainings, public postings, paper records stored in public filing cabinets, or town halls, and electronic means, such as online discussion groups, blogs, and social networking sites (Lynch 2002; Kushin and Kitchener 2009).

2.3.3. Limitation of Existing Research

Research into the legislative process offers useful, but incomplete, insights for controversial knowledge collection and retrieval and the construction of an ontology to support it. Of help to understanding the actors, processes, and content of controversial knowledge collection and retrieval in the legislative domain are the previously referenced

portraits and insights of lobbyists and legislators that give an insiders view of the legislative process, studies that identify and examine the context and documentations surrounding legislation, and publications regarding existing systems and technology used in the legislative domain. These fall short however in three main regards. First, while insights are available into the current state of affairs, a normative approach is missing that provides insight into what actors in the legislative process desire as they engage in controversial knowledge collection and retrieval. Second, the content of the knowledge management systems developed, though often accessible from a single portal, are not integrated in a comprehensive, seamless way and are treated as uniformly accepted knowledge, ignoring the controversial aspects of controversial knowledge content. Third, representational structures used in legislative information systems that would be useful for forming the basis of an ontology for controversial knowledge collection and retrieval are incomplete in that they focus on a single aspect and are poorly publicized in terms of documentation, application programming interfaces (API), or schematics in order to support development and application by third-parties of controversial knowledge management systems for the legislative and other domains.

2.3.4. Relationship to this dissertation

The legislative process will serve as the means to develop a conceptual model, formal representation, and KMS for controversial knowledge collection and retrieval based on a real-world context. The legislative process entails the *collection and retrieval* of controversial knowledge and is desirable compared to other potential domains like law or business because it is inherently competitive, with the various sides of legislation

engaging with controversial knowledge as a central aspect of their activity; it is a structured process that can be defined yet has unstructured behind-the-scenes processes; it is a documented process that is open to public examination; and the learning curve to understand its jargon and culture is relatively low. In studying this domain, the aforementioned literature will provide background knowledge that will be useful in intelligently communicating with actors, identifying research questions that haven't already been addressed in previous work, and understanding the context of content. By modeling and encoding in the artifacts the actors, processes, and content of controversial knowledge collection and retrieval in the legislative process, this dissertation aims to both demonstrate their utility for controversial knowledge collection and retrieval more broadly and provide artifacts that can be fed back into the legislative domain to provide a comprehensive, integrated, public, and extensible representation for understanding and improving existing systems in the legislative process.

3. Chapter 3: Methodology

3.1. Framework

3.1.1. Design Science

A case study conducted within the Design Science framework was used to answer this dissertation's research questions. Design Science "creates and evaluates IT artifacts intended to solve identified organizational problems." (Hevner, March et al. 2004) In the case of this dissertation, the organizational problem is that the submission and retrieval of controversial knowledge is unstructured, unorganized, and unspecialized. To solve this problem, a conceptual model and associated formal representation was created to reflect the relevant actors, processes, and content, and functional needs of these tasks. This formal representation was then used to construct a knowledge management system (KMS) for submitting and retrieving controversial knowledge. These three artifacts, the conceptual model, formal representation, and an instance of a KMS, were each evaluated to measure how well they reflect or improve the submission and retrieval of controversial knowledge. In order to develop, justify, and evaluate these artifacts, a case study methodology was used.

3.1.2. Case Study

The case study approach is "an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context." (Yin 2009) It is appropriate for the situation where the phenomenon and its context are intertwined and when multiple sources of evidence are needed to answer one's research question(s). Controversial knowledge submission and retrieval are an example of phenomena interconnected with their context. A medical setting compared to a legal setting or a business setting will

have significant differences that will impact submission and retrieval, be it the type of knowledge being handled, the desired meta-data, or regulations governing the processes. Moreover, to understand the submission and retrieval of controversial knowledge, no single data source will suffice. Interviews with domain actors are needed to elicit insider assessments, insights, requests, and evaluations, content analysis of documents and archives are needed to identify the structure, content types, and relationships of explicit controversial knowledge instances, and observation of processes to find tacit aspects and possible means for improvement that insiders/natives may not recognize. The selection of the case study methodology then begs the questions of what case to study.

The State of Maryland's Legislature served as the deliberative, decision-making context for answering this dissertation's research questions. This domain has several strengths that outweigh its weaknesses and the strengths of other domains. Foremost is the centrality of controversial knowledge submission and retrieval. Legislators must often legislate on divisive and unfamiliar issues and so knowledge is requested and submitted to compete in order to fill that void and influence a legislator's understanding on the topic of legislation. As such, submission and retrieval of controversial knowledge is necessary in order for a legislator to do his/her job effectively. The legislative process is also a real-world, significant domain, whose outcomes involve billions of dollars and impact the lives of millions of people. On a practical level, the Maryland Legislature is a public institution which allows for greater access to documents, people, and other useful information than more private, confidential domains like law or medicine, especially to a student of a Maryland state university. In terms of complexity, the legislative process has

both structured and unstructured content and processes and a quickly surmountable learning curve to comprehension, making it a good middle point of difficulty to model. The Maryland Legislature is also slightly above average in state legislature professionalism (Squire, 2007), and while occupied by a majority of Democrats, has a significant minority of Republican and/or conservative representatives and constituents. The legislative domain, and the Maryland Legislature in particular, however are not without their shortcomings.

There are three main, expected weaknesses with this domain based upon the literature and an informal discussion with a veteran Maryland state legislator. First, while legislators are ideally open to opposing knowledge and keep an open mind, legislators can be, or are at least popularly described as, opinionated and/or partisan rather than deliberative. Second, legislators are generally not technology savvy or inclined to replace face to face or telephone communication with an electronic medium. Third, many decisions on controversial legislation are made privately, off the record, behind-the-scenes. On the one hand, these present a challenge to the likelihood that actors involved with the submission and retrieval of controversial knowledge will see the utility or favor the adoption of an electronic KMS. But on the other hand, these biases and issues are not unique to the legislative process and suggest that if utility is found here, it will bode well for utility in other domains. Indeed, the Maryland Legislature is not perfect, but it has strengths and was used as the real-world domain of study.

3.2. Phase 1 – Development of the Conceptual Model

3.2.1. Units of Analysis

In order to get a handle on the submission and retrieval of controversial knowledge, a key proposition of this case study is that a model of this process should focus on the actors, processes, and content involved. These three foci of attention have been employed successfully in health policy analysis (Walt and Gilson 1994; Collins, Green et al. 1999), and possess positive theoretical crossovers to the submission and retrieval of controversial knowledge in the legislative process. In this proposition, content refers to explicit instances of controversial knowledge, such as position papers or research reports. Actors are those who are involved with the task of submitting or retrieving this controversial knowledge content, e.g. lobbyists, legislators, assistants, or librarians. Processes refer to the activities actors engage in to submit and retrieve controversial knowledge content, e.g. submitting controversial knowledge to a decision maker, identifying who to send controversial knowledge to, or publicizing a request for controversial knowledge. These three areas of attention inter-connect in order to provide an organized picture of the submission and retrieval context. The focus on actors identifies the who, the focus on content the what, and the focus on process the where, when, and how.

3.2.2. Acclimation

The first step in developing the conceptual model was to gain familiarity with the Maryland Legislature, the legislative process, and the way controversial knowledge is currently submitted and retrieved. This familiarity was gained by interviewing legislative librarians about how information is organized and managers of the Legislature's Office of

Information Systems about its available technologies and technology culture, reading literature published by the Legislature about its processes and culture, observing legislative sessions, the geographic layout of the Legislature, and the flow of people, and browsing the records kept in legislative bill files, published by the Department of Legislative Services, and the information and functionality available through the Legislature website. Notes were kept about the actors, processes, and content that would be relevant to the development of the conceptual model for the submission and retrieval of controversial knowledge in the Legislature.

3.2.3. Document Analysis

3.2.3.1. Document Collection

Three sources of documents were utilized for the document analysis. The first source was the legislative bill folders stored by the Maryland Legislative Library. Legislative bill folders contain the public record of the document and submissions about a piece of legislation. As such, bill folders contain a variety of document types, such as bill versions, position papers, and written testimony. Different bill folders will contain different sets of documents, such that some may contain letters from constituents while other may not. The analysis of the contents of these bill folders was expected to shed light onto what legislators expect to be able to retrieve, and what knowledge lobbyist are currently providing. The first challenge was identifying the set of document types from the legislative bill files to analyze.

The process of identifying the set of document types entailed a thorough review and validation. First, the most recent bill folders available from the Maryland Legislative

Library were browsed in order to create a draft list of the types of documents found. For each document in the folder, a type was determined based upon either an explicit type included in the document, e.g. written testimony, or a novel name that seemed an appropriate term for the type of the document, e.g. internal correspondence for emails and notes between legislative staffers and legislators. This process continued until saturation was achieved. The result of this process was a listing of document types, along with a brief description of the type, e.g. Floor Report - An official summary from a legislative committee for the larger legislative body regarding a piece of legislation providing a description of the legislation, committee actions, and relevant people.

A meeting with the Legislative Librarian who oversees the creation of the official legislative bill folders for archiving after the legislative session was used to validate this listing and description of document types. The librarian was provided with the list and asked to read and critique it based upon his knowledge. Additionally, this meeting was held while he and interns were creating the legislative bill file, allowing for additional insight into the manual process and documents that were not seen in the legislative library. The result of this meeting was a listing and description of the types of documents found in legislative fill folders that was consistent with the librarian's and my experience and understanding. Based on this listing of document types, the legislative bill folders were reviewed again to gather instances of the document types, which were digitally scanned into PDF documents.

The second set of documents was official publications from the Department of Legislative Services (DLS). DLS is the in-house, nonpartisan support for Legislatures and essentially administer the legislative process and provide legal, fiscal, committee, research, reference, auditing, administrative, and technological support. DLS produces a range of publications in its role intended to inform legislators and the public about a variety of topics, such as individual legislation, the legislative process, and topic research. It was expected that through the DLS documents, insight into the official rules and process of the legislature, what information is currently available to legislators and lobbyists upon request, and what actors are involved in the legislative process beyond legislators and lobbyists. Again, there was no comprehensive listing of DLS publications, and so a review was conducted.

The list of DLS publications was compiled by integrating DLS references to its own publications from its office, the internet, and the publications themselves. The core of the compilation was formed by visiting the DLS offices and taking a copy of all the publications available on the shelves for public taking and by asking librarians for materials, not on the shelf, that I should have. The next source was the Maryland Legislature and DLS websites, which was browsed for references and listing of publications. Lastly, the publications currently held were reviewed to see if they referenced any other DLS publications. The result of this process was an enumeration of the types of publications produced by DLS, along with a description of the publication, e.g. "Best Seller" Publication - A listing of bills receiving calls from the public and whether that bill passed both chambers. Again, this listing of types was used to gather

instances of all the DLS publications and to analyze which were digitally scanned into PDF documents.

The third set of documents was collected from the State Ethics Commission (the Commission). The Commission provides oversight of the legislative process and manages the reporting required by legislators and lobbyists, e.g. financial disclosures, conflicts of interest, lobbying registration. The goal of this set of document was to provide insight into what ethics rules govern the legislative process and how legislators and lobbyists interact, as well as what information is currently requested from legislators and lobbyists that may be available, though not fully public or digitized. Fortunately, the Commission website provides a centralized listing of its publications. The result of downloading these publications was a digital compilation of the forms, rulings, reports, and ethics explanations relevant to the legislative process as HTML, Word, or PDF documents.

These three sources, legislative bill folders, DLS publications, and Ethics Commissions publications, provided the set of documents that were analyzed for information about the actors, processes, and content relevant to the submission and retrieval of information about legislation in the Maryland Legislature. The listing of document types analyzed is provided in Appendix A.

3.2.3.2. Analysis of Collected Documents

The analysis of the collected documents was conducted using formal tools and methods.

Three primary tools were used. The first was NVivo 8, which is a professional qualitative data analysis software package. This tool was used to review documents, label/code and categorize text in the documents, and make analysis notes. The second was the Optical Character Recognition (OCR) program ScanSoft OmniPage SE 4 since many of the documents were not in a text-format that NVivo could process. Through the ScanSoft OCR batch processing capability, the PDF documents were converted into plaintext documents that preserved much of the document formatting. The third tool was Microsoft Office, whose Word and Excel program were used to work with and manipulate the NVivo codes in an easier, freer fashion.

The analysis process followed a procedure intended to ensure that all the relevant explicit and tacit information in the document was identified. First, the document was read without making any nodes, i.e. a labeled concept, in order to get a sense of the documents purpose and what stood out. Next, the visual aspect of the document was analyzed through the PDF version of the document to identify relevant images/ non-text content, layouts, color usages, and any other visual elements. The information contained in the document was then identified. Actors, such as people, organizations, offices, and roles were coded, along with information relevant to describing actors and their relationships. Processes and process artifacts were also identified, such as references to actions people can take, descriptions of time, rules, and orderings, the inputs and outputs of processes, the proper names of processes, and relationships/links between actors and content. In terms of content, attention was primarily focused on coding the text and type of

information that a piece of text in a document was aiming to convey, and secondarily on references to other types of content referenced. After coding items relevant to actors, processes, and content, information that seemed relevant to the submission and retrieval of the document was coded, such as how the document got where it is, who created it, who the intended audience is, who might request or retrieve the document, how the document would be referenced colloquially, and the key parts someone would probably want to retrieve. Lastly, the following series of questions were answered for the purpose of eliciting and summarizing the context, essence, and lessons from the document type:

- Questions raised about/by this document
- Intended audience of the document
- Expected purpose of the document
- Where this document found?
- What is believed to be the key parts/content of the document?
- What information about Actors is missing or could be useful?
- What information about Processes is missing or could be useful?
- What information about Content is missing or could be useful?
- What information about Submission/Collection is missing or could be useful?
- What information about Retrieval is missing or could be useful?
- What information about controversial/competing knowledge is missing or could be useful?
- What information about anything else is missing or could be useful?

The result of this process was a comprehensive analysis of each document's components relevant to the submission and retrieval of controversial knowledge in the Maryland

Legislature. A hierarchy of concepts dealing with actors, processes, and content/information were produced that was grounded in the documents. Also, notes containing the high-level thoughts about the context, content, and lessons were produced. These analysis artifacts provided the understanding necessary to conduct the subsequent interviews with pertinent actors.

3.2.4. Interviews

Whereas document analysis was effective at identifying text-based details about the submission and retrieval of controversial knowledge in the Legislature, interviews with knowledge domain actors was utilized to add human understanding about the process.

Interviews were conducted with three legislators, four lobbyists, and one legislative aide. Legislators were engaged about the retrieval of controversial knowledge, lobbyists about the submission of controversial knowledge, and the legislative aide about their insights into both as an intermediary. Legislators were selected from the Joint Advisory Committee on Legislative Data Systems that deals with issues of technology in/for the Legislature. It is a group of mixed perspectives on technology and was expected to have a better-than-average understanding of both the Legislature and technology. The three legislators consisted of two Delegates and one Senator, two men and one woman, and two younger and one older legislator. The four lobbyists interviewed were identified using the public lobbyist registration listing and a random selection moderated by the researchers subjective sense of the appropriateness and feasibility of interviewing that person. The four lobbyists consisted of one for-hire lobbyist, one corporate lobbyist, one association lobbyist, and one issue-focused lobbyist. The legislative aide, who also

served as an assistant to a legislative leader, was identified by reference in the document analysis and was also a personal friend.

The interviews were semi-structured, audio-recorded, designed to take 45-60 minutes, and utilized an interview guide that mixed in questions aimed to confirm insights from the acclimation and document analysis phases, and elicit the interviewee's understand and mental model of the submission and retrieval process. Interviews for each started with an introduction to the research and explanation of what would happen during the interview and followed with some basic questions about their background and experience. Next, their understanding and critiques of the term and concept of controversial knowledge was discussed, but also clarified after the discussion to try to develop a shared sense of the term for the interview. Participants were then asked to self-describe how they submit or retrieve controversial knowledge about legislation. This description was then followed up with clarifying questions meant to further elicit insight into the actors, processes, and content involved. The interview then transitioned into sections aimed at retrieving confirmation and/or feedback about insights gained from the acclimation phase, the document analysis, and previous interviews surrounding perceived challenges in the submission or retrieval process, features or abilities, as well as information, that might be desired or helpful in the process, and seemingly accurate and insightful claims made by others interview subjects. The interview concluded with an opportunity for them to ask questions, provide suggestions about the research, and future participation in the research. The full interview guide templates can be found in

Appendix B. The audio recordings of the interview, the hand-written notes with insights, and the key takeaways from each interviewee were analyzed.

The analysis of these interviews entailed creating an integrated list of responses and insights to the topics covered in the interview. The first step in this process involved transcribing the interview audio recordings through NVivo. The transcriptions were nearly verbatim, with vocal fillers, pauses, and unrelated expressions skipped. The points made by the interviewee were labeled as nodes/instances of the topic discussed, e.g. points about the term controversial knowledge were all coded under “Feedback on Controversial Knowledge term.” Similarly, the hand-written interview notes were typed out and the points made placed under their appropriate topic. The result of this process was an aggregation of all the interview responses into categorical topics. These individual responses were then enumerated in an Excel spreadsheet and labeled with their topic, whether it was descriptive or proscriptive, about data or a feature, about submission or retrieval, and about actors, processes, or content.

3.2.5. Iterative Analysis and Integration

After the completion of the document analysis and interviews, a massive amount of information and insights existed in the form of NVivo nodes from the document analysis and an Excel spreadsheet of the interview responses. The goal of this phase of the research was to integrate these two sources into a single, coherent conceptual model that would answer RQ1 by providing a model of the information needs and design parameters for a knowledge management system (KMS) that would improve the submission and retrieval of controversial knowledge in a deliberative, decision-making context.

The first step in this process involved identifying the top-level categories of information. These were determined to be: the Maryland Legislature, Controversial Knowledge, Actors, Processes, Content, Submission, and Retrieval. The text of each of the NVivo nodes and interview responses was placed into one or more of the seven aforementioned categorical sections of a Word document. An iterative process was then initiated of reviewing the items in each section to

- merge similar concepts into a single statement that reflected the point of each concept,
- split up complex responses with several points into distinct, one-topic statements
- create a new high-level concept that categorized and encapsulated two or more concepts
- remove items that were redundant or out of the scope of the research

The section and overall document were repeatedly reviewed until no further merges, splits, creations, or removals seemed appropriate and that document contained, for each of the seven categorical sections, a set of relevant, simple, and organized bullet points.

These seven categorical sections were then further categorized to better reflect the topics of RQ1. Three high-level categories were created: Foundations, Information, and Design. The Foundation section incorporated information about the Maryland Legislature and controversial knowledge that could be used to provide a grounding for those involved with building a KMS for controversial knowledge in the Maryland Legislature. The Information section presented the information deemed relevant and

desirable about legislators, lobbyists, and content. The Design section enumerated desired abilities, perceived challenges, general principles, and relevant processes related to the submission and retrieval of controversial knowledge. These new categorical buckets were then used and an iterative process of moving, merging, and removing bullet points was conducted. The result of this process was a single document (see section 4.1) with three top-level sections that presented a conceptual model for answering RQ1

3.2.6. Validation of the Conceptual Model

The conceptual model was based upon analysis of real-world document and interviews with legislators and lobbyists, but the synthesis of the conceptual model development had yet to be validated by any legislator or lobbyists. As such, meetings were scheduled with legislators and lobbyists to review the conceptual mode and provide feedback.

Due to the length and depth of the conceptual model, a version of the model was created for the purposes of validation. The validation version presented high-level concepts along with a description of the concept and, where applicable, examples of the concept given. For example, under the section of Information about Lobbyists, the concept “Client” would be presented as “Client – Information concerning the entity which a lobbyist is representing; e.g. the client’s name, their reputation, or their campaign contributions.” Lastly, the conceptual model was divided into three separate documents based on the three top-level sections: Foundation, Information, and Design.

A mix of previously and newly interviewed legislators and lobbyists were utilized to validate the conceptual model. Four legislators and four lobbyists were interviewed, with half being new and half being from the previous set of interview subjects. The two new Legislators were again selected from the Joint Advisory Committee on Legislative Data

Systems and the two new Lobbyists from a random selection from the public lobbyist registration listing but moderated by the type of lobbyist they were and their availability to be interviewed.

The distribution of the three sections of the conceptual model was designed such that each section was reviewed by two legislators and two lobbyists, where the two contained one previous and new interview subject, and the Foundation section was paired equally with the Information and Design section. This distribution is presented as a table in

Table 2.

ID	Foundation	Information	Design
Leg1			X
Leg2	X	X	
Leg3	X		X
Leg4		X	
Lob1	X	X	
Lob2		X	
Lob3	X		X
Lob4			X

Table 2: Distribution of Conceptual Model sections across participants

The review process entailed participants reading the provided section and for each concept, indicating whether they agreed, disagreed, or would modify it. Participants were given one page at a time, observed to see that they were reading it, and encouraged to ask questions where issues arose. After reviewing all of the pages, those items which were marked as modify or disagree were discussed. These discussions resulted in clarification of how to modify concepts, a discussion of some additional nuance or insight, a justification for why an item should be removed, and/or a self-correction of their objection. After each validation session, the feedback was reviewed and where modifications were considered meaningful yet simple, the model was revised and used in

subsequent validations. The result of these eight validation meetings was a set of feedback on each of the conceptual model elements from legislators and lobbyists. The feedback from these validation sessions was analyzed after all the sessions were conducted and integrated to produce a single, validated conceptual model (see section 4.1). For the most part, the requested modifications of reviewers were made; however, in the case of disagreements, it was found that there was not enough agreement to remove any items. However, reviewers did have valid reasons for their disagreements. As such, an additional section was created that presented the concerns/disagreements raised by reviewers for users of the conceptual model to read. The result of this process was the final conceptual model intended to answer RQ1.

3.3. Phase 2 – Formal Representation Development

In order to answer RQ2, a formal representation of the conceptual model of the information needs and design parameters for a KMS for supporting the submission and retrieval of controversial knowledge is needed. A translation of the conceptual model into an ontology was conducted to achieve this goal.

The Protégé 3.4.4 editor was used to create an OWL 1.0 ontology intended to be used in a KMS. To create this ontology, a simple process was deployed using the version of the conceptual model containing the low-level details of the conceptual model, e.g. in addition to the concept “Contact Information” all the types of contact information and desired meta-data about them. Because this version of the conceptual model is represented as a hierarchy of bullet points, a linear process was used for going through

the bullet point listings and either translating each concept item into an ontology entity, or considering it irrelevant for inclusion in the ontology.

A distinction existed however in the way that each of the three sections was translated. The Foundation section was largely un-translated since it dealt with conceptual ideas that were useful for people, but were not relevant to the ontology, e.g. a definition of controversial knowledge is important for a person to read, but is not a class, object property, or data property. The Information section was already in a format similar to the ontology, and so a simple mapping of conceptual model terms to ontology terms was feasible for all of them. The Design section covered aspects related to the design of a system, ranging from challenges, which are not items appropriate for the ontology, to features, which are clear about what the KMS should do, but less clear about what representational support they would need from the ontology. As such, when translating the Design section, best guesses were used regarding what needs the ontology would need to provide in order to support the features or processes, with the presumption that improvements to the ontology would be made when the prototype KMS was actually being developed for the purposes of answering RQ3.

When translating a conceptual model item, a basic procedure was followed that entailed consideration of the item along with subjective design decisions. First, the item was reviewed to consider whether it was appropriate to represent it as a class, a data property, or an object property in the ontology. In general, an item was considered a class if it was a person, document, or something that would have meta-data associated with it, e.g. a

Legislator, a Position Paper, or an Address. An item was considered a data property if it was a value of some kind that could be represented by text, a number, a date, or some basic data type, e.g. the text of a document, the date an item was submitted, or the estimated reading time of an item. The object property classification was used for items that dealt with relationships, e.g. between a document and its ratings, an actor to their profile, or an answer to a question. Once the type of ontology entity was determined, the concept name used in the conceptual model was utilized to give the ontology entity a name. Similarly, the bullet point hierarchy was used to determine the parent-child hierarchy of ontology elements.

After considering each of the items from the conceptual model, an overall review was conducted. First, the ontology was reviewed for inconsistencies, redundancies, unclear names, or conceptual mistakes. Second, the ontology was reviewed by two ontology engineering experts: one from academia and one from industry, who each provided feedback, which was used to either update the ontology or identify future work. In the end, an OWL ontology that was believed to be able to represent the information desired and support the capabilities needed in a prototype KMS based upon the conceptual model was produced.

3.4. Phase 3 – Prototype Development and Evaluation

3.4.1. Prototype Development

At this point, a conceptual and formal model for developing a prototype KMS for supporting the submission and retrieval of controversial knowledge in the Maryland Legislature had been created. To create this prototype KMS, the Java programming

language and the Jena framework for building Java applications that utilize ontologies was used.

The scope of this KMS is shaped by its being a research prototype and being intended for evaluating the three proposed design artifacts, not real-world usage. As a prototype, this system did not focus on being bug-free, having a smooth user interface, being computationally efficient, or having only real-world data in the system. Further, because the KMS was intended for evaluation purposes, emphasis was given to informing users of the system functionalities, but did not worry about fully implementing aspects that were not going to be used in the demonstration, e.g. a list of possible search options may be shown, and the system could handle making all the options work, but only the options that will be used in the demo are functional at this time. Along these lines, demonstration videos that show the functionalities of the prototype were created in order to consistently run the same demonstrations for evaluators.

The first step in creating the KMS was establishing the use cases to support. To start, the design section of the conceptual model was reviewed to create a listing of features to be discussed and prioritized into high, medium, and low priority groups. Next, the high priority capabilities were further refined to produce the top-level tasks related to the submission and retrieval of controversial knowledge in the Maryland Legislature. Using these top-level capabilities, the remaining features were categorized under the top-level feature along with or through which it might be demonstrated. For example, identifying legislation about which to submit or retrieve knowledge was a top-level task, but

demonstrating the capability to search using calendar information could also be shown using the hearing date as a search criteria. Additionally, this review identified desired features which would not be implemented in the prototype system due to having a low priority, high implementation cost, and difficulty to demonstrate, e.g. cell-phone and email notifications of relevant activity in the system. The result of this process was a refined and categorized listing of capabilities that the prototype would be committed to demonstrating; however, a list of features is not a set of use cases.

The development of the prototype use cases involved the creation of a narration script for the demonstration while simultaneously drafting the interface for the prototype. For each top-level feature, use cases, that would both demonstrate the features associated with it and convey the power and potential utility of the system, were drafted. Based on the draft, an interface was drafted using the Eclipse Visual Editor Project plug-in to demonstrate the use case, which in turn provided insight into what additional information might be able to be shown or alluded to, or what might be a more meaningful example. The script was then revised based on the interface, and the interface reviewed again. This iterative process was continued until a script was created to demonstrate all the necessary features in a meaningful way, and could be effectively presented by the prototype system. The final version of the script is provided in Appendix C.

Through the creation of the narration script, the rudimentary interface for the prototype was also developed, leading to the second phase of the prototype development: adding functionality to the interface. At this point, the set of features was known, and an

ontology existed that could serve as the data structure for the prototype, but no information yet existing in the system with which to work. To address this, data population programs were written to populate the ontology in a controlled way. One program parsed the bill information pages from the Maryland Legislature's website to add information about legislation to the ontology. Other programs parsed the lobbyist registration listings and legislator information pages from the Maryland Legislature website to create an initial set of actors and information about them. Lastly, a randomization program was created that filled in parts of the ontology for which real-world information could not be extracted, e.g. estimated reading times of documents, links between lobbyists and documents, or information about the quality of an information source. As such, the data set used for the prototype contained a mix of real and manufactured information.

This set of data was used to develop the ontology queries and functionality needed for the working prototype. For each interface element previously drafted, its information needs were determined based on the script and knowledge of the domain. A query was then written to extract that information from the ontology, and user interface code written to effectively present the query results. Additionally, the process of writing the ontology queries identified missing information or design shortcomings in the ontology that were then fixed. After each of the interface modules was functional, the size, layout, and other final presentation items were addressed. After completing this process for each of the interfaces drafted, the result was a functional prototype that could demonstrate all of the features described in the script.

The final phase of the prototype development was the creation of the demonstration videos. To create these videos, the Jing screen recorder was used. For each of the demonstrations mentioned in the script, the respective interface would be run, and the narration read, each of which was recorded by Jing to produce a ShockWave Flash video file for that demonstration. The result of this process was 31 demonstration videos capable of demonstrating the features of the prototype KMS based upon the conceptual model and ontology.

3.4.2. Prototype Evaluation

In order to answer RQ3, the utility of the prototype system for the submission and retrieval of controversial knowledge in the Maryland Legislature were measured, using evaluation sessions with legislators and lobbyists, who watched demonstration videos and provided open-ended and questionnaire responses. 16 evaluation sessions, with eight legislators and eight lobbyists, were used to evaluate the prototype. None of the evaluators had been interviewed before. The eight lobbyists consisted of two lobbyists from each of the identified types: for-hire, association, issue-based, and corporate. 3 Senators and 5 Delegates were interviewed. The evaluations sessions ranged from 60-90 minutes. Lobbyists were presented with videos demonstrating the features pertinent to submitting knowledge, whereas legislators were presented with videos demonstrating the features pertinent to retrieving knowledge.

In order to present the evaluation videos, a PowerPoint presentation was created. This presentation provided evaluators with an introduction to the purpose of the evaluation and

directions for what to pay attention to, and what to ignore. For each top-level feature, e.g. identifying legislation on which to submit knowledge, embedded links to the demonstration videos are provided and followed up by a summary slide enumerating the features demonstrated. After the summary, slides for asking questions, discussing the prototype, and completing the questionnaire were presented.

The open-ended discussion was audio recorded and aimed at seeing what stood out to the evaluator. As such, the evaluator was prompted with the question of whether they saw “anything that would be particularly useful or not to you?” These responses would try to be steered towards concrete features or contexts in their work as legislators or lobbyists.

The questionnaire used was based on the questions used by (Davis 1989) for measuring the perceived usefulness of a proposed system. These questions ask the user to express his/her perception of whether the system would help them perform the task: more quickly, with improved performance, with increased productivity, with enhanced effectiveness, with greater ease, and with overall useful. The wording of the questions were customized to the top-level task being addressed, e.g. The features of the system would make it easier to identify bills on which to retrieve information. The full set of surveys used is provided in Appendix D.

The result of these evaluations was a set of likert scale scores for the six aforementioned factors of perceived usefulness and open-ended feedback for each top-level activity. These scores were analyzed to see whether the null-hypothesis that the system provided

no utility along a given usefulness attribute could be rejected. The open-ended responses were used to produce a brief narrative regarding the overall usefulness or lack of usefulness of the system for the particular top-level task. The results of this analysis provided the answer to RQ3.

3.5. Design Science Guidelines

Design Science research is required to adhere to seven guidelines, each of which is satisfied in this methodology. This dissertation begins fulfilling the guidelines by addressing a relevant problem, since controversial knowledge submission and retrieval are common realities which theory and systems have yet to adequately represent or support. In addressing this problem, an iterative search process is utilized to develop and refine three artifacts: a conceptual model of controversial knowledge submission and retrieval (RQ1), an ontology to provide a formal representation of this model (RQ2), and an evaluated, prototype KMS to support submission and retrieval based upon the ontology (RQ3). A case study methodology that employs domain-experts from IT managers to lobbyists and actual domain content is relied upon to construct and evaluate the model and a simulation with real-world data, participants, and tasks is used to test the utility of the KMS based upon the ontology. These artifacts contribute to future research by providing a model of controversial knowledge submission and retrieval that can be expanded to cover other aspects of controversial knowledge management such as sharing or application, an ontology upon which to build knowledge managements systems in the legislative and other domains, and a process for evaluating and comparing such systems. Further, this work will be communicated to knowledge management journals,

publications popular amongst those in the legislative process, and to the general public via a website providing the artifacts produced along with subsequent publications.

3.6. Formative and Summative Validity

In addition to following the design science guidelines, this research methodology is designed to have both formative and summary validity (Lee and Hubona 2009).

Formative validity is achieved through the implementation of the aforementioned research methodologies, whereas summative validity is demonstrated through the following logic of modus tollens. Regarding the conceptual model, it was proposed that if the model is not accurate (p), then significant revisions will be requested by Legislators and Lobbyists (q); however few revisions were requested by Legislators and Lobbyists (!q), so the null statement that the model is not accurate is rejected (!p). Regarding the ontology, it was proposed that if the ontology is not accurate (p), then it won't support a useful prototype; however the ontology did support a useful prototype (!q), so the null statement that the ontology is not accurate is rejected (!p). Regarding the prototype, it was proposed that if the prototype is not useful (p), then survey results will be < 4 on average (q); however the survey results were > 4 on average (!q), so the null statement that the prototype is not useful was rejected (!p). Summative validity was also found for the conceptual model and ontology. It was proposed that if the conceptual model and ontology are not useful (p), then the prototype will not be useful (q); since the prototype was found to be useful (q), the statement that the conceptual model and ontology are not useful was rejected.

4. Chapter 4: Results

4.1. Conceptual Model

Research Question 1 asks: What is a conceptual model of the information needs and design parameters for such a KMS? This question is answered through a presentation of the validated conceptual model that consists of three parts. The Foundation section discusses information about the Maryland Legislature and controversial knowledge. The Information section deals with what information is desired by legislators and lobbyists. The Design section deals with insights relevant to developing the specifications of a KMS for controversial knowledge. Each of the bullet points in this section expresses a statement validated by legislators and lobbyists.

4.1.1. Foundation

The term “Controversial Knowledge” is a term used and developed in this dissertation that has not been used in the Knowledge Management literature or the Legislature, as such, the conceptual model provides a validated set of statements concerning its novelty, reality, and meaning.

- Knowledge exists that is in competition with other knowledge to influence the understanding and eventual decision of a legislator.
- Knowledge used in the Maryland Legislature may not be complete, fully accurate, or beyond skepticism but is still considered knowledge.
- Legislators use knowledge when coming to an understanding or deciding how to vote on legislation. This knowledge can be either agreed upon and objective, or questionable and subjective.

- There currently is no collective term amongst legislators and lobbyists for referencing the knowledge provided by lobbyists and the various competing interests on an issue.
- Providing knowledge based on experience, insights, and understandings to legislators (as well as applying political/constituent pressure and representing their clients) is at the heart of what lobbyists do.
- The term “controversial knowledge” is an acceptable term for referencing knowledge that competes with other knowledge to influence a decision-maker, e.g. the knowledge provided by lobbyists regarding legislation.
- The adjective “controversial” can have a negative connotation of something that is not appropriate, not good, questionable, or problematic.
- The terms “competing knowledge” or “subjective knowledge” are also considered acceptable, and considered a more neutral phrasing for knowledge that competes with other knowledge to influence a decision maker.

The Foundation section of the model also pays attention to the domain of the Maryland Legislature, in particular understanding the role of controversial knowledge in the Legislature:

- Deliberation and decision-making are central to what the Maryland Legislature does.
- Legislators use knowledge, both controversial and non-controversial, when deliberating and making decisions.

- The submission and retrieval of controversial knowledge are prominent activities in the deliberative decision-making process of the Legislature.

The Legislature also provides a venue for understanding how existing aspects of competition may take place in the Legislature, and may therefore also be a basis of a list of aspects of competition that are relevant to controversial knowledge contexts. The following listing identifies aspects of competition, along with a brief description and list of examples of each aspect.

- Competitors – The people who are actively and directly involved in the competition; e.g. Legislators, Lobbyists, Party Leaders
- Arena – The setting in which competitors compete; e.g. The Capitol Building, Committee Rooms, Legislator Offices
- Rules – What governs the competition; e.g. Rules of Order, The Legislative Process
- Teams – Group of players who form in order to play the game as allies and compete against others; e.g. Coalitions, Political Parties, Caucuses, Lobbying Firms, Special Interest Organizations, Legislative Leaders
- Leadership – Individuals who have the authority/role to direct how the competition is played and how competitors act, e.g. Speaker of the House, Senate President, Majority Leader, Committee Chair

- Actions – The activities that players can perform in the competition to advance towards their goal; e.g. Sponsoring Legislation, Voting on Legislation, Meeting with Legislators, Testifying at Hearings.
- Points – The metric by which the winner in the competition is decided and progress towards achieving victory is measured; e.g. Vote counts, Number of desired bills passed or defeated.
- Statistics & Records – Analysis and preserved data about competitors and the overall competition; e.g. percent of sponsored bills that advanced through committee, or records of all votes taken during a legislative session.
- Overseer – A non-partisan actor who aims to enforce the rules and/or facilitate fair competition; e.g. State Ethics Commission, Dept. of Legislative Services
- Object of Competition – The entity over which players compete; e.g. Legislation, Amendments, Funding, Social Status, Appointments
- Fouls – Actions by competitors who go against the rules of the competition; e.g. Not following rules of the Chamber, not registering or reporting activity
- Improper Conduct – Actions that go against the norms of the competition; e.g. Lying, Ad hominem attacks of other legislators or lobbyists, pulling surprises
- Observers – People who are not part of the competition, but follow and take an interest in the competition; e.g. Journalists, Citizens, Reporters

- Time Factors – The time constraints controlling when the competition begins, ends, breaks, and activities can occur; e.g. 90 day session, Legislative calendar, deadlines, hearing schedules, vote schedules
- Outcome – The result of the competition; e.g. Vote tallies, whether bill makes it out of committee, passes floor vote
- Stages of competition – The phases through which the competition occurs; e.g. Period for introducing bills, period for having hearings on bills, period for voting on bills, period for offering amendments
- Prominent Competitors – Regular, established competitors who are known/expected to be involved; e.g. Chamber of Commerce, Teachers Union, Political Parties
- Fairness – The nature of whether there is equal opportunity, despite unequal outcome and skill, in the competition; e.g. Some legislators or lobbyist are more effective or powerful than others, but setup is still “one legislator, one vote” and all citizens may lobby.
- Role of memory and analysis and strategy – The past influences/informs current competitions; e.g. Memory of how a lobbyist acted previously informs how they are treated, analysis of what approaches for persuading a legislator worked best in the past influences how knowledge is presented.

- Penalties – The negative consequences for not following the rules or norms; e.g. Loss of access, distrust, non-cooperation, loss of position in legislature or lobbying firm, lowered ability to influence others, lowered reputation in community, expulsion, fines, criminal prosecution
- Fair Play – The written and unwritten protocol for how the competition is respectfully conducted; e.g. Being courteous and respectful of everyone, being honest, giving people notice and not pulling surprises, not approaching an interest except through their lobbyist
- Predictability – Competitors know the basic outline of how the competition will proceed; e.g. The legislative process of how legislation will proceed, what will be expected, how votes will be taken, etc.
- Unpredictability – The events that take place in the competition and the outcome are not known in advance; e.g. Tactics and messaging used by lobbying interests, what amendments will be proposed, how people will vote.

4.1.2. Information

In addition to understanding the Legislature and controversial knowledge itself, the conceptual model provides a breadth of information about the actors and content that will be useful to support the submission and retrieval of CK. The high-level categories of information are presented below, along with descriptions and examples. Details such as sub-types and attributes of the categories are presented through the details of the ontology in Section 4.2.

4.1.2.1. Information about Actors

Actors are the people involved with the submission and retrieval of CK. The primary actors in this research are Legislators and Lobbyists. Committees, legislative aides, DLS staff, and many others are also important actors, but are not within the scope of this conceptual model or this dissertation.

Information about actors was found to have both specific and universal elements.

Universal information is that information which is considered to be applicable to both Legislators and Lobbyists, whereas the sections on Lobbyists and Legislators specifically apply to those actor types. Information elements about Legislators or Lobbyists that add to a universal element have its name in bold font, e.g. there is universal reputation information, but also reputation information specifically about legislators and lobbyists as distinct actor types.

4.1.2.1.1. Universal Information about both Legislators and Lobbyists

- **Contact Information** – The details of how to communicate with actors via the array of available communication technologies; e.g. telephone number, Instant Messenger handle, or website.
- **Identification Information** – Information pertinent for referencing or identifying an actor; e.g. name, picture, or title.
- **Stake** – The way in which an actor is connected to the legislative process; e.g. involvement in the issue, or how the actor might be impacted by the legislation.

- Political Intelligence Assessment – Descriptions of how well the actor understands politics and the political process; e.g. understanding of compromise, or understanding the situation and needs of other actors.
- Historical Information – Records of previous interactions and behaviors of actors; e.g. personal notes from previous meetings or previous votes.
- Infraction Instances – Details of when an actor acted improperly; e.g. ethics violations, or providing misleading content.
- Relationships – Descriptions of the connections between one actor and other actors; e.g. conflicts of interest, or closeness with legislative leaders.
- Agenda – The goals of an actor in the legislative process; e.g. legislation sponsored, or advocacy priorities.
- Reputation – Information about an actor’s esteem and how other people view the actor; e.g. honesty, expertise, or success rate.
- Biographical – Narrative information about the life and personality of the actor; e.g. where they have lived, jobs they have held, or whether they are married or have children.
- Filings – Details regarding an actor’s personal filings with the ethics commission; e.g. registration or reporting forms.

4.1.2.1.2. Information about Lobbyists

- Client – Information concerning the entity that a lobbyist is representing; e.g. the client’s name, their reputation, or their campaign contributions.
- **Historical Information** – Records of previous activities of lobbyist; e.g. previous clients or previously lobbied legislation.
- Quality as an Information Source – Details useful for evaluating the provider of content; e.g. their integrity, whether they admit when they don’t know, or their responsiveness.
- Type – Details regarding the classification of the lobbyist; e.g. association lobbyist, for-hire lobbyist, areas of government lobbied.
- **Reputation** – Information about a lobbyist’s esteem and how other people view the lobbyist; e.g. political contributions, effort exerted in lobbying campaigns, or expertise.
- Activity – Information about the actions taken by a lobbyist; e.g. legislators contacted, knowledge provided, or stakeholders organized.

4.1.2.1.3. Information about Legislators

- **Biographical** – Narrative information about the life and personality of the legislator; e.g. electoral history, birthday, political roles, or legislative achievements.
- Affiliations – Information about organizations a legislator associates with; e.g. professional or civic association memberships, or caucus memberships.

- Representation Roles in Legislature – Details of who a legislator represents; e.g. party affiliation, legislative district, or committee memberships.
- Legislative Aide – Information about assistants to the legislator; e.g. name of legislative aide, or tasks delegated to the aide.
- Voting Record – Details concerning the votes cast by a legislator; e.g. committee votes, floor votes, or reliability of intended vote indication.
- Electoral – Details regarding a legislator’s election; e.g. term length, margin of victory, or reported contributions.
- **Reputation** – Information about a legislator’s esteem and how other people view the legislator; e.g. expertise, conservativeness or progressiveness, or respect within delegation.
- Personalization – Information useful for building relationships or tailoring content; e.g. favorite TV show or legislative issue of top priority.
- Concerns – Descriptions of what is important to a legislator; e.g. important issues in their district, what’s significant to them individually, or what information is considered necessary to have.
- Information Sources – Identification of where a legislator goes for information; e.g. television news channels, newspapers, research institutes.
- Responsibilities – Description of tasks a legislator is responsible for in the Legislature; e.g. leadership positions, or committee assignments.

- Position on Legislation – Information concerning a legislator’s intended vote on a piece of legislation; e.g. certainty of vote, intended vote, or interest in issue.
- Legislating Statistics – Analysis of a legislator’s activities and performance; e.g. percent of sponsored bills that pass, number of missed votes, or how a legislator tends to vote on particular subjects.
- Receiving – Information regarding how a legislator would like to receive content; e.g. preferred communication medium, willingness to be approached out of the Legislature, or desired content.

4.1.2.2. Information about Content

In addition to information about legislators and lobbyists, the conceptual model provides information about what CK content is generally submitted and retrieved.

4.1.2.2.1. Types of Controversial Knowledge

Three high-level types of CK emerged from analysis: political, policy, and personal.

- Political Controversial Knowledge (CK) deals with CK related to subjects of political calculus, e.g. constituent feelings, election impacts, leadership’s attitudes, or maneuvering.
- Policy CK addresses the public policy merits of the legislation, e.g. whether it’s needed, will it solve the problem, could it be done with less money, or what other states are doing.

- Personal CK covers knowledge from particular people who are significant due to the personality providing it, e.g. statements from the governor or legislative leadership, knowledge from a person whom a legislator trusts on particular issues, or a legislator's own opinions and understanding.
- The variety of CK provided on legislation can be classified under one (or more) of the 3 aforementioned high-level types of Controversial Knowledge.

4.1.2.2.2. Types of Content Parts

Controversial knowledge covers many topics, but this conceptual model identifies the types of content that form the content parts of a CK document/argument. The following listing enumerates and describes the types of content parts identified from this study's analysis and gives examples of that content element.

- Advice – A suggestion intended to help a recipient decide what to do, e.g. campaign advice, informational advice, or policy advice.
- Alternative Proposal – An option to consider that is different from the one currently being deliberated, e.g. opposition party's legislative proposal, or an amendment promoted by an interest group.
- Analysis – A meaningful discussion of a breadth of information, e.g. analysis of public opinion data, or analysis of the pros and cons of a bill.
- Background – Introductory information useful to understand a subject, e.g. background regarding a scientific or technical matter, or background of how legislation developed.

- Change – Information regarding a shift in some state of affairs, e.g. political shifts, or changes in usage of a government service.
- Challenge – Details regarding a hurdle relevant to the subject of deliberation, e.g. a policy challenge, or political obstacle.
- Claim – A statement asserting something to be true, e.g. a claim regarding the jobs a bill will create, or a claim about the trustworthiness of a source.
- Clarification – Information intended to correct or improve understanding, e.g. clarification of the meaning of a term, or clarification of what groups are impacted by legislation.
- Comparison – Content comparing one thing to another, e.g. comparison to laws passed in other states, an analogy, or comparison of new versus old technology for addressing environmental problem.
- Conclusion / Finding – The result of an investigation or deliberation, e.g. a legal ruling, a committee’s recommendation, or the conclusions of a research study.
- Cons – Knowledge regarding the drawbacks and why something might lack support, e.g. harms to a particular group, financial costs, or ease of abuse/misuse of power.
- Criticism – Content intended to critically evaluate some other content, e.g. criticism of another’s source, identification of logical fallacy, or criticism of need for legislation.
- Data – Numerical or factual content, e.g. statistics, or facts.

- Economic – Knowledge pertinent to finances, business, and the economy, e.g. the economic impact of a problem, an estimate of the economic benefits of a proposal, or an analysis of the current economic situation.
- Educational Material – Content intended to teach about a particular subject, e.g. guide to the legislative process, foundational facts of the domain, or tutorials for understanding a technology.
- Example – A representative instance, e.g. lessons from a case study, identification of an exemplar of a particular practice, or a hypothetical example.
- Existing Effort – Descriptions of actions already being taken, e.g. reforms made by industry to curb abuse, or local laws passed that address a problem.
- Explanation – Content intended to reconcile confusion, e.g. why there are gaps in a data set, an explanation of what a prediction means and how it came about, or an explanation of why a procedure is done.
- Goal – Description of a desired end result, e.g. why a goal is desired, changes in result desired, or details of what is intended.
- Historical – Content that describes the past, e.g. historical justifications for legislation, timelines of events, or memories from past legislative sessions.
- Importance / Significance – Details regarding why something is worthy of attention and consideration, e.g. time urgency, size of groups effected, or importance to the economy.

- Implication – Description of the ramifications of an action or idea, e.g. whether the ramifications are positive or negative, impacts on the political dynamic, or implications for the business community.
- Important Point – The key takeaway or message, e.g. talking points, important points about a policy, or important research findings.
- Legal – Content relevant to the law, e.g. current laws and regulations, constitutionality of legislation, or legal cases.
- Legislative – Details regarding the legislation being deliberated, e.g. implications of the legislation, actors connected to the legislation, or synopsis of the legislation.
- Legislative and Lobbying Activity – Descriptions of actions taken to advance legislation and legislative goals, e.g. lobbying campaigns, progress in legislative agenda, or amount of knowledge submitted.
- Lesson – Content that provides helpful teachings, e.g. lessons from the actions of another state, or lessons from previous attempts at passing legislation.
- List – Content that takes the form of an enumeration, e.g. a checklist of who remains to be contacted about legislation, or a bullet point listing of agreed upon facts.
- Methodology – Descriptions of how content was developed, e.g. method of calculating estimated job loss, method of data collection, or methodology employed in research study.

- Performance Assessment – Content regarding the evaluation of an actor or program, e.g. whether agency is meeting goals, whether industry is performing up to standards, or polls of whether public feels legislator is serving them well.
- Persuasive Appeal – Content written to persuade by appealing to a particular value, e.g. an appeal to responsibility, an appeal to practical considerations, or an appeal to tradition.
- Political – Content related to political dynamics, e.g. descriptions of a political drama, details of a political calculus, or identification of political hurdles.
- Position – Content pertinent to understanding an actor’s intention on a decision, e.g. position of political party on legislation, position of newspaper editorial staff, or caveats to a legislators intended vote.
- Practical / Logistical Consideration – Content relevant to the achievability of a proposal, e.g. resource requirement and availability, needed buy-ins, or administrative challenges.
- Prediction – Knowledge regarding expectations about the future, e.g. predicted vote outcome, what factors influence a phenomenon, or whether a metric will increase or decrease.
- Problem – Descriptions of the problem seeking to be addressed, e.g. examples of the problem, why the problem is significant, or hypothesized cause of the problem.

- Pros – Knowledge regarding the benefits and why something might be supported, e.g. environmental improvements, groups helped, or financial savings.
- Public Opinion – Knowledge concerning the beliefs and attitudes of the citizenry, e.g. polls and surveys, popularity of items, or citizen testimony.
- Questions & Answers – Content in the format of questions and/or answers, e.g. answers to frequently asked questions, question about legislation, or rhetorical questions.
- Quote – Content providing a report of what an actor stated, e.g. the text of the quote, information about who said it, or the subject of the quote.
- Rationale – Content intended to justify an action or piece of knowledge, e.g. rationale for a given prediction, reason why a legislator voted a certain way, or the argument for taking a certain position.
- Reaction – Description of an actor’s response, e.g. reaction to document, reaction to meeting with legislator, or reaction to vote outcome.
- Rebuttal – Description of an actor’s response intended to counteract the impact of other content, e.g. rebuttal to opposition lobbyist’s claim, rebuttal to official opinion of Attorney General, or rebuttal to alternative proposal.
- Recommendation – Content offering suggestions, e.g. amendment recommendations, recommendations to conduct further studies, or recommendations of position to take on issue.

- Reference – A link to other content, e.g. document references, footnotes, or additional data sources.
- Relationship – Content identifying relationships between actors, e.g. conflicts of interest, alliances, or connections between legislators.
- Request – An indication of what actions or information are desired by an actor, e.g. request for information, request for an amendment, or request for financial support.
- Status quo – Descriptions of the current state of affairs, e.g. current laws on the books, how much a service or resource is being used, or who is benefiting or hurting under the current situation.
- Stakeholders – Identification of actors connected with the subject or deliberation, e.g. agencies effected by legislation, special interests involved with the legislation, or key decision makers.
- Story – Knowledge presented in the form of a narrative, e.g. anecdotes, personal story, or a quick story serving as an example.
- Summary – An abbreviated version of a document that intends to preserve the main points and narrative, e.g. summary of legislation, summary of the debate, or summary of a document.
- Supplement – Document additions intended to help readers, e.g. glossaries, indices, or prefaces.

- Trend – Knowledge concerning patterns, e.g. purchasing trends, whether trend is positive or negative, or what the implications are of the trend.
- Visual – Content that makes use of pictures and movies, e.g. graphs, images, or film clips.

4.1.2.2.3. Desired Information about Content

This conceptual model also provides an extensive set of additional, descriptive information about available content/information that is desired by legislators and lobbyists. The following is an enumeration of that meta-data, along with descriptions and examples.

- Type of Controversial Knowledge – A high-level classification of the basic subject matter of the content, e.g. whether the content is political, personal, or policy knowledge.
- Objective Descriptions – Information about the content that is objectively defined, e.g. the content length, timestamps, newness, funding sources, etc.
- Author/Provider Information – Details regarding the person who provided the content, e.g. follow-up contact information, expertise, affiliated organizations, or other items provided
- Social Information – Information from the community regarding the content, e.g. popularity metrics, ratings, or comments.
- Intended Audience – Identification of the intended consumer of the content, e.g. opposition lobbyists, committee legislators, or legislative staff.

- Content Summary – A condensed description of the substance of content, e.g. list of subjects covered, people and organizations mentioned, sources used, or listing of content types contained.
- Assessment of Controversy – Insights into the extent of competition and disagreement on the content, e.g. its factuality, areas of agreement or disagreement, or shifts in positions.
- Distribution – Details regarding the delivery of content, e.g. privacy and confidentiality information, reason for receiving, recipients, or delivery status.
- References – Identification of links to other content, e.g. documents or actors referenced, reference to electronic version of document, or references to related resource.
- Type of Document – The colloquial or official name of a document, e.g. a newspaper article, a constituent letter, or a position paper.

4.1.3. Design

Another set of insights provided by the conceptual model is an enumeration of challenges, features, principles, and concerns to be reflected in the design of a system for the submission and retrieval of CK.

4.1.3.1. Challenges

The design of a system can benefit from an understanding of prominent challenges faced by people in the domain. The following list provides a brief description of those

challenges and an indication of how the reality of the challenge should impact the design of a system for the submission and retrieval of CK.

- Time Scarcity – There is time allotted for each bill through the legislative process, but Legislators have limited time to spend on any particular piece of legislation. A system for retrieving Controversial Knowledge (CK) must recognize that legislators need to be able to find what they want in seconds, not minutes.
- Document Overload – Each piece of legislation has several required documents produced about it by the Department of Legislative Services and Legislative Committees. On top of these, lobbyists provide an array of documents of varying types and length. The result is that Legislators are often presented with more documents than they have time to organize and read. A system that can organize these documents and their content and make it manageable would be desired.
- Waste and Inefficiency – The legislative process is hampered in several ways, including having to deliberate on hundreds of bills that have little to no chance of getting out of committee, holding timely public hearings on all legislation despite important lobbying and CK submission occurring one-on-one outside the hearing, and distributing hundreds of paper copies of lengthy documents that few will ever read. These seeming inefficiencies are necessary and valuable in some ways, but the extent to which a system can focus attention on particular legislation, lesson the time consumed by committee hearings, and minimize unread printing would be desirable.

- Oversimplification – As a result of limited time to present and understand nuances and complex details, CK is often oversimplified, which can lead to improper understandings and decision-making. A system that can allow for simplifications, but also allow for the nuances and details to be available for those who are interested would be desirable.
- Prejudice – Prior to being considered, CK is often judged not by its content, but by the provider and other secondary attributes. This prejudging can lead to the avoidance of quality knowledge or the embracing of poor quality knowledge. A system for the submission and retrieval of CK should recognize and try to mitigate the problems of prejudicial thinking about CK, e.g. by allowing for the hiding or highlighting of information about the political affiliations of an author or who funded a research study.
- Getting and Keeping Attention of Legislators – Legislators are often overwhelmed by the demands on their time, particularly during the legislative session. As such, it is a challenge for lobbyists to initially gain and keep the attention of a legislator for a period of time, unless speaking during the interim session. A system that can provide lobbyists with a reliable way to gain the attention of a legislator and that can allow a legislator to focus his/her attention as the/she sees fit, particularly during the legislative session, would be desired.

4.1.3.2. Tasks and Desired Abilities

This conceptual model aims to identify both key tasks in the current system for submitting and retrieving CK, but also abilities that may not yet exist that would be

desirable. These findings are placed into the following categories: those that deal particularly with the submission of CK, the retrieval of CK, equally to both submission and retrieval, and to the basic legislative and lobbying process in which CK is submitted and retrieved.

4.1.3.2.1. Submission

- Providing Knowledge about Legislation to Legislators – This is the central submission task of lobbyists.
- Following up on submission – It is a common and important task for lobbyists to communicate with legislators after submitting knowledge to see if they read it, understood it, and had any questions or requests.
- Talking & Meeting with Legislators – Lobbyists often present their CK in-person to Legislators, either at a scheduled meeting or when they have a moment, e.g. walking in the hall. While documents play an important role, spoken and in-person communication also need to be supported.
- Tailoring CK – CK often benefits from being presented in a way that a particular legislator will find it more meaningful and persuasive. A system for submitting CK should provide information that will help providers of CK to determine how to customize the presentation of their knowledge and how to allow submissions to be marketed and tailored for a particular legislator.

- Determining Actors and Legislation to Lobby – There are thousands of bills each session and hundreds of legislators. Providers of CK must identify which pieces of legislation are relevant to the provider’s concerns and which legislators connected with those pieces of legislation should receive the CK. As such, a system for submitting CK should contain information helpful for identifying pertinent legislation and legislators.
- Propose Amendments & Modifications – The CK a lobbyist provides is often related to a desired change, be it an amendment to a piece of legislation or a modification of another’s claim. The ability to propose amendments and request modifications will be desired.
- Augment, Comment, and Rebut – The context of CK is interactive and competitive, and so the ability to submit responses to CK, in the form of augmentations to documents, comments on particular content, or rebuttals to claims is essential to a system designed to support the submission of CK.
- Providing Rationale and Research to Support an Intended Vote – Lobbyists seek to sway the vote of legislators, and a common way to do so is to provide rationales that show why or how a given vote is supported by the available research/CK. As such, a system for submitting CK should allow providers to indicate the vote outcome sought through their CK and to enable providers to submit arguments for where and how the CK should lead decision makers.

- Determining when to not provide CK – There comes a point when submitting CK is undesired by legislators or not worth a lobbyist’s effort. To support this determination on the part of lobbyists, a system for submitting CK should allow legislators to indicate their opposition to receiving more CK or to indicate that the legislator’s mind has been made up on a piece of legislation.
- Submitting to Official Legislative Bill File – In addition to providing CK directly to legislators, it is still considered important to provide CK in paper form to the legislative bill folder stored in the committee considering the bill. This folder is accessible to the public and archived for historical preservation. It is not a challenge to submit to this folder, but could be improved in a computer system by allowing providers to indicate if submitted CK should be automatically printed and stored in the legislative bill folder.
- Specifying Medium to Use – Lobbyists can provide CK in many formats and over many mediums, from paper to fax to email to websites to PDF and more, so it can be difficult for providers to know if they are providing CK in a way that recipient legislator prefers. The ability for a legislator to indicate his/her preferences for how CK should be submitted to them would be a desired feature in a system to support the submission of CK.

- Targeted Distribution of Submitted CK – It is often the case that CK is only relevant to a select, known group of legislators, e.g. members of a committee or members who voted a certain way. The ability of a provider of CK to stipulate the set of legislators to receive the CK submitted as part of the public record, either by name or by a logical rule, would be desired.

4.1.3.2.2. Retrieval

- Asking Lobbyists Questions – A primary way for Legislators to retrieve CK is to talk with a lobbyist and to engage that lobbyist in dialogue. In the case that a lobbyist does not have an answer, the lobbyist generally follows up in-person or in writing as soon as possible. As such, a system to support retrieving CK should support the asking of questions to the lobbyist population and the organizing of answers from the community.
- Personal Reference Folder – In addition to the committee bill file, it is common for legislators to take personal copies of items and notes related to legislation they are following so that they can review it later if/when needed. To support this retrieval practice, a computer system for retrieving CK should allow for the creation of private, personal, electronic folders that contain a subset of available content and notes that each particular legislator desires for a specific piece of legislation

- Reading Summary Documents – Legislators often rely on documents that provide summaries, e.g. Fiscal and Policy Note, and then if need be, look into the details. This behavior leads to the desirability of clearly identifying CK documents and contents that provide summaries and those that provide details to those summaries.
- Reading Documents from Political Party Leadership – Legislators are often given CK documents from their political party’s leadership and so the ability to identify and highlight documents from political party leadership will be desired in the retrieval task.
- Filtering – Legislators must filter the available CK when retrieving it and deciding what to actually read based upon tacit and explicit understandings of what they want. A system for supporting the retrieval of CK can aid this task by allowing retrievers to hide or emphasize content based on attributes associated with that content, e.g. estimated reading time, ratings by others, topics discussed, or sources used.
- Deciding and Specifying what CK is Desired – Lobbyists generally want to provide the CK that legislators want, and Legislators don’t want their time wasted hearing about knowledge they are not interested in. Therefore, an important capability would include allowing a legislator to specify the types of CK he/she wishes to retrieve about a bill. e.g. CK about legislation’s impact on jobs in their district, or CK about scientific research on the legislation’s subject.

- **Printing Documents** – Although most documents are currently produced electronically and there is a desire to reduce paper waste, documents are still commonly submitted and retrieved as paper. Additionally, many legislators prefer reading and handling documents as paper. As such, it is important that an electronic system for retrieving CK be able to support the printing of available content and not restrict users to the computer.
- **Assessing CK** – When retrieving CK, legislators must evaluate it along several attributes, from relevancy to believability. It will be important for a CK retrieval system to identify what these assessment attributes are and to provide information to facilitate making judgments about them.
- **Aggregating of CK** – CK is generally spread across many documents. The ability to bring together all the instances of a particular type of content is a desired ability, e.g. listing all the pros for a bill, or all the agreed upon facts and statistics on an issue.
- **Linking Content** – It is often the case that when retrieving content, there is related content that a retriever may not be aware of. The ability to link related content, such as lobbyist reaction documents to an agency research study, would be a desired feature of a CK retrieval system.
- **Notifications** – The ability to be notified, e.g. through RSS feeds or email alerts, to new or updated CK of interest would be desired, so long as the amount of notifications and their presentation is not overwhelming.

4.1.3.2.3. Submission & Retrieval

- Submission & Retrieval of Electronic Files – CK documents are usually produced electronically, but are submitted and retrieved as paper. The ability to provide electronic files, e.g. Office documents or PDFs, and to access those files for viewing on a computer would be desired.
- Support for multiple communication mediums – CK is submitted and retrieved through a variety of mediums, e.g. paper, speech, visuals, in-person, over the phone, text messages, etc., each with its own niche and value. A system for the submission and retrieval of CK should support interactions through as many of these electronic and non-electronic mediums as possible.
- Electronic Bill File & Repository – The legislative bill file is currently paper-based and accessible in one physical location. The ability to have online-accessible bill files and a repository of legislative and CK knowledge organized in a meaningful way would be desired.
- Submitting and Retrieving CK as Parts – CK is often presented in the form of complete documents, which must be skimmed in order to find the particular parts of interest, e.g. assessment of political impact, finding of new research study, etc. Additionally, providing CK in document form often requires removing or condensing CK, and not providing all that is known. The ability to submit an unlimited number of knowledge snippets to a searchable database of knowledge parts, as well as submit whole documents that present a refined, integrated version of one's CK would help address these challenges and be desired.

- Paging – It is often the case that legislators and lobbyists want to know if another is available and willing to call or meet with them. A system that makes use of available contact information to enable paging of particular people would be desired.
- Tracking CK – It is a challenge for providers of CK to know what happens to their submissions and for retrievers to be informed about the retrieval activities of others. Incorporating tracking information in an electronic system for submitting and retrieving CK, like hit counts, evaluations, what others are reading, avoiding, or thinking important, etc., would help address this challenge and would be desired.
- Multimedia Support – CK can be submitted and retrieved as audio, text, video, and image files. A system for submission and retrieval should be able to receive and play/present these electronic multimedia files.
- Programmable, Queryable Interface – A system that contains extensive amounts of CK should support the ability to create custom computer programs to further aid providers and retrievers of CK and not be bound by what the main interface supports.
- Actor Profiles Linked with Content – The ability to see relevant information about individual legislators and lobbyists in a profile page, and moreover, to have that profile linked to content is desired. A system for submitting and retrieving CK would benefit from links between: mentions of people to their profile, profiles of

lobbyists to the CK they provide, and legislators to the legislation with which they are involved.

- Tagging – CK exists within a community of providers and retrievers. As such, the ability for them to augment available information with their own labels for others to see would be desired, e.g. tagging content believed to be misleading or incorrect, identifying logical fallacies, or labeling the types of content parts.
- Tailored System for Submitting and Retrieving CK – An electronic information system designed for lobbyists to provide CK and for legislators to retrieve it would be desired. At the same time, while computer systems can support human relationships and human communication, they cannot replace them.

4.1.3.2.4. Process

- Logging and Recording of Activities – The legislative domain, like other domains, cares about keeping a detailed and accurate log and record of events. As such, a system designed for this domain should maintain a log that records the actions taken by users and supports archiving for official records, auditing and oversight, and news feeds.
- Vote Counting – An important task that legislators and lobbyists must do to tailor and focus their CK is to keep track of the intended votes of legislators to see what the likely outcome of the official vote will be. The ability to automatically create an updated list of the legislators connected to legislation and their current vote intention would be desirable.

- Incorporation of schedule and time information – The submission and retrieval of CK takes place in the context of the legislative process, which consists of particular time constraints, e.g. hearing dates, vote schedules, session breaks, amendment due dates, etc. A system that supports the submission and retrieval of CK should also include information about the legislative calendar and support exporting/linking with electronic calendaring programs, e.g. iCal or Exchange.

4.1.3.2.5. Principles

The following list of principles articulates overarching design considerations that go beyond specific abilities and speak to qualities that should be incorporated in a system for the submission and retrieval of CK in the Legislature.

- Secrecy & Confidentiality – At the same time that Controversial Knowledge (CK) seeks to be widely known and influence decision makers, the competitive context of CK leads to the need for confidentiality policies regarding access and distribution of information, based on the desire to keep some information and activities secret from other people; e.g. knowledge about how to influence a particular legislator, or deal-making meetings. A system for supporting the submission and retrieval of CK should similarly support, if not improve, secrecy and confidentiality within the confines of public access/disclosure laws.
- Scalability – The legislature handles thousands of bills each session, involves hundreds of individual actors, and maintains thousands of documents. A system designed for handling CK in this domain must be built to handle this scale.

- Streamlining – Legislators and Lobbyists have limited time and attention due to the limited duration of the legislative session and the number of bills to address. As such, efficiency, reliability, and speed are a high priority in a system for handling the submission and retrieval of CK.
- Customizability – The information systems utilized in the Maryland Legislature have been built in-house to meet its needs or have been commercial systems customized to meet its needs. A system for the submission and retrieval of CK in the Legislature should allow for maximum customizability so that system administrators in a particular Legislature can tailor the system to its needs.
- Oversight and Administration – Like most competitive contexts, there is a need for referees that understand the domain, who can monitor what is happening, make needed adjustments, and be trusted by the players involved. A system for handling CK needs to enable and support having administrators that can intervene, enforce policy, and generally govern the system and process.
- Timeliness and Real time Reporting – Legislators and Lobbyists desire the most accurate information, and desire it to be available as soon as possible, but don't want to be overwhelmed with update messages. Systems for submitting and retrieving CK should minimize time between submission and availability, and make the process for submitting new information quick and easy.

- Non-partisanship and Equity for Diverse, Uneven Actors – At the same time that a system for submitting and retrieving CK in the legislature should treat all actors fairly, regardless of seniority, party affiliation, etc., the system should recognize that in reality there is diversity amongst actors and unevenness in their clout and influence.
- Transparency – The principle of openness in a system for submitting and retrieving CK in the Legislature is due both to the fact that it is a public institution that the public should be able to understand and observe, and that, it is hoped, the more the actions and the submissions of the actors can be monitored, the better the actors will behave.
- Understanding the Legislative and Lobbying Process – A system that aims to support the submission and retrieval of CK needs to not just understand CK, but also the larger context with which it is connected; e.g. the Legislative and Lobbying processes which utilizes CK.
- Information is Power – It must be realized that to provide information and knowledge to the system can empower others, including one's opponents, and to lessen one's advantage over others. These self-interest roadblocks to submission must be accounted for.

- Lobbyists help and wait for Legislators – Legislators often ask lobbyists to produce research for them. Lobbyists are often responding to the requests of legislators and waiting for them to be available to talk. As such, a system for the submission and retrieval of CK can presume that lobbyists will provide CK on request and will be used to waiting for legislators to engage with them.
- Human Interaction – An electronic system for submitting and retrieving CK should not forget that interacting with people is a central and preferred way to provide and access CK. Systems should have the ability to establish communication with an actual person in addition to providing CK through computer systems.

4.1.3.2.6. Concerns

Lastly, the conceptual model provides a summary of the concerns raised by legislators and lobbyists after validating the above sections regarding a system for the submission and retrieval of CK in the Legislature.

- Confidentiality and Transparency
 - There is concern over what the public can see versus what only registered lobbyists and legislators can see. In particular, about whether non-professionals will have enough context to understand what is read. There is also a concern that non-professionals might draw inappropriate conclusions from the information. Others are concerned about giving professional lobbyists an advantage and unequal access compared to that of typical citizens.

- Concern was also expressed about unforeseeable uses or harm of information, such as in elections or in the press where information may be intentionally or unintentionally taken out of context
- Similarly, concern existed about being able to control information that would aid opponents, e.g. notes about how to influence a particular legislator or a legislator's intended vote
- While there is value in transparency, there is also concern that increasing transparency will push more activities and decisions behind closed doors, since people will always find a way to be out of sight.
- There is a desire for people to have control over information, particularly information about them and the content they've provided.
- There is recognition of the need to have an archive of the information, but similarly a concern about not being able to move past negative incidents if they are permanently and publically attached to them.
- Accuracy
 - There is concern that people will not provide honest information, such as about reputation, if everyone can see that information and/or the provider is identified.
 - If the system is anonymous however, there was concern the system would be prone to the abuses for which online forums are infamous.
 - It was also clarified that the intended vote information is rarely known or accurate until the votes are cast.

- Lastly, there were concerns about how to recognize and fix errors in the data.
- Professionalism
 - Concern was expressed about the impact of the system on lobbying as a profession and an art.
 - It is a professional lobbyist's job to find and know the information listed and to do the tasks described in the conceptual model, but a computer system that tries to do or simplify their task may hurt the professionalism and art of lobbying by lowering barriers to access and shortening the learning curve.
 - There was also concern that a reliance on a computer system may lead to laziness and less human interaction as legislators and clients rely on text and numbers in a database, not the direct, human, professional insight of those engaged in the process.
- Diversity
 - The Legislature and lobbying community are diverse, with a variety of styles, personalities, roles, ages, and attitudes towards technology, where each member will want different things. At the same time, all people need to be supported, and so there was concern regarding whether the system would be designed for high-tech people or the whole community.

- Culture
 - Concern was expressed regarding the impact of such a system on the culture of the Legislature.
 - With respect to legislators, there was concern about increased group-think based on electronic, easily accessible ratings and social influence instead of individual judgment; and concern about the pace of the Legislature being increased further to match the pace of computers.
 - With respect to lobbyists, there was concern about lobbying becoming more about data entry and less about human interactions and relationships. Further, there was concern about technology overcomplicating the process and leading to people getting bogged down in the details and the back and forth, like an online form.
- Law
 - Rules are in place to enforce ethical behavior, equal access, and a public record. As such, there was concern if more activity moved to this electronic system then the role of the public hearing would be diminished and there would be an increase in both the inequality of access and the amount of private records and communication that the public cannot observe.

4.2. Formal Representation – Ontology

The second research question of this dissertation asks: what is a formal representation expressed as an ontology reflecting the conceptual model described above in Section 4.1.

To answer this question, an OWL ontology was developed that translated the Information

and Design section into the set of OWL ontology structures: classes, object properties, and data properties. The full ontology is available to download¹, but for the purposes of this text-based dissertation, a hierarchical listing of the terms used in the ontology categorized by their OWL resource type is provided in Appendix E. That listing also serves as the presentation of the low-level details and examples of many of the conceptual model elements presented in Section 4.1.

The classes of the ontology represent the people and things identified in the conceptual model that are relevant to representing controversial knowledge and supporting its submission and retrieval. For example, there is the Actor class (classes are capitalized in this section), which is a super-class to the classes identifying the relevant types of actors: Legislators, who are further differentiated between Delegates and Senators, Lobbyists, and Clients. Any of the people intended to be represented by the ontology can be categorized as one of these sub-classes of Actor. Another type of class is the ContentPart class, which is a super-class that categorizes the spectrum of types that individual pieces of controversial knowledge may take. For example, knowledge may take the form of a Comparison, or more specifically, a ComparisonOfAlternatives. The Profile class creates elements to which information about legislators and lobbyists can be linked, through the LegislatorProfile and LobbyistProfile sub-classes respectively.

Object properties (which are italicized in this section) establish relationships between instances of classes. The *answersQuestion* object property allows an instance of the class Answer to be meaningfully linked to an instance of the Question class to denote what

¹ <http://dl.dropbox.com/u/2127576/CKOntology.owl>

question was answered and what answers were provided to a particular question. The relationship between a lobbyist and clients is able to be expressed through the *hasClient* property, which is a type of *hasLobbyistInfo*, which is a type of *hasActorInfo*. The *opposes* object property supports identifying what legislators have expressed opposition to a piece of legislation. The use of object properties is also seen in the *providedBy* object property, which allows the linking of a lobbyist to the knowledge they have submitted to the system.

Data properties (which are italicized in this section) express the informational attributes of classes. For example, an Actor can have a variety of information about it (*hasActorInformation*), such as information appropriate for both legislators and lobbyists (*hasUniversalActorInformation*), which entails contact information (*hasContactInformation*), which has a sub-property *hasAddressInformation*, which has sub-properties to represent its street address (*hasStreetAddress*) to when they are typically at that address (*whenThere*). Additionally, there are data properties for representing assessments of a document's controversy (*hasAssessmentOfControversyInformation*), objective descriptions of content (*hasObjectiveDescriptionInformation*), and information about a person's Position (*hasPositionInformation*)

4.3. Prototype and Evaluation Metrics

The third research question asks: What utility does a prototype KMS based upon the conceptual model and formal representation provide for submitting and retrieving controversial knowledge in a deliberative, decision-making context? (RQ3) To answer

this question, a computer program was created that used the ontology as its data structure and the conceptual model as the basis of the features to provide. This prototype was then evaluated through a structured questionnaire and informal discussion with legislators and lobbyists. This section describes the prototype developed and the findings about the utility the system is perceived to provide.

4.3.1. Prototype

The prototype implements a variety of features for the high-level tasks related to the submission or retrieval of controversial knowledge in the Legislature. This section describes those features and the interface developed to evaluate them. This dissertation provides images of the system, however the slideshows with videos used to present the prototype can be viewed online: Legislator Slideshow², Lobbyist Slideshow³.

4.3.1.1. Legislators

Legislators were presented with the aspects of the prototype intended for the retrieval of controversial knowledge.

4.3.1.1.1. Browse Legislation

The first task supported by this system is identifying relevant legislation on which to retrieve knowledge. In the center is a table listing basic information about legislation, such as bill #, year, title, and synopsis. This listing is updated based on the criteria and information provided on the left.

² [http://dl.dropbox.com/u/2127576/Legislator Videos Screencast Version.ppt](http://dl.dropbox.com/u/2127576/Legislator%20Videos%20Screencast%20Version.ppt)

³ [http://dl.dropbox.com/u/2127576/Lobbyist Videos Screencast Version.ppt](http://dl.dropbox.com/u/2127576/Lobbyist%20Videos%20Screencast%20Version.ppt)

This first demonstration (Figure 10) identifies legislation based on some common searchers. Legislation can be searched based on some information about the bill relating to the legislative process, such as its Committee Assignment, a keyword search of all the information available about a bill, such as bills dealing with either pension or retirement, or by its sponsor, such as Delegate Melaney Griffith.

If a bill in this listing is double-clicked, a detailed presentation of all the information available about that bill is shown (Figure 11). There is basic information such as its committee assignment, status, subjects, and synopsis, the listing of its sponsors name, party, and district, documents related to the legislative process like bill versions and its fiscal and policy note, the bill's legislative process events, with description and date, a listing of the people and organizations who have stated a position on the bill, information about the controversy around a bill, such as a description of areas of agreement and disagreement, related bills, such as previous introductions, its crossfiled counterpart, and bills that share the same committee, sponsor, or subject, a basic listing of the available content for that bill, like its type, position, and provider, and a browser for viewing all the types of information about the bill, such as knowledge about the bill's implications, its purpose, development context, and lobbying activity.

This system can also identify legislation using more complex specifications (Figure 12). Along with a simple criteria like a bill still being "in committee," criteria can be created using information about the bill's status, such as being "in committee," the person doing the browsing, such as identifying sponsors not by name or county, but "My County," or

information about the amount of available content about the bill, such as having a high amount of content submitted.

Legislation can also be found based on the types of content associated with the bill and yes/no conditions (Figure 13). For example, suppose someone is reviewing bills in their committee for mistakes in order to propose friendly amendments. They can specify that the system should only show bills where the bill's committee assignment is one of My Committees, and when specifying legislation types, it can be stated to show bills which do have mistake information, e.g. loopholes, wording mistakes, etc, and does not have any amendments.

Lastly, the system also can make use of schedule information and information about the intended votes of legislators (Figure 14). For example, criteria can be created such that a bill must have a committee vote within a given time period and the intended vote of Del. Susan Lee is for the bill and the number of committed yea overall votes is greater than the number of committed nay votes.

Process Info: + -

Property	Value
Committee Assignment	Budget and Taxation

Search: pension retirement

Sponsor: + -

Name
Delegate Marvin Holmes
Delegate Mary Love
Delegate Mary Walkup
Delegate Mary-Dulany James
Delegate Melony Griffith
Delegate Melvin Stukes
Delegate Michael Busch
Delegate Michael McDermott

Apply

Bill #	Year	Title	Synopsis
HB481	2008	State Retirement and Pension Systems - Investments	Removing restrictions placed on the Board of Trustees for the State Retirement and Pension System with regard to investing the assets of the several systems of the State Retirement and Pension System in nondividend paying common stocks; requiring that a majority of the Comptroller, Treasurer, and Secretary of Budget and Management, in their capacity as members of the Board of Trustees, approve the sales and purchases of real estate; etc.
SB581	2008	Hometown Heroes Act of 2008 - Income Tax - Subtraction Modification for Retirement Income of Law Enforcement, Fire, Rescue, and Emergency Services Personnel	Providing, under specified circumstances, a subtraction modification under the Maryland income tax for retirement income of residents who are at least 50 years old and are retired law enforcement officers or fire, rescue, or emergency services personnel; applying the Act to tax years after 2007; etc.
SB541	2008	Correctional Officers' Retirement System - Service Retirement Allowance	Increasing the member contribution rate from 5% to 6% for members of the Correctional Officers' Retirement System; and increasing the accrual rate from 1.8% to 2.4% for computing the retirement allowance of members of the Correctional Officers' Retirement System.
HB1181	2008	Teachers' Retirement System and Teachers' Pension System - Reemployment of Retirees	Altering the criteria for hiring specified retirees of the Teachers' Retirement System or the Teachers' Pension System who are exempt from a specified offset of a retirement allowance; limiting the period of time that specified retirees who are exempt from a specified offset of a retirement allowance may be reemployed at specified schools; and altering reporting requirements.

Figure 10: Screen of first set of features for legislators to browse legislation

Legislation Detail Viewer

HB481 State Retirement and Pension Systems - Investments

Sponsors:

Name	Party	District
Delegate Melony Griffith	Republican	25

Process Documents:

Name	Type
hb0481f	First Reader
hb0481t	Third Reader
Ch_506_hb0481T	Chapter
hb0481	Fiscal & Policy Note

Activity:

Description	Date
Favorable Report	3/26
Adopted (Senate) - Chapter 506 (Governor)	5/13
Hearing 2/26 at 1:002/13 (p.m. House)	

Positions:

Name	Position	Type
Elizabeth	Yea	Delegate
Bobo		
John	Yea	Delegate
Olszewski		
Barbara Feldman	Yea	Lobbyist
Kriselda	Yea	Delegate

Controversy Information:

Info	Type
There's a disagreement over the source of funding: budget reshuffling or savings from staff	hasAreaOfDisagreementInformation

Related Legislation:

Bill #	Description	Relationship	Status
HB1121	Commercial Law - Mortgage Servicers - On-Line Payments	Shared Subject	Passed Chamber
SB941	Natural Resources - Somers Cove Marina Commission	Shared Subject	In Committee
HB1061	Public Safety - Denial of Permit to Carry Handgun - Return of Application Fee	Shared Subject	1st Reading

Content:

Name	Description	Provider	Position
DetailItem2	Document		TBD
DetailItem1	Document		Yea
Image_42229	Image		Nay
Exhibit_42228	Exhibit		TBD
PersonalStory_42226	PersonalStory		Nay
DetailItem3	Document		TBD
Trend_42225	Trend		TBD
AppealToPublicHazard_42218	AppealToPublicHazard	Barbara Feldman	TBD
AppealToPublicHazard_42218	AppealToPublicHazard	Mark Wasserman	TBD

Misc. Information:

- hasLegislationRequirementInformation (0)
- hasPunishmentInformation (1)
- hasStatuteAffectedInformation (1)
- hasToWhomLegislationDoesApply (1)
- hasToWhomLegislationDoesNotApply (0)
- hasWhatLegislationDoesNotDo (0)
- hasLegislationLobbyingActivityInformation (10)
 - hasInformationAboutArgumentsPresented (3)
 - hasInformationAboutPositionsTaken (1)
 - hasInformationAboutTestimonyPresented (2)**
 - hasLevelOfControversyInformation (2)
 - hasLevelOfSubmissionActivity (2)
- hasLegislationMistakeInformation (6)
- hasLegislativeProcessInformation (6)
- hasLobbyingActivityLimitationInformation (0)

Add Remove

Figure 11: Screen of information available about legislation

Process Info: + -

Property	Value
Status	In Committee

Sponsor: + -

Name
My County

Submission Level: High

Available Content Type: + -

Condition	Type

Apply

Bill #	Year	Title	Synopsis
HB1281	2008	Teen Driving Safety Act of 2008	Extending the period of time during which specified driving restrictions apply to specified holders of learner's instructional permits or provisional driver's licenses.
HB881	2008	Procurement - Preference Procurement Program for Sheltered Workshops - Individual With Disability Owned Businesses	Expanding eligibility in the preference procurement program for sheltered workshops within the Department of General Services to include a business owned by an individual with a disability under specified circumstances; defining "individual with disability owned business" and specifying requirements for the business to qualify to participate in the program; requiring the State or specified State aided or controlled entities to buy supplies and services from specified businesses under specified circumstances; etc.
SB841	2008	Maryland Community Health Resources Commission - Modifications	Establishing the terms of Maryland Community Health Resources Commission members; authorizing the Governor to remove a member under specified circumstances; establishing requirements for Commission decisions, compensation, and staff; authorizing the Commission to implement specified programs; repealing specified standing committees; requiring the Commission to adopt specified regulations; etc.
HB1321	2008	Criminal Law - Criminal Gang Participation - Sentencing	Altering a provision of law to require that a specified sentence for a violation of the prohibition against participation in a criminal gang under specified conditions be separate from and consecutive to a sentence for the underlying crime.
HB481	2008	State Retirement and Pension Systems - Investments	Removing restrictions placed on the Board of Trustees for the State Retirement and Pension System with regard to investing the assets of the several systems of the State Retirement and Pension System in nondividend paying common stocks; requiring that a majority of the Comptroller, Treasurer, and Secretary of Budget and Management, in their capacity as members of the Board of Trustees, approve the sales and purchases of real estate; etc.
HB921	2008	State Highway Administration - Unauthorized Signs on Rights-of-Way	Providing for original jurisdiction of the District Court for specified actions; prohibiting unauthorized signs within the right-of-way of a State highway; clarifying that such signs may be removed by the State Highway Administration or by other designated agencies; authorizing the State Highway Administration or a specified county or municipal corporation government to recover specified costs; providing for civil penalties; etc.
HB1461	2008	Creation of a State Debt - Garrett County - Adventure Sports Center International	Authorizing the creation of a State Debt not to exceed \$500,000, the proceeds to be used as a grant to the Board of Directors of Adventure Sports Center, Inc. for the construction of a whitewater course, located on Marsh Mountain in Garrett County; providing for disbursement of the loan proceeds, subject to a requirement that the grantee provide and expend a matching fund; establishing a deadline for the encumbrance or expenditure of the loan proceeds; etc.

Figure 12: Screen of second set of features for legislators to browse legislation

Committee: + -

Condition	Name
is	My Committee

Submission Level:

Available Content Type: + -

Condition	Type
has	Mistake
doesn't have	

- AgencyFinding
- AgencyOpinionLetter
- Agreement
- AlternativeProposal
- Amendment
- AmendmentRecommendation
- AmicusBrief
- Analogy

Apply

Bill #	Year	Title	Synopsis
HB1281	2008	Teen Driving Safety Act of 2008	Extending the period of time during which specified driving restrictions apply to specified holders of learner's instructional permits or provisional driver's licenses.
HB881	2008	Procurement - Preference Procurement Program for Sheltered Workshops - Individual With Disability Owned Businesses	Expanding eligibility in the preference procurement program for sheltered workshops within the Department of General Services to include a business owned by an individual with a disability under specified circumstances; defining "individual with disability owned business" and specifying requirements for the business to qualify to participate in the program; requiring the State or specified State aided or controlled entities to buy supplies and services from specified businesses under specified circumstances; etc.
SB841	2008	Maryland Community Health Resources Commission - Modifications	Establishing the terms of Maryland Community Health Resources Commission members; authorizing the Governor to remove a member under specified circumstances; establishing requirements for Commission decisions, compensation, and staff; authorizing the Commission to implement specified programs; repealing specified standing committees; requiring the Commission to adopt specified regulations; etc.
HB1321	2008	Criminal Law - Criminal Gang Participation - Sentencing	Altering a provision of law to require that a specified sentence for a violation of the prohibition against participation in a criminal gang under specified conditions be separate from and consecutive to a sentence for the underlying crime.
HB481	2008	State Retirement and Pension Systems - Investments	Removing restrictions placed on the Board of Trustees for the State Retirement and Pension System with regard to investing the assets of the several systems of the State Retirement and Pension System in nondividend paying common stocks; requiring that a majority of the Comptroller, Treasurer, and Secretary of Budget and Management, in their capacity as members of the Board of Trustees, approve the sales and purchases of real estate; etc.
HB921	2008	State Highway Administration - Unauthorized Signs on Rights-of-Way	Providing for original jurisdiction of the District Court for specified actions; prohibiting unauthorized signs within the right-of-way of a State highway; clarifying that such signs may be removed by the State Highway Administration or by other designated agencies; authorizing the State Highway Administration or a specified county or municipal corporation government to recover specified costs; providing for civil penalties; etc.
HB1461	2008	Creation of a State Debt - Garrett County - Adventure Sports Center International	Authorizing the creation of a State Debt not to exceed \$500,000, the proceeds to be used as a grant to the Board of Directors of Adventure Sports Center, Inc. for the construction of a whitewater course, located on Marsh Mountain in Garrett County; providing for disbursement of the loan proceeds, subject to a requirement that the grantee provide and expend a matching fund; establishing a deadline for the encumbrance or expenditure of the loan proceeds; etc.
HB721	2008	Job Creation Tax Credit - Termination Provisions	Altering to January 1, 2014, the termination date applicable to the job creation tax credit program; etc.

Figure 13: Screen of third set of features for legislators to browse legislation

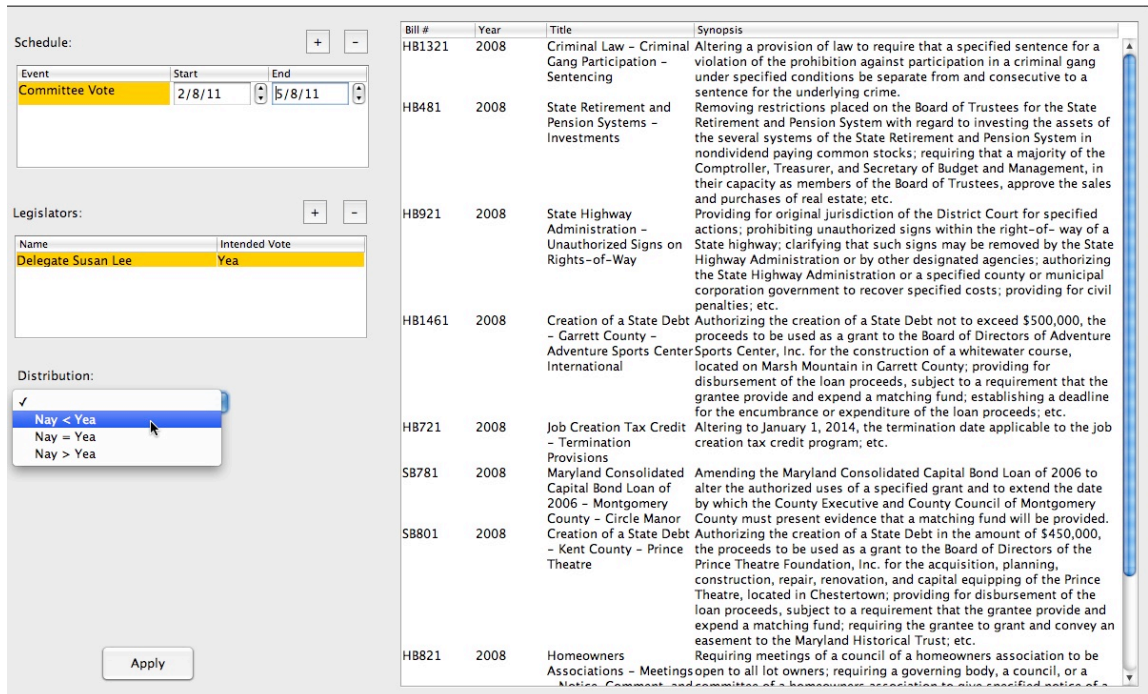


Figure 14: Screen of fourth set of features for legislators to browse legislation

In all, these examples demonstrated some of the capabilities of the system for identifying legislation, such as through

- information about people and their relationship to the legislation, such as their name, sponsorship, or county
- content available about the legislation, such as amendments and possible mistakes
- information about the legislation itself, such as subjects, keywords, or its status in the process
- information available about the person doing the retrieving, such as the county they represent or their committee assignment

- legislative process information, such as scheduled vote date or intended vote balance

The system also supports viewing the breadth of information available about legislation, such as related bills, implications, controversy, and legislative history.

4.3.1.1.2. Browsing Available Content

After identifying a bill of interest, the system supports reviewing what content is available for that item. On the left is a browser for skimming the content available about a bill, similar to skimming a paper legislative bill file. In addition to viewing text, images, and PDF documents, the browser can sort the content, such as by the date it was submitted, or the vote outcome that the content item aims to support.

The system also presents a variety of descriptive information about the content available for the bill (Figure 15). At the basic level, it shows the number of items available, in this case 34, along with a breakdown of how much of the available 34 documents supports each of the possible vote options. Beyond numbers, this system can present a list of the types of documents available and how many documents of each are available. Here, it can be seen that there is an achievability assessment, a discussion of how the document provides an environmental benefit, a story, a trend, and more. There is also a listing of the names of providers of content and their clients, and information about the overall the usage of the content, such as number of viewers, the number who understood the content, and the number of questions asked related to the content.

In addition to descriptive information, the system can also highlight whether commonly desired types of content are available. For example, there is a designated location for the Fiscal and Policy Note and any other DLS documents, documents providing summary information and documents providing more detailed analysis, and documents from political parties.

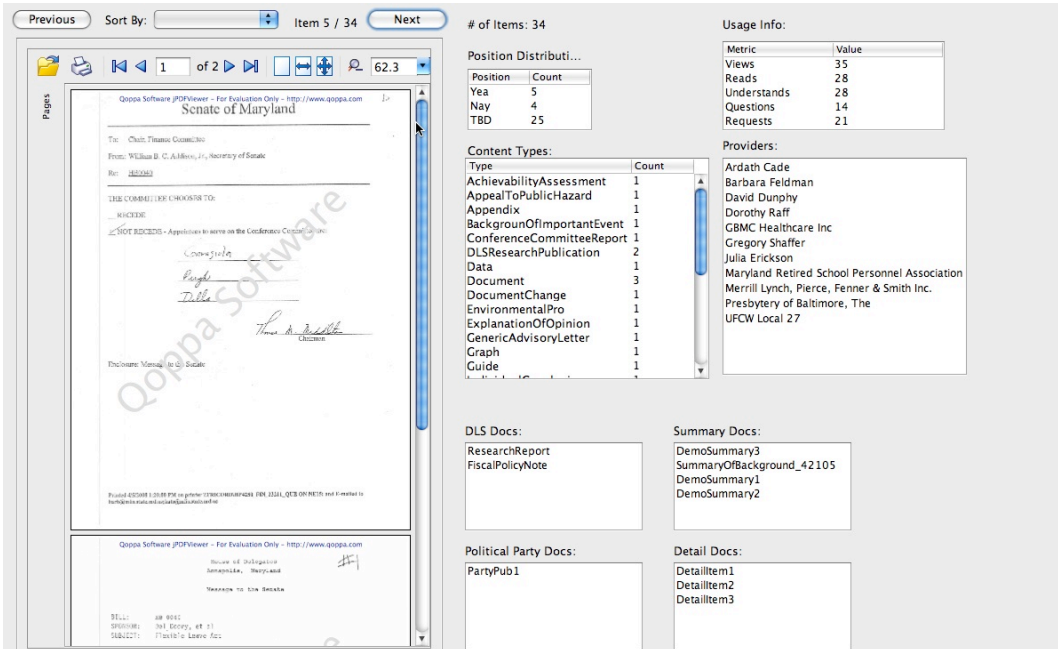


Figure 15: Screen of set of features for legislators to browse bill file content

4.3.1.1.3. Searching Available Content

Beyond just browsing content, this system supports searching the content by using filters to only show items with a set of desired qualities (Figure 16). On the left are some filter panels for identifying content and on the right is a listing of all the available content for a bill, along with a viewer. The provider panel allows searching for content along an extensive list of descriptive information. From advocacy priority information to whether they're known to tell the whole story, or just their side. A possible filter with this panel might be to have the system only show information where the provider's reputation as an information source is good and they are connected with a particular place, such as

Baltimore. The content information panel similarly allows searching for content based on a variety of descriptions. Such as that the estimated reading time is 2 minutes, where the type of knowledge discussed is policy in nature (as opposed to being about politics or personal knowledge), that discusses children, has a good rating, and where the intended audience is legislators (as opposed to the general public, fellow lobbyists, or legislative staff). The time information panel allows searching for content based on time values associated with the content. For example, content that was submitted in the month of February.

Another way that the system supports searching for desired content is by type and position (Figure 17). This system has an extensive list of the types of content that might be submitted about legislation, from information about how something is being abused or an assessment of the achievability of a proposal, to witness lists and who is affected by the legislation. If interested in trends, stories, and visuals, these types can be entered in the list. After applying the search, the file list at the bottom is populated with items whose type of information is a trend, or a category of story or category of a visual. In addition to searching by type, the position of the items can be used. For example, the system can show which are for, against, or neutral regarding the bill. If some of the content found would be considered useful to keep on file and be readily accessible, this system provides an electronic, personal bill file. By checking off the box next to items, and clicking Store, the system will add the checked items to a personal reference folder for that particular bill, which can be returned to at a later time.

Provider Info: + -

Property	Value
hasQualityAsInformationSource	Good
information	
hasLocationInformation	Baltimore

Content Info: + -

Property	Value
Estimated Reading Time	2
CK Type	Policy
Keywords	Children
Rating	Good
Intended Audience	Legislators

Time Info: + -

Event	Start	End
Date Submitted	2/1/11	3/1/11

Apply

File List:

Name	Type	Provider	Position
RebuttalToDocument_42...	RebuttalToDocument		Nay
Map_42203	Map	Bernard Shaw	Yea
IdentityOfKeyDecisionMa...	IdentityOfKeyDecisionMa...	Bernard Shaw	TBD
DetailItem3	Document	Larry Simms	Yea
Anecdote_42201	Anecdote	Bernard Shaw	Nay
Exhibit_42206	Exhibit	Dorothy Raff	Nay
DetailItem2	Document	Cynthia Collins	Nay
Anecdote_42200	Anecdote	Bernard Shaw	Yea

Qoppa Software PDFViewer - For Evaluation Only - http://www.qoppa.com

Maryland Chamber of Commerce

Legislative Position

HB 40
Flexible Leave Act

HB 40
OPPOSE
Finance
Committee
3/28/08

Brief Summary of Bill:

House Bill 40, in part, requires a private sector employer who provides paid leave to allow an employee to use earned paid leave to care for a child, spouse, or parent with an illness. An employer is prohibited from taking adverse action against an employee who exercises the rights granted under this legislation or against an employee who takes action against an employer for allegedly violating this legislation.

Maryland Chamber's Position:

HB 40 is particularly troubling to businesses and employers throughout the state, because it remains in its original form, without any amendments that address employers' concerns. SB 344, the companion bill, has been amended to exempt employers with fewer than 15 employees, and to make the leave only applicable for the care of a sick child under the age of 18 or children who are not capable of taking care of themselves do to a disability.

The Maryland Chamber of Commerce strongly opposes both versions of this legislation; however, if such legislation does pass, it should be amended to address employer concerns, which SB 344 attempts to do to a degree. SB 344, as amended is a step in the right direction to address some employer concerns. Legislation that has such a huge impact on businesses of all sizes throughout the state, particularly small businesses, should not exclude the concerns of those businesses and employers.

HB 40 falls to define "child," "spouse," "illness," or "parent." This bill would allow an

Figure 16: Screen of first set of features for legislators to search bill file content

Position: TBD

Type: + -

Type
Visual
Trend
Story

Search

Item List:

Item
<input type="checkbox"/> Trend_42291
<input checked="" type="checkbox"/> Graph_42297
<input type="checkbox"/> Story_42292
<input type="checkbox"/> Chart_42300
<input checked="" type="checkbox"/> Trend_42290
<input type="checkbox"/> Anecdote_42296
<input checked="" type="checkbox"/> Trend_42289

Store

Previous Sort By: Date Item 7 / 7 Next

State capitols around the country are granting greater press privileges to bloggers.

Figure 17: Screen of second set of features for legislators to search bill file content

4.3.1.1.4. Reading & Assessing Content

When an item of interest has been found, this system supports seeing more detailed information about it to help read and assess it (Figure 18). To support assessing a piece of content, this system presents along side the content item a variety of descriptive information. First, there is a table listing any available information about controversy surrounding the item, such as areas of agreement, disagreement, or changes. To its right is a listing of information from the community, such as its rating for objectivity and clarity or the number of questions asked about it. Objective information is also available, such as the items length and estimated reading time, its funding source, how new it is, the vote it intends to support, and whether the content is primarily policy, political, or personal. Information about the provider of the content is also available, such as their subjects areas of interest, location, and quality as an information source, such as whether they tell the whole story and their expertise. The summary information box provides information such as the list of information types it contains, organizations and people mentioned, subjects, and descriptions of its purpose and relevance. Lastly, information about relationships between this item and other available content is provided, such as items it is known to directly support, oppose, balance, respond to, and augment. Along with all the information that is available, the system also recognizes that some information may be more relevant than others, or that some may be prejudicial or undesired. To reflect this, based on the user's pre-determined preferences, color highlights can be used to highlight information considered desired, or the text from the values column can be hidden.

Lastly, to support reading and assessing available content, the system can print to paper the content item, along with the information provided to its right.

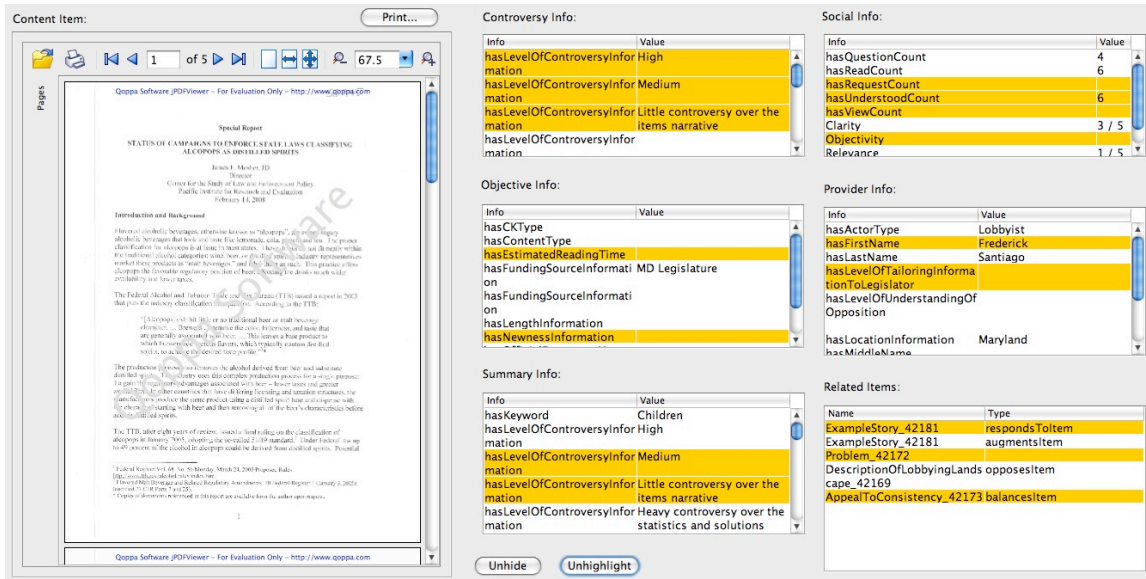


Figure 18: Screen of set of features for legislators to read and access bill file content

4.3.1.1.5. Asking Questions & Requesting Content

After reviewing a bill or a document, this system supports asking questions and requesting additional content. This system allows users to see what questions have been asked about an item and see how they have been answered (Figure 19). The table at the top lists a variety of questions, such as about the statistics presented in the document. Along with the question is information about who provided it, the type of question, and the number of answers it has received. When a question is selected, the table below it lists the answers provided, who provided it, and whether there is a document attached in addition to a simple text answer. Questions can be submitted about the document by typing it in the text entry field, optionally specifying a type, and clicking Add. A similar process is supported for asking questions about documents.

In addition to submitting questions, this system supports being able to request particular content (Figure 20). For example, “Can someone provide examples of bills on this topic passed in other states?” is requesting Research and has received # replies. The system shows there are eight responses which can be viewed by selected the request. Requests can be submitted in the same fashion as questions.

The screenshot shows a web interface for asking questions. On the left, there is a 'Questions:' section with a table listing questions, askers, types, and answer counts. Below this is an 'Answers:' section with a table listing answers, providers, and file status. On the right, there is a 'Content Item:' section displaying a PDF document titled 'Special Report: STATUS OF CAMPAIGNS TO ENFORCE STATE LAWS CLASSIFYING ALCOPOPS AS DISTILLED SPIRITS' by James F. Mosher, JD, Director of the Center for the Study of Law and Enforcement Policy at the Pacific Institute for Research and Evaluation, dated February 14, 2008. The PDF content includes an introduction and background section discussing flavored alcoholic beverages and their classification.

Question	Asker	Type	# Answers
Why is there such a large difference between the statistics quoted here and what your opponents are providing?	Delegate David Rudolph	Technical	8
Can you describe the	Delegate Sam Arora	Political	7

Answers	Provider	File
Their stats are from 2008, ours are from 2010.	Julia Erickson	No
They are different studies looking at similar, but different groups. Because there is large natural variance in the population.	Barbara Feldman	No
	Gregory Shaffer	Yes

Figure 19: Screen of set of features for legislators to ask questions about content

The screenshot shows a web interface for requesting information about legislation. On the left, there is a 'Requests:' section with a table listing requests, askers, types, and reply counts. Below this is a 'Replies:' section with a table listing replies, providers, and file status. On the right, there is a 'Legislation:' section displaying a PDF document titled 'SENATE BILL 205' by the President (By Request - Administration) and Senators Frost, Garagiola, Forehand, King, Lenett, Madaleno, Pinsky, and Rosapepe, introduced and read first time on January 18, 2008. The PDF content includes a chapter section titled 'EmPOWER Maryland Energy Efficiency Act of 2008'.

Request	Asker	Type	# Replies
Can someone provide examples of bills on this topic passed in other states?	Delegate David Rudolph	Research	2
There's a hearing next week. Please submit any proposed amendments by Friday.	Senator Larry Haines	Opinion	4

Reply	Provider	File
Delaware passed something similar as HB 487. It set a goal a lower goal of 10% but grandfathered fewer companies.	Brooke Hisle	Yes
Virginia tried to pass this, but it failed in the Senate.	Barbara Feldman	Yes

Figure 20: Screen of set of features for legislators to request information about legislation

4.3.1.1.6. Profiles

In addition to a focus on legislation and the content associated with it, this system supports reviewing information about legislators and lobbyists through profiles. Through the legislator profile, the system supports seeing a variety of information (Figure 21). There is a photo of the legislator along with his/her name, and basic representation information, such as his/her district, party, leadership role, and committee. Next to the photo is a color representation of whether there are ethics infractions or warnings from others for this person. The affiliations table lists the name, type, and duration of known affiliations, such as boards he/she serves on, joint committees, caucuses, associations, committees and sub-committees, task forces, and schools attended. Beneath, access to this person's ethics commission filings can be gained by double-clicking the submitted filing in the list. Through the contact information box, any information about phone numbers, mailing addresses, emails, screen names, and websites are shown. The recent activity of the legislator can also be seen, such as requests posted, questions asked, bills sponsored, documents read, and votes cast. Double-clicking would show the object of the activity, such as the content item or bill. A more focused listing is given for votes, listing all the bills on which he/she has cast a vote, along with the vote, its type, and date. The legislation table lists legislation related to that legislator. For example, bills he/she has sponsored, bills assigned to his/her committee, or bills with subjects similar to his/her subjects of interest. Similarly, the content table shows related content, such as content read, questioned, tailored for him/her, about a bill he/she sponsored, or about a bill in his/her committee. Lastly, there is a comprehensive listing of all descriptive information

about the legislator on a variety of topics, such as information about his/her agenda, biography, such as birthday, career, and family, political intelligence, relationship with aide and groups, awards, bias, stats, preferred information and delivery mechanism, and voting pattern. The profile also supports adding and removing information.

In addition to seeing information about people, the profile supports off-line interactions. Messages can be sent to people through his/her profile and the system will deliver that message using the available information about how to contact him/her. Also, if an in-person meeting is desired, that can be setup by clicking the Schedule Meeting button.

Similar profiles also exist for lobbyists, but provide slightly different information (Figure 22). The basic representation box instead lists the lobbyist's current clients and the affiliations box lists all his/her past and present clients and duration. Information about ethics filings, contact information, activity, and position present similar information. The legislation list shows bills that intersect with his/her subjects of interest and bills where he/she has submitted content. The content panel shows items he/she has submitted, rated, and commented upon. And in the extensive information listing, there is information about his/her agenda, historical information, political information, and quality as an information source.

Affiliations:

Name	Type	Duration
High School	Education	
University of Delaware, M	Education	
Wilmington College, BA	Education	

Ethics Commission Docs:

Type	Year
Financial Disclosure	Tue Feb 02 15:21:29 EST 2010

Contact Information

Info	Type
1-800-492-7122, ext. 3444	Toll Free
david.rudolph@house.state.md.us	Official
(410) 841-3444	Annapolis Number
(410) 658-2808	District Number

Activity:

Description	Date
Sponsored Bill	Wed Mar 03 15:21:30 EST 2010
Cast Vote	Mon Feb 22 15:21:30 EST 2010
Read Document	Sat Feb 13 15:21:30 EST 2010

Votes

Bill #	Vote	Type	Date
HB1321	Abstain	Committee Vote	Wed Mar 03 15:21:30 EDT 2010
HB881	Nay	Committee Vote	Tue Feb 02 15:21:30 EST 2010

Legislation:

Bill #	Description	Involvement	Position
HB1321	buy supplies and services from specified businesses under specified law to require that a specified sentence for a violation of the prohibition against	Subject of Interest	Nay

Content:

Name	Description	Related Bill	Interaction	Position
DetailItem3	Document	HB761	About Bill in Committee	TBD
ComparisonOfOutcomesFromOtherPolicies_42220	ComparisonOfOutcomesFromOtherPolicies	HB267	About Bill in Committee	Yea
ExampleStory_42022	ExampleStory	HB761	About Bill in Committee	Nay
Answer_42405	Answer	HB267	About Bill in Committee	Nay

Misc. Information:

- hasLegislatingStatistic (1)
- hasLegislativeAideInformation (0)
- hasLegislatorBiographicalInformation (6)
- hasLegislatorReputationInformation (0)
- hasPersonalizationInformation (0)
- hasReceivingInformation (2)
 - hasContactPersonInformation (0)
 - hasContentPreference (1)
 - hasCurrentLocation (0)
 - hasDeliveryPreference (1)
 - hasMediumPreference (0)
 - hasTechnologyUsageInformation (0)
 - hasWillingnessToBeApproached (0)
 - hasWillingnessToReceiveInformation (0)
 - hasResponsibilityInformation (0)

Value: Prefers emails and phone calls. Doesn't like paper.

Buttons: Message, Schedule Meeting, Add, Remove

Figure 21: Screen of set of features for legislator profiles

Clients:

Name	Duration
Cirdan Group, Inc.	01/27/2010 - 10/31/2010
Lehigh Cement Company	03/29/2010 - 10/31/2010
Apollo	11/01/2000 -

Ethics Commission Docs:

Type	Year
Activity Report	Fri Apr 02 17:41:02 EDT 2010
Event Report	Sun Feb 21 17:41:02 EST 2010
Registration	Mon Feb 01 17:41:02

Contact Information

Info	Type
123 Main Street, Baltimore, MD 21201	Address (Organization Office)
410-669-7700	Office

Activity:

Description	Date
Answered Question	Thu May 27 17:41:03 EDT 2010
Answered Question	Mon May 24 17:41:03 EDT 2010
Answered Question	Tue May 11 17:41:03 EDT 2010
Testified	Mon May 10

Positions:

Bill #	Position
HB881	Yea
HB921	Yea
HB 932	Yea
HB921	Nay
HB1281	Nay
HB1461	Nay
HB 932	TBD

Legislation:

Bill #	Description	Involvement	Position
HB1281	Extending the period of time during which specified driving restrictions apply to specified holders of learner's instructional permits or provisional driver's licenses.	Subject Intersection	Nay
HB1463	orywxc tshtp ep excjfl	Subject Intersection	TBD

Content:

Name	Description	Related Bill	Interaction	Position
BackgroundOfControversy_42216	BackgroundOfControversy	HB1181	Submitted	Nay
BackgroundOfControversy_42216	BackgroundOfControversy	HB 932	Submitted	Nay
BackgroundOfControversy_42216	BackgroundOfControversy	HB761	Submitted	Nay
LessonFromPreviousAttempts_42085	LessonFromPreviousAttempts	HB761	Submitted	Yea
LessonFromPreviousAttempts_42085	LessonFromPreviousAttempts	HB1251	Submitted	Yea

Misc. Information:

- Profile Information
- Universal Info
- Lobbyist Info

Value: (Empty)

Buttons: Message, Schedule Meeting, Add, Remove

Figure 22: Screen of set of features for lobbyist profiles

4.3.1.2. Lobbyists

Lobbyists were presented with the aspects of the prototype intended for the submission of controversial knowledge.

4.3.1.2.1. Browse Legislation

The first task supported by this system is identifying relevant legislation on which to submit knowledge. In the center is a table listing basic information about legislation, such as bill #, year, title, and synopsis. This listing is updated based on the criteria and information provided on the left.

This first demonstration (Figure 23) identifies legislation based on some common searches. Legislation can be searched based on some information about the bill relating to the legislative process, such as its Committee Assignment, a keyword search of all the information available about a bill, such as bills dealing with either pension or retirement, or by its sponsor, such as Delegate Melaney Griffith.

If a bill in this listing is double-clicked, a detailed presentation of all the information available about that bill is shown (Figure 24). There is basic information such as its committee assignment, status, subjects, and synopsis, the listing of its sponsors' name, party, and district, documents related to the legislative process like bill versions and its fiscal and policy note, the bill's legislative process events, with description and date, a listing of the people and organizations who have stated a position on the bill, information about the controversy around a bill, such as a description of areas of agreement and disagreement, related bills, such as previous introductions, its crossfiled counterpart, and

bills that share the same committee, sponsor, or subject, a basic listing of the available content for that bill, like its type, position, and provider, and a browser for viewing all the types of information about the bill, such as knowledge about the bill's implications, its purpose, development context, and lobbying activity.

This system can also identify legislation using more complex specifications (Figure 25). The system supports identifying bills based on people involved with the bill. Options include experts, DLS staff, aides, particular lobbyists, and more. The example here is searching by special interest and selecting the Maryland Watermen's Association from the populated list of all registered special interests. A search based on understandings of the legislation is also possible, such as impacted populations. Here, the system is asked to show bills where business is impacted. Information about the intended vote of legislators can also be used, such as the bill status and the positions and requests of legislators. For example, this system supports seeing bills where anyone in the committee has an undetermined / to-be-determined position on the bill and has made a request for additional information.

Legislation can also be identified using information about the person doing the searching (Figure 26). The subject of legislation and a pre-supplied list of subjects that interest a lobbyist can be used to identify relevant legislation. Here, instead of selecting from the exhaustive list of legislative subjects, the My Subjects option can be used and any bills that have any of those subjects of interest will be shown. Legislative schedule information can also be used. Here, bills can be identified where its schedule committee

hearing occurs within a given timeframe, for example in the month of March. Information about the content submitted about legislation is also incorporated into the system. Along with keeping track of the amount of material available, information about the types of materials are utilized. Using the Available Content Type panel, there is an extensive listing of content types, from Analogies, to Historical Data, to Written Testimony. The search here simply asks for bills where there hasn't been much submission activity and the bill has an achievability assessment in the set of information provided about it.

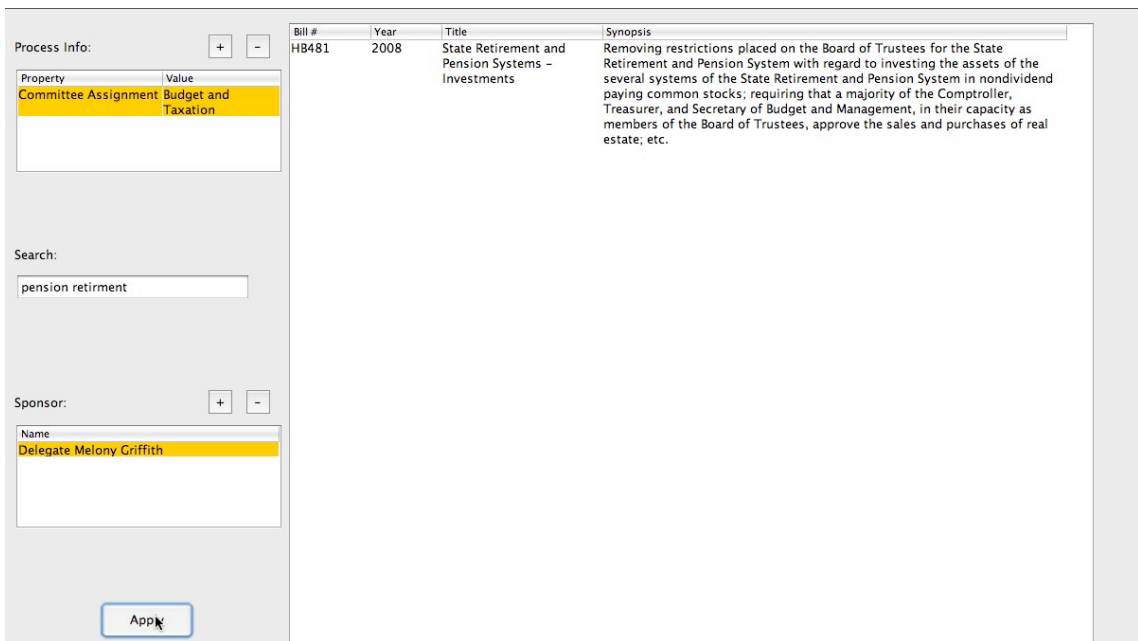


Figure 23: Screen of first set of features for lobbyists to browse legislation

HB481 State Retirement and Pension Systems - Investments

Sponsors:

Name	Party	District
Delegate Melony Griffith	Republican	25

Process Documents:

Name	Type
hb0481f	First Reader
hb0481t	Third Reader
Ch_506_hb0481T	Chapter
hb0481	Fiscal & Policy Note

Activity:

Description	Date
Favorable Report Adopted (Senate) - Chapter 506 (Governor)	3/26
Hearing 2/26 at 1:00/2:13 p.m. (House)	5/13

Positions:

Name	Position	Type
Elizabeth Bobo	Yea	Delegate
John Olszewski	Yea	Delegate
Barbara Feldman	Yea	Lobbyist
Kriselda	Yea	Delegate

Controversy Information:

Info	Type
There's a disagreement over the source of funding: budget reshuffling or savings from staff	hasAreaOfDisagreementInformation

Related Legislation:

Bill #	Description	Relationship	Status
HB1121	Commercial Law - Mortgage Servicers - On-Line Payments	Shared Subject	Passed Chamber
SB941	Natural Resources - Somers Cove Marina Commission	Shared Subject	In Committee
HB1061	Public Safety - Denial of Permit to Carry Handgun - Return of Application Fee	Shared Subject	1st Reading

Content:

Name	Description	Provider	Position
DetailItem2	Document		TBD
DetailItem1	Document		Yea
Image_42229	Image		Nay
Exhibit_42228	Exhibit		TBD
PersonalStory_42226	PersonalStory		Nay
DetailItem3	Document		TBD
Trend_42225	Trend		TBD
AppealToPublicHazard_42218	AppealToPublicHazard	Barbara Feldman	TBD
AppealToPublicHazard_42218	AppealToPublicHazard	Mark Waccaman	TBD

Misc. Information:

- hasLegislationCombinationInformation (1)
- hasLegislationRequirementInformation (0)
- hasPunishmentInformation (1)
- hasStatuteAffectedInformation (1)
- hasToWhomLegislationDoesApply (1)
- hasToWhomLegislationDoesNotApply (0)
- hasWhatLegislationDoesNotDo (0)
- hasLegislationLobbyingActivityInformation (10)
 - hasInformationAboutArgumentsPresented (3)
 - hasInformationAboutPositionsTaken (1)
 - hasInformationAboutTestimonyPresented (2)
 - hasLevelOfControversyInformation (2)
 - hasLevelOfSubmissionActivity (2)
- hasLegislationMistakeInformation (6)
- hasLegislativeProcessInformation (6)
- hasLobbyingActivityLimitationInformation (0)

Value: Presenter Distribution: 3 Yea, 2 Nay, 3 Pass with Amend. Little attendance from the general public

Add Remove

Figure 24: Screen of information available about legislation

People Connected:

Type	Name
Special Interest	Maryland Watermen's Association

Impacted Population:

Value
Business

Committee Members:

Name	Vote	Request
Anyone	TBD	Yes

Status: In Committee

Apply

Bill #	Year	Title	Synopsis
SB841	2008	Maryland Community Health Resources Commission - Modifications	Establishing the terms of Maryland Community Health Resources Commission members; authorizing the Governor to remove a member under specified circumstances; establishing requirements for Commission decisions, compensation, and staff; authorizing the Commission to implement specified programs; repealing specified standing committees; requiring the Commission to adopt specified regulations; etc.
HB1281	2008	Teen Driving Safety Act of 2008	Extending the period of time during which specified driving restrictions apply to specified holders of learner's instructional permits or provisional driver's licenses.
HB881	2008	Procurement - Preference Procurement Program for Sheltered Workshops - Individual With Disability Owned Businesses	Expanding eligibility in the preference procurement program for sheltered workshops within the Department of General Services to include a business owned by an individual with a disability under specified circumstances; defining "individual with disability owned business" and specifying requirements for the business to qualify to participate in the program; requiring the State or specified State aided or controlled entities to buy supplies and services from specified businesses under specified circumstances; etc.
HB1321	2008	Criminal Law - Criminal Gang Participation - Sentencing	Altering a provision of law to require that a specified sentence for a violation of the prohibition against participation in a criminal gang under specified conditions be separate from and consecutive to a sentence for the underlying crime.
HB481	2008	State Retirement and Pension Systems - Investments	Removing restrictions placed on the Board of Trustees for the State Retirement and Pension System with regard to investing the assets of the several systems of the State Retirement and Pension System in nondividend paying common stocks; requiring that a majority of the Comptroller, Treasurer, and Secretary of Budget and Management, in their capacity as members of the Board of Trustees, approve the sales and purchases of real estate; etc.
HB921	2008	State Highway Administration - Unauthorized Signs on Rights-of-Way	Providing for original jurisdiction of the District Court for specified actions; prohibiting unauthorized signs within the right-of-way of a State highway; clarifying that such signs may be removed by the State Highway Administration or by other designated agencies; authorizing the State Highway Administration or a specified county or municipal corporation government to recover specified costs; providing for civil

Figure 25: Screen of second set of features for lobbyists to browse legislation

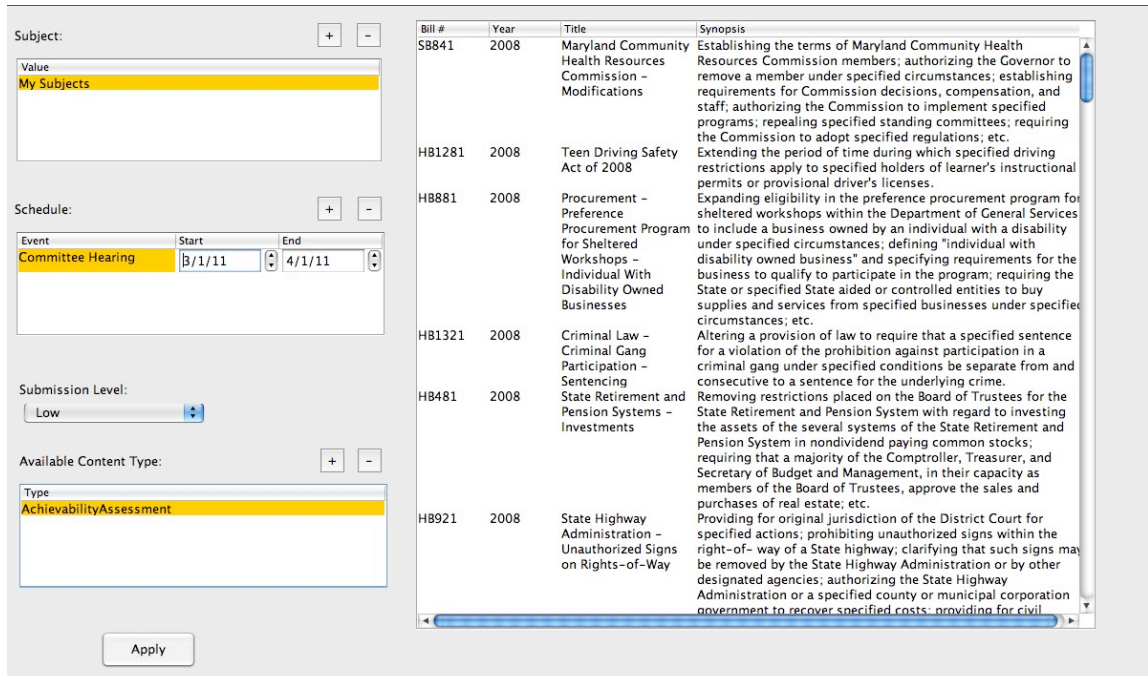


Figure 26: Screen of third set of features for lobbyists to browse legislation

These examples have demonstrated some of the capabilities of the system for identifying legislation, such as through:

- Information related to the legislative process, such as committee assignment, status, vote outcome, or hearing date.
- Information about people related to the legislation, such as special interest groups, individual lobbyists, DLS staff, and sponsors.
- Information about the intended votes of legislators and whether they have made any requests for information.
- Information about the legislation itself, such as impacted populations, subject, and keywords
- Information about the person doing the searching, such as their subject areas of interest

- Information about the content available about the bill, such as the amount of material provided, and the types of material submitted.

The system also supports viewing the breadth of information available about legislation, such as related bills, implications, controversy, and legislative history

4.3.1.2.2. Browsing Content

After identifying a bill of interest, the system supports reviewing what content is available about that legislation (Figure 27). On the left is a browser for skimming the content available about a bill, similar to skimming a paper legislative bill file. In addition to viewing text, images, and PDF documents, the browser can sort the content, such as by the date it was submitted, or the vote outcome that the content item aims to support.

The system also presents a variety of descriptive information about the content available for the bill. At the basic level, it shows the number of items available, in this case 40, a breakdown of how much of the available 40 documents supports each of the possible vote options is also provided. Beyond numbers, this system can present a list of the types of documents available and how many documents of each are available. Here, it can be seen that there is a chart, a discussion of existing efforts, including one regarding industry's efforts, and four personal stories. There is also a listing of the names of providers of content and their clients. Information is also available about the overall usage of the content such as number of viewers, the number who understood the content, and the number of questions asked related to the content

This system can also present other summary information about the content available (Figure 28). At the top, the system lists any information requests legislators have made about the bill and how many responses they've received. Next, there is a tabulation of

any intended vote information about both legislators and lobbyists connected to the bill. Lastly, the distribution of each content type across the positions is shown. In this case, it can be seen that the opposition has not provided a corresponding view about efforts from industry, and the supports have not provided any countering example stories.

Previous Sort By: Item 37 / 40 Next

of Items: 40

Usage Info:

Metric	Value
Views	53
Reads	41
Understands	41
Questions	17
Requests	29

Providers:

- Barbara Feldman
- Daniel Doherty
- David Dunphy
- Dorothy Raff
- Frederick Santiago
- GBMC Healthcare Inc
- DLSResearchPublication
- Greater Baltimore Committee
- Gregory Shaffer
- Kisha Brown
- Lisa Fadden
- Maryland Association for Justice
- Maryland Retired School Personnel Association
- Merrill Lynch, Pierce, Fenner & Smith Inc.
- Montgomery County Chamber of Commerce
- UFCW Local 27

Position Distribution:

Position	Count
Yea	8
Nay	9
TBD	23

Content Types:

Type	Count
Chart	1
ComparisonOfLegislation	1
CriticismOfArgument	1
CriticismOfBehavior	1
CriticismOfSource	1
DLSResearchPublication	2
Document	3
ExampleStory	1
Exhibit	1
ExistingEffort	2
ExistingEffortInIndustry	1
Flyer	1
GenericAdvisoryLetter	1
Glossary	1
GovernmentPublication	1
Graph	1
IdentityOfSupportingStakeholder	2
Image	1
ImplementationStatusQuo	1
JournalArticle	1
Multimedia	1

Figure 27: Screen of first set of features for lobbyists to browse bill file content

Previous Sort By: Item 1 / 40 Next

Requests:

Requester	Description	Provided
Senator Thomas Miller	So far, the information provided as been very remote. Some compelling stories would be of interest.	2
Senator Bryan Simonaire	There's a hearing next week. Please submit any proposed amendments by Friday.	0
Delegate Aisha Braveboy	Information about how this bill would impact smaller communities is missing	4

Intended Vote Info:

Name	Vote
Lobbyist Kathleen Maloney	Yea
Lobbyist Kisha Brown	Yea
Lobbyist Leah Gibbons	Yea
Lobbyist Mark Wasserman	Yea
Senator Nathaniel McFadden	Nay
Lobbyist Barbara Feldman	Nay
Lobbyist Brooke Hisle	Nay
Lobbyist Heather Carmichael	Nay
Lobbyist Julia Erickson	Nay
Senator Paul Pinsky	Nay
Lobbyist Daniel Doherty	TBD
Lobbyist David Dunphy	TBD

Submissions Count Across Positions:

Type	Yea	Nay	TBD
Chart	1	0	0
ComparisonOfLegislation	0	1	0
CriticismOfArgument	0	0	1
CriticismOfBehavior	0	0	1
CriticismOfSource	0	0	1
DLSResearchPublication	0	1	0
Document	2	0	1
ExampleStory	0	1	0
Exhibit	0	1	0
ExistingEffortInIndustry	1	0	0
Graph	0	0	1
IdentityOfSupportingStakeholder	0	1	0

HB 374 FAVOR with Amendment

Maryland Chamber of Commerce Economic Matters Committee 02/12/08

EmPOWER Maryland Energy Efficiency Act of 2008

Brief Summary of Bill:

House Bill 374 requires electric companies to procure and provide customers with energy conservation and energy efficiency programs and services that are designed to achieve a 15% reduction in both per capita and overall peak electricity consumption by 2015.

Maryland Chamber's Position:

The Maryland Chamber of Commerce ("Maryland Chamber") understands and supports the State's effort to address reliability concerns. However, the

Figure 28: Screen of second set of features for lobbyists to browse bill file content

4.3.1.2.3. Submitting Content

Beyond seeing bills and what is already available, this system supports submitting knowledge in a variety of ways. First, this system supports submitting documents as files (Figure 29). On the left is a file browser for identifying documents on a computer to submit to the system about a bill. For example, a Position Paper in the form of a PDF document. Along with the file, some basic information about the document can be provided to help others find and retrieve it. First, there is the document type. This is an extensive list of the types of documents generally submitted about a bill, from Advisory Opinions, to in depth research and vote reports. For this document, Position Paper would be found under the Lobbying Document type. Next, the outcome the document is intended to support can also be specified. There are also options for linking an information user profile to the document, providing document keywords, and having the system print and include a paper version of the electronic document in the official legislative bill file.

Submitting pieces of information, rather than whole documents, is also supported (Figure 30). For example, a lesson from another state can be entered and in the listing of content parts, under Lesson, LessonFromOtherPolicy can be selected.

The information pieces of a document can also be specified after it has been submitted (Figure 31). On the left is the text of a submitted document, and on the right is a list of known types of information that might be provided in a document. A piece of text can be selected, along with a type, and labeled. Once labeled, others looking for particular types

of information can retrieve these typed and labeled pieces of text. For example, someone looking for Policy Recommendations will see all the text from all the available documents on a bill labeled as providing a Policy Recommendation.

Beyond basic information about content, this system also allows a broad array of descriptive information to be added (Figure 32). For example, given a Policy Brief that was submitted, the provider can submit information about the list of sources used, information about who funded the work, its subjects, the intended audience type, that it deals primarily with policy knowledge, not personal or political knowledge, and an executive summary.

Knowledge can also be submitted in this system in response to questions and requests from legislators (Figure 33). Questions and requests are listed about a bill along with the number of responses to it and the name of the legislator who asked the question or made the request. Clicking on each will show the responses given. To respond, text can be entered, and/or a document can be attached. For example, to answer the first question, about businesses leaving, text could be used and a document with further information attached. Or, to answer the request for amendments, just the proposed amendment file can be attached. These answers and request responses are now added to the set of available knowledge about the legislation.

This system also supports the tailoring of content to legislators (Figure 34). If a lobbyist wishes to create some content customized to a particular legislator or group of legislators,

the lobbyist can identify for whom the information is tailored. Here, a document is provided along with a listing of individual legislators and committees. Through these checkboxes, the target legislators and committees can be selected. When a legislator goes to retrieve information on the bill, he/she will be able to see which content is customized to him/her or his/her committee.

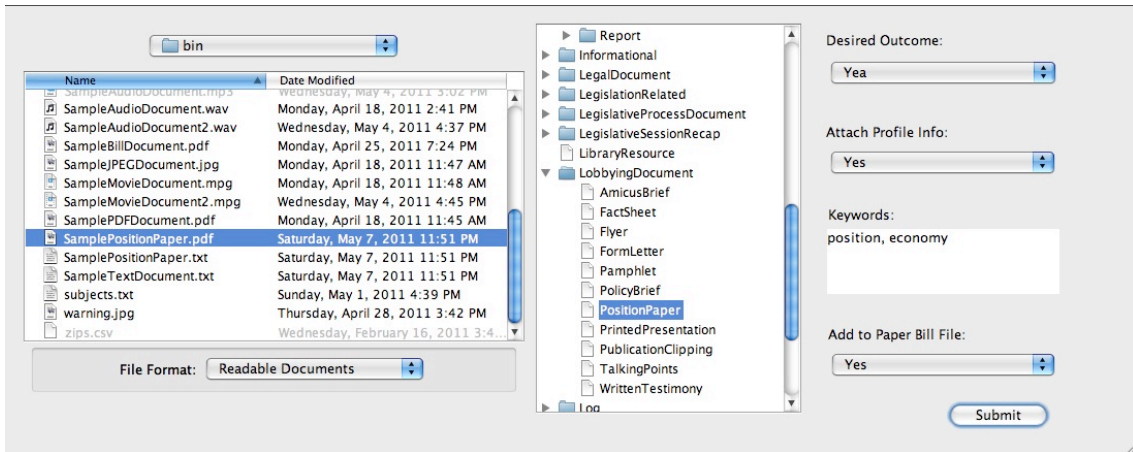


Figure 29: Screen of first set of features for lobbyists to submit content

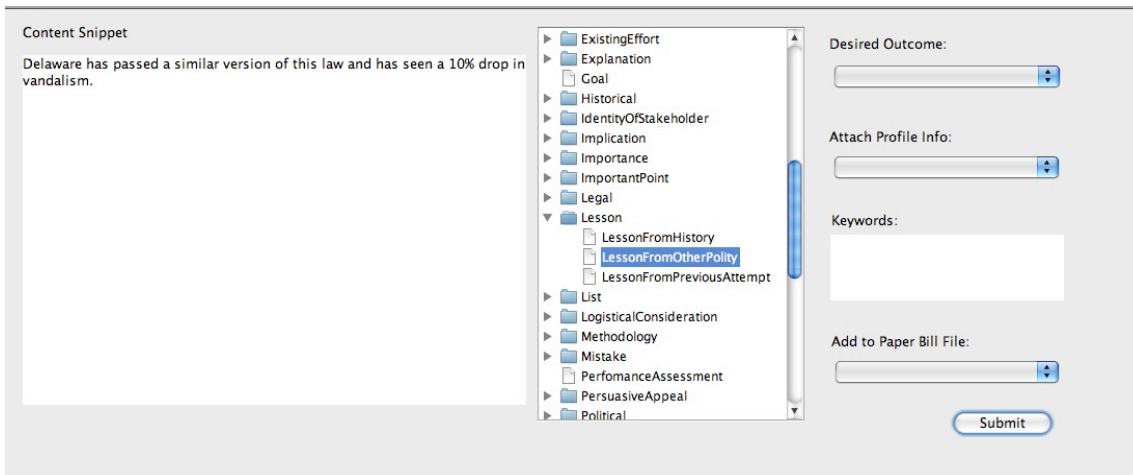


Figure 30: Screen of second set of features for lobbyists to submit content

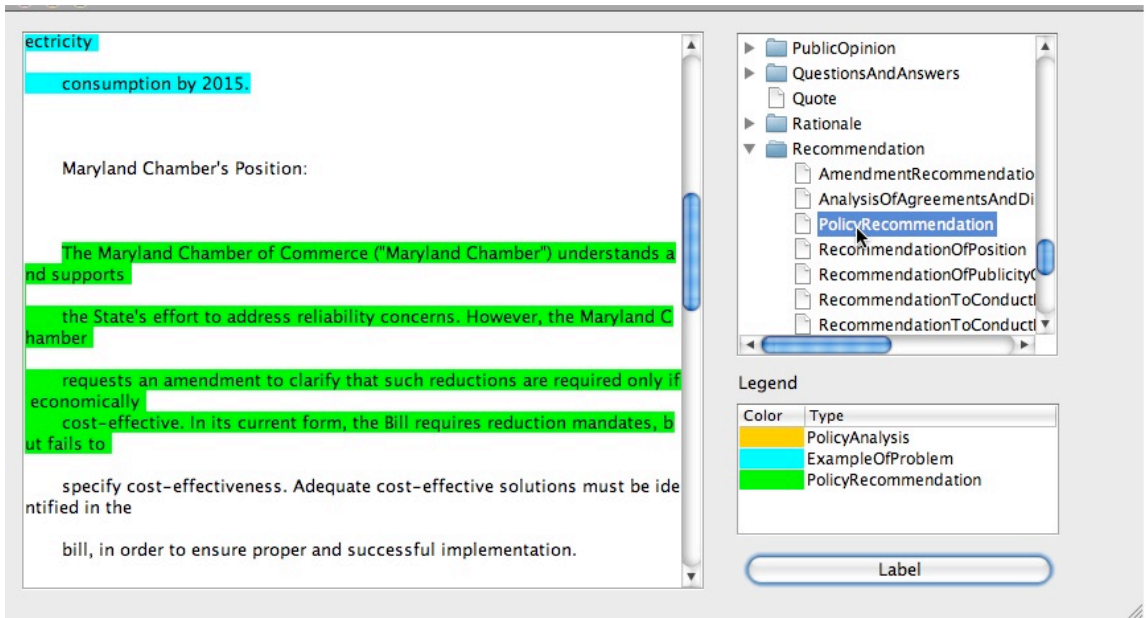


Figure 31: Screen of third set of features for lobbyists to submit content

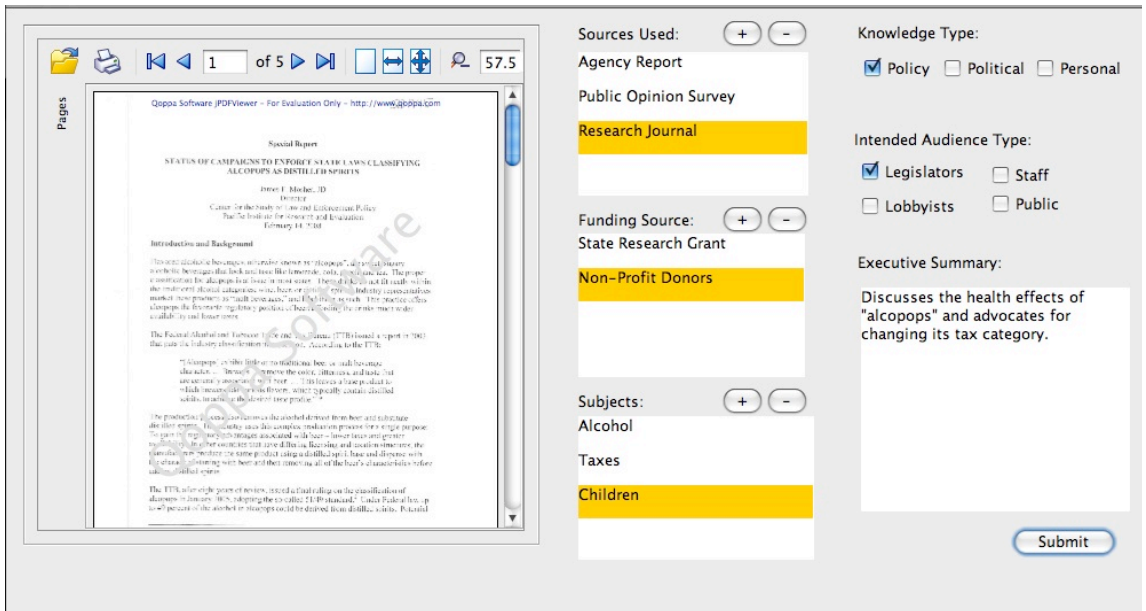


Figure 32: Screen of fourth set of features for lobbyists to submit content

Questions:

Asker	Description	# Responses
Senator Bryan Simonaire	Is this likely to cause any business to leave the state?	7
Delegate John Olszewski	What is the basis for the fine amount proposed here?	6
Delegate Susan Lee	Has Leadership taken a position on this bill?	3
Delegate Jeannie Haddaway	How will this bill economically impact my	1

Requests:

Requester	Description	# Responses
Senator Thomas Miller	So far, the information provided as been very remote. Some compelling stories would be of interest.	2
Senator Bryan Simonaire	There's a hearing next week. Please submit any proposed amendments by Friday.	0
Delegate Aisha Braveboy	Information about how	4

Responses:

Answers	Provider	File
Yes, MD taxes will be much higher than our neighbors.	Robert Noble	No
It's not clear. Some have said they might, but most are too settled that moving costs would be prohibitive.	Daniel Doherty	No

Text:

Similar actions taken in other states have not resulted in business flight.

File:

velopment/workspace/Demo/bin/SamplePDFDocument.pdf

Browse...

Submit

Figure 33: Screen of fifth set of features for lobbyists to submit content

Pages

Qoppa Software jPDFViewer - For Evaluation Only - http://www.qoppa.com

Special Report

STATUS OF CAMPAIGNS TO ENFORCE STATE LAWS CLASSIFYING ALCOPOPS AS DISTILLED SPIRITS

James F. Mosher, JD
Director
Center for the Study of Law and Enforcement Policy
Pacific Institute for Research and Evaluation
February 14, 2008

Introduction and Background

Flavored alcoholic beverages, otherwise known as "alco pops" - also sweet, sugary alcoholic beverages that look and taste like lemonade, cola, pop, and iced tea. The proper classification for alco pops is at issue in most states. These drinks do not fit neatly within the traditional alcohol enterprises: wine, beer, or (distilled) spirits. Industry representatives market these products as "malt beverages," and label them as such. This practice offers alco pops the favorable regulatory position of beer, affording the drinks much wider availability and lower taxes.

The Federal Alcohol and Tobacco Trade and Tax Bureau (TTB) issued a report in 2005 that puts the industry classification in question. According to the TTB:

"[Alco pops] exhibit little or no traditional beer or malt beverage character. ... Breweries ... remove the color, bitterness, and taste that are generally associated with beer. ... This leaves a base product to which brewers add various flavors, which typically contain distilled spirits, to achieve the desired taste profile."¹

The production process also removes the alcohol derived from beer and substitute distilled spirits. The industry uses this complex production process for a single purpose: To gain the regulatory advantages associated with beer - lower taxes and greater market access. In other countries that have differing licensing and taxation structures, the manufacturers produce the same product using a distilled spirit base and dispense with the character imparting with beer and then removing all of the beer's characteristics before adding distilled spirits.

The TTB, after eight years of review, issued a final ruling on the classification of alco pops in January 2005, adopting the so-called 51/49 standard.² Under Federal law up to 49 percent of the alcohol in alco pops could be derived from distilled spirits. Potential

Intended Legislators:

Name

- Senator George Della
- Senator George Edwards
- Senator Gloria Lawlah
- Senator Gwendolyn Britt
- Senator J. Hooper
- Senator J. Stoltzfus
- Senator James Brochin
- Senator James DeGrange
- Senator James Robey
- Senator Jamie Raskin
- Senator Janet Greenip
- Senator Jennie Forehand
- Senator Jim Brochin
- Senator Jim Rosapepe
- Senator Joan Conway
- Senator John Astle
- Senator Katherine Klausmeier

Intended Committee:

Name

- Appropriations
- Budget and Taxation
- Economic Matters
- Education Health and Environmental Affairs
- Environmental Matters
- Executive Nominations
- Finance
- Health and Government Operations
- Judicial Proceedings
- Judiciary
- Rules
- Rules and Executive Nominations
- Ways and Means

Submit

Figure 34: Screen of sixth set of features for lobbyists to submit content

4.3.1.2.4. Submitting Content in Reaction

In addition to submitting content on its own, this system supports submitting content in connection with content previously submitted by others and oneself (Figure 35). On the left is a list of the content submitted about a bill. When submitting a related document, the type of relationship can be specified, such as supports, summarizes, or counter balances. The type of item being submitted can also be specified. When submitting a related item, a file can be attached or some text typed and then linked to that content item. For example, given a detailed item, content can be submitted to summarize it. When a legislator looks at either the detailed item or the new summary item, he/she will also be able to see the relationship between them.

The system also supports submitting ratings, and comments to existing content (Figure 36). Given a selected document from the list of items submitted about a bill, ratings can be given about the item's clarity, objectivity, usefulness, and relevance. Similarly, a generic comment or a comment on these four attributes can be attached to the document.

Beyond ratings and comments, additional descriptive information can be added about available content (Figure 37). For example, given a research paper, information can be provided about the controversy surrounding it, such as its level of factuality or controversy, or areas of agreement, disagreement, or change. In this case, a description of opposition is added. Additionally, information can be added about its funding sources, time periods covered, subjects, newness, estimated reading time, or summary. Here, critical funding information is added. Relationships between the document and other items can also be specified, such as that the report augments an anecdote.

This system also supports proposing and requesting changes to legislation and to other people's content. For legislation, an Alternative Proposal can be added to the set of information through text and documents (Figure 38). Once submitted, anyone considering making amendments can easily review the proposal.

When dealing with content submitted by others in which there is a problem, the system supports two main ways of reacting (Figure 39). First, labels can be applied to the text in question, about which the provider of the item will be notified. For example, some text can be identified as misleading, a logical fallacy, or simply inaccurate. These labels will be seen by others when they review the document. Second, a public or private request can be sent to the provider, including a rationale for the request and a possible replacement.

File List:

Name	Type	Provider	Position
DetailItem1	Document	Ardath Cade	Yea
PersonalStory_42036	PersonalStory	Dorothy Raff	Yea
Anecdote_42038	Anecdote	Frederick Santiago	Yea
Map_42040	Map	Ardath Cade	Yea
Story_42037	Story	Larry Simms	Yea
Graph_42041	Graph	Cynthia Collins	TBD
Story_42035	Story	Dorothy Raff	TBD
DetailItem2	Document	Dorothy Raff	Yea
Trend_42030	Trend	Cynthia Collins	Nay
Trend_42034	Trend	Larry Simms	TBD
Trend_42033	Trend	Leah Gibbons	Nay
DetailItem3	Document	Ardath Cade	TBD
Visual_42039	Visual	Larry Simms	TBD
Trend_42031	Trend	Cynthia Collins	Yea
Diagram_42042	Diagram	Dorothy Raff	TBD
Trend_42032	Trend	Larry Simms	Nay

Relationship:
Summarizes

Type:
Request
Response
StatusQuo
Story
Summary
SummaryOfBackground
SummaryOfControversy
SummaryOfDebate
SummaryOfDocument
SummaryOfLegislation
SummaryOfMessage

File:
space/Demo/bin/SampleTextDocument.txt

Text:
Suggests the state require electric companies to procure and provide customers with energy conservation and energy efficiency programs and services that are designed to achieve a 15% reduction in both per capita and overall peak electricity consumption by 2015.

Figure 35: Screen of first set of features for lobbyists to submit content in reaction

File List:

Name	Type	Provider	Position
DetailItem1	Document	Larry Simms	Yea
PersonalStory_42036	PersonalStory	Dorothy Raff	Yea
Anecdote_42038	Anecdote	Cynthia Collins	Yea
Map_42040	Map	Dorothy Raff	Yea
Story_42037	Story	Larry Simms	Yea
Graph_42041	Graph	Bernard Shaw	TBD
Story_42035	Story	Arthur Abramson	TBD

Rating:

Metric	Score
Clarity	2
Objectivity	4
Usefulness	5
Relevance	5

Comment:
Usefulness

I found this particularly useful in clearing up ambiguities left from the committee hearing.

State Fiscal Effect: Higher education expenditures could increase by an estimated \$55,704 in fiscal 2005, which accounts for the bill's July 1, 2004 effective date and a 90-day start-up delay. The estimate reflects the cost of hiring one assistant general counselor to review additional procurement bids and contracts that would be processed by MSU. The estimate includes a salary, fringe benefits, one-time start-up costs, and ongoing operating expenses.

Salary and Fringe Benefits	\$49,142
Operating Expenses	6,562
Total FY 2005 State Expenditures	\$55,704

Future year expenditures reflect: (1) a full salary with 4.6% annual increases and 3% employee turnover; and (2) 1% annual increases in ongoing operating expenses.

MSU advises that the increased contracting authority provided in the bill could result in increased grant revenues and indirect cost recoveries for the university beginning in fiscal 2006. MSU estimates that these revenues would at least offset, and possibly surpass, any increase in higher education expenditures.

Although the bill removes MSU from the Board of Public Works' traditional authority over procurements, broad involvement with MSU procurement transactions would still be required in two ways. First, the board would be required to review and approve the procurement policies and procedures to be developed by MSU. Second, the board would continue to approve all contracts that exceed \$500,000 for services or capital improvements. The bill, therefore, is not expected to have a significant impact on MSU procurement expenditures.

Additional Information

Prior Introductions: None.

Cross File: HB 1066 (Delegate McIntosh, et al.) - Appropriations.

Information Source(s): Morgan State University, Maryland Higher Education Commission, Department of Legislative Services

MS 4307 Page 3

Figure 36: Screen of second set of features for lobbyists to submit content in reaction

Content Item:

Qoppa Software PDFViewer - For Evaluation Only - http://www.qoppa.com

Special Report
**STATUS OF CAMPAIGN TO ENFORCE STATE LAWS CLASSIFYING
 ALCOPOPS AS HISHLEIGH BEVERAGES**

James F. Mosler, JD
 Director
 Center for the Study of Law and Government Policy
 Public Institute for Research and Evaluation
 February 11, 2008

Introduction and Background

Historical alcoholic beverages, often known as "alco-pops," are among many alcoholic beverages that look and taste like lemonade, cola, punch and tea. The proper classification for alcopops in all states is "beer," "ale," "stout" and "light beer" within the traditional alcohol categories (beer, wine or distilled spirits). Many representations market these products as "soft beverages" and "light beer" as such. This practice allows alcopops the favorable regulatory treatment of beer, including the alcohol strength availability and federal taxes.

The Federal Alcohol and Tobacco Tax and Trade Administration issued a report in 2003 that puts the industry classification in perspective. According to the TTTB:

"Alco-pops, such as light beer or non-traditional beer or malt beverage alternatives... derived... separate the color, bitterness, and taste that are generally associated with beer... This covers a beer product to which brewers've added flavors, which typically contain less alcohol than traditional beer." [1]

The production process for alcopops involves the alcohol derived from beer and substitute fruit and sugar. The alcopops uses the complete production process for a single process. To gain the regulatory advantages associated with beer - lower taxes and greater opportunities for distribution - brewers ferment and analyze or ferment the ingredients produce the same product using a distilled spirit base and alcopops with their own starting with beer and then removing all of the beer's characteristics before adding distilled spirits.

The TTB, after eight years of review, issued a final ruling on the classification of alcopops in January 2005, adopting the revised 2004 standard. Under federal law up to 49 percent of the alcohol in alcopops could be derived from alcohol spirits. Percent

[1] Federal Register Vol. 68, No. 36 Monday, March 24, 2003 Proposed Rule: Internal Revenue Code Section 5051(b)(1) - "Light Beer" (January 3, 2003) quoted in LTR Form 7 and 23.

Qoppa Software PDFViewer - For Evaluation Only - http://www.qoppa.com

Controversy Info: **Opposition Description**

Opponents believe further study is required to learn about other possible solutions

Descriptive Info: **Funding Source**

This study was mainly sponsored by corporations seeking to avoid regulation

Relationship: **Augments**

Name	Type	Provider	Position
DetailItem1	Document	Ardath Cade	Yea
PersonalStory...	PersonalStory	Dorothy Raff	Yea
Anecdote_420...	Anecdote	Cynthia Collins	Yea
Map_42040	Map	Lisa Fadden	Yea
Story_42037	Story	Larry Simms	Yea
Graph_42041	Graph	Leah Gibbons	TBD
Story_42035	Story	Dorothy Raff	TBD
DetailItem2	Document	Dorothy Raff	Yea
Trend_42030	Trend	Bernard Shaw	Nay
Trend_42034	Trend	Cynthia Collins	TBD
Trend_42033	Trend	Ardath Cade	Nay
DetailItem3	Document	Larry Simms	TBD
Visual_42039	Visual	Arthur Abramson	TBD
Trend_42031	Trend	Leah Gibbons	Yea
Diagram_42042	Diagram	Cynthia Collins	TBD

Submit

Figure 37: Screen of third set of features for lobbyists to submit content in reaction

Bill:

Qoppa Software PDFViewer - For Evaluation Only - http://www.qoppa.com

SENATE BILL 205 810248

By: **The President (By Request - Administration) and Senators Frosh, Garagiola, Fowheand, King, Lemett, Madaleno, Pinsky, and Roscappe**
 Introduced and read first time: January 18, 2008
 Assigned to: Finance

Committee Report: Favorable with amendments
 Senate action: Adopted with floor amendments
 Read second time: March 26, 2008

CHAPTER _____

1 AN ACT concerning

2 **EmpOWER Maryland Energy Efficiency Act of 2008**

3 FOR the purpose of establishing the State goal of achieving certain percentage

4 reductions in per capita electricity consumption and peak demand by the end of

5 a certain year; requiring the Public Service Commission to make certain

6 calculations each year and to report those calculations to the General Assembly

7 each year as part of its annual report; requiring certain municipal electric

8 utilities and small rural electric cooperatives to include certain

9 programs or services to encourage and promote the efficient use and

10 conservation of energy, as part of their service to their customers; requiring that,

11 by certain dates, the Public Service Commission shall adopt regulations or issue

12 orders requiring each electric company to procure or provide to certain

13 customers certain energy efficiency and conservation measures programs and

14 services that are designed to achieve certain energy reduction targets by certain

15 dates; requiring electric companies to submit to the Commission a certain plan

16 by certain dates; requiring electric companies to consult with the Maryland

17 Energy Administration regarding certain plans; requiring the Administration to

18 give certain findings to the Commission; requiring the Commission to review

19 certain plans by a certain time; authorizing the Commission and the

20 Administration to request certain information; prohibiting the Commission from

21 requiring an electric company to require an electric customer to

22 allow the electric company to control the amount of the electric customer's

23 electricity usage; requiring the Commission, by regulation or order, to require

24 certain electric companies to implement certain rate adjustment mechanisms

25 for certain customers and certain demand response programs for certain

EXPLANATION: CAPITALS INDICATE MATTER ADDED TO EXISTING LAW.
 [Brackets] indicate matter deleted from existing law.
 Underlining indicates amendments to bill.
 Strike-out indicates matter stricken from the bill by amendment or deleted from the law by amendment.

Qoppa Software PDFViewer - For Evaluation Only - http://www.qoppa.com

Alternative Proposal:

Description:
 This proposal calls for moving the implementation date of the bill back one year.

File:
 pe Development/workspace/Demo/bin/ProposedAmendment.pdf

Browse...

Submit

Figure 38: Screen of fourth set of features for lobbyists to submit content in reaction

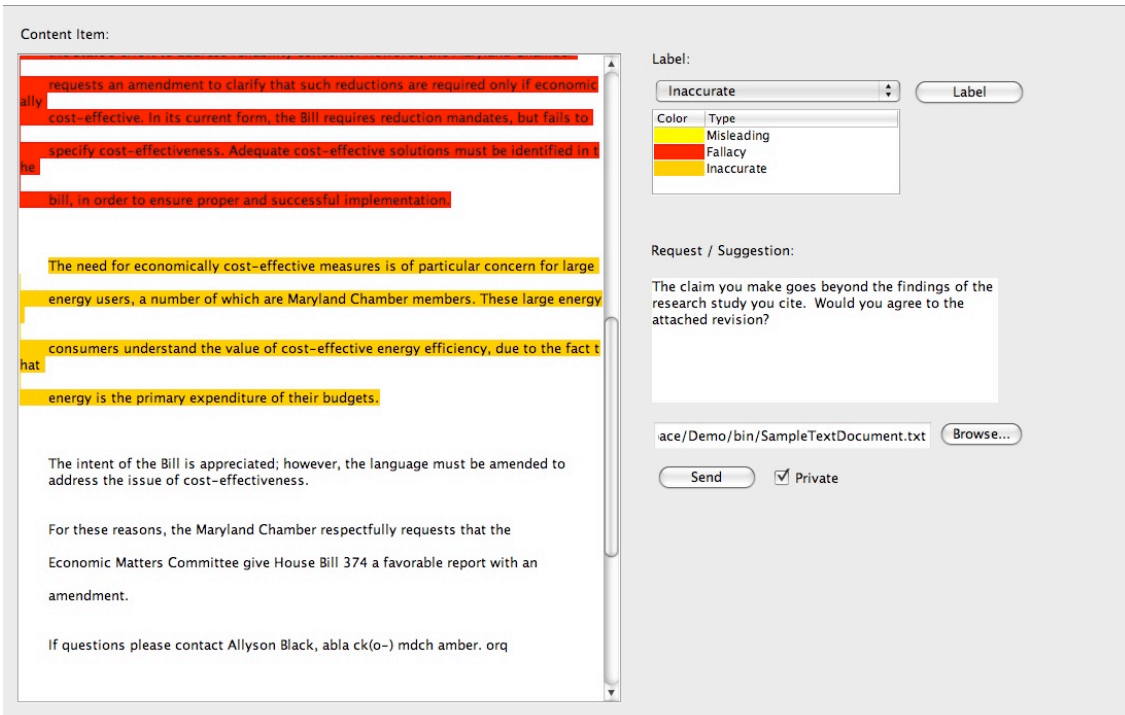


Figure 39: Screen of fifth set of features for lobbyists to submit content in reaction

4.3.1.2.5. Usage Tracking

After submitting content, this system supports tracking its usage (Figure 40). To support tracking of content, this system provides a listing of the content submitted by a lobbyist, each with metrics reflecting the number of views, the number of viewers who understood it, and the number who had questions. The system also supports seeing further details for individual items. The reader listing provides the name and type of the individual people who read the item, and whether they understood or had questions about it. In the labels panel, any tags are listed along with the text involved and the person doing the tagging. For example, there are tags about text considered inaccurate, fallacious, or misleading, and tags meant to identify the type of information some text provides, such as the identify of a key decision maker. The ratings panel provides information about the range of scores the item received, such as the most frequent score for clarity and the average score

for usefulness. Lastly, there is a listing of the comments along with the name of the commenter and the type of comment, such as whether it a general comment or a comment about its objectivity.

Submitted Content:

Name	Type	Viewed	Understood	Questions
ComparisonOfDataFrom	ComparisonOfDataFrom	5	4	2
OtherPolity_42307	OtherPolity			
CriticismOfBehavior_42100	CriticismOfBehavior	5	4	2
BackgroundOfLegalMatter_42197	BackgroundOfLegalMatter	7	6	4
EconomicPro_42502	EconomicPro	5	4	2
Table_42437	Table	3	2	0

Readers:

Name	Type	Read	Understood	Questions
Kisha Brown	Lobbyist	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Thomas Miller	Senator	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Robert Noble	Lobbyist	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Julia Erickson	Lobbyist	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Paul Pinsky	Senator	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Heather Carmichael	Lobbyist	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Larry Haines	Senator	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Labels:

Type	Text	Tagger
IdentityOfKeyDecisionMaker	The chair of the committee is really going to determine the outcome	Brooke Hisle

Ratings:

Metric	Mean	Min	Max	Mode
Clarity	4.0	0	4	4
Objectivity	4.0	0	5	5
Relevance	2.0	0	3	3
Usefulness	2.0	0	3	3

Comments:

Type	Comment	Commenter
Relevance	Addresses the bill topic, but not the details of the proposed bill.	Brooke Hisle
Objectivity	Keeps good balance.	Leah Gibbons
General	Nothing new.	Leah Gibbons
Relevance	Not relevant.	Kathleen Maloney
Usefulness	Other docs more useful	Julia Erickson

Main Content:

HB 374
FAVOR with
Maryland Chamber of Commerce
Economic Matters
Amendment
Matters Committee
MARYLAND CHAMBER OF COMMERCE Legislative Position 02/12/08

HB 374
EmPOWER Maryland Energy Efficiency Act of 2008

Brief Summary of Bill:

House Bill 374 requires electric companies to procure and provide customers with energy conservation and energy efficiency programs and services that are designed to achieve a 15% reduction in both per capita and overall peak electricity

Figure 40: Screen of set of features for lobbyists to track their submitted content

4.3.1.2.6. Profiles

In addition to a focus on legislation and the content associated with it, this system supports reviewing information about legislators and lobbyists through profiles. Through the legislator profile, the system supports seeing a variety of information (Figure 41). There is a photo of the legislator along with his/her name, and basic representation information, such as his/her district, party, leadership role, and committee. Next to the photo is a color representation of whether there are ethics infractions or warnings from others for this person. The affiliations table lists the name, type, and duration of known affiliations, such as boards he/she serves on, joint committees, caucuses, associations,

committees and sub-committees, task forces, and schools attended. Beneath, access to this person's ethics commission filings can be gained by double-clicking the submitted filing in the list. Through the contact information box, any information about phone numbers, mailing addresses, emails, screen names, and websites are shown. The recent activity of the legislator can also be seen, such as requests posted, questions asked, bills sponsored, documents read, and votes cast. Double-clicking would show the object of the activity, such as the content item or bill. A more focused listing is given for votes, listing all the bills on which he/she has cast a vote, along with the vote, its type, and date. The legislation table lists legislation related to that legislator. For example, bills he/she has sponsored, bills assigned to his/her committee, or bills with subjects similar to his/her subjects of interest. Similarly, the content table shows related content, such as content read, questioned, tailored for him/her, about a bill he/she sponsored, or about a bill in his/her committee. Lastly, there is a comprehensive listing of all descriptive information about the legislator on a variety of topics, such as information about his/her agenda, biography, such as birthday, career, and family, political intelligence, relationship with aide and groups, awards, bias, stats, preferred information and delivery mechanism, and voting pattern. The profile also supports adding and removing information.

In addition to seeing information about people, the profile supports off-line interactions. Messages can be sent to people through their profile and the system will deliver that message using the available information about how to contact them. Also, if an in-person meeting is desired, that can be setup by clicking the Schedule Meeting button.

Similar profiles also exist for lobbyists, but provide slightly different information (Figure 42). The basic representation box instead lists the lobbyist's current clients and the affiliations box lists all his/her past and present clients and duration. Information about ethics filings, contact information, activity, and position present similar information. The legislation list shows bills that intersect with his/her subjects of interest and bills where he/she has submitted content. The content panel shows items he/she has submitted, rated, and commented upon. And in the extensive information listing, there is information about their agenda, historical information, political information, and quality as an information source.

The screenshot displays a comprehensive profile for a legislator, organized into several key sections:

- Affiliations:** A table listing educational institutions such as the University of Delaware and Wilmington College, with columns for Name, Type, and Duration.
- Ethics Commission Docs:** A table showing financial disclosure records, including a record from February 2010.
- Contact Information:** Provides personal and official contact details, including phone numbers, a toll-free number, and an email address.
- Activity:** A log of legislative actions, such as sponsoring bills and casting votes, with associated dates and times.
- Votes:** A table detailing the legislator's voting record on specific bills (e.g., HB1321, HB881), including the vote type and date.
- Legislation:** A table of bills the legislator is involved in, such as HB1321, with details on description, involvement, and position.
- Content:** A table of documents and items created or interacted with, such as 'ComparisonOfOutcomesFromOtherPolity_42220'.
- Misc. Information:** A list of personal preferences and characteristics, such as 'hasDeliverPreference (1)' and 'Prefers emails and phone calls.'

Figure 41: Screen of set of features for legislator profiles

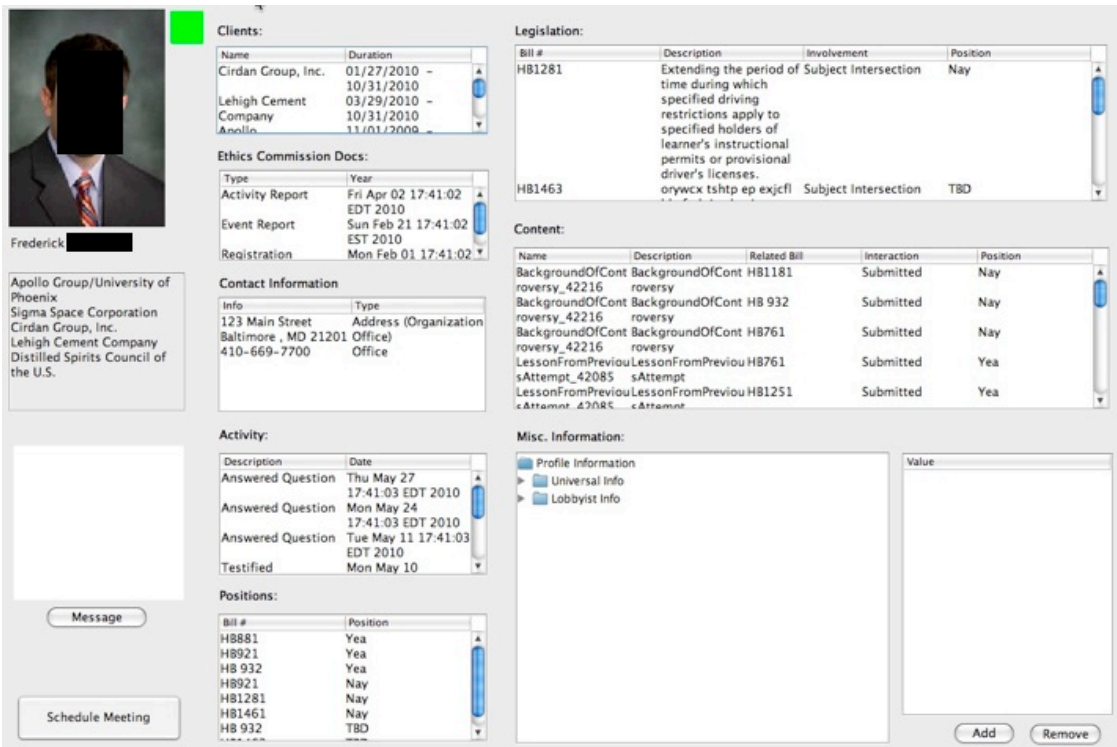


Figure 42: Screen of set of features for lobbyist profiles

4.3.2. Utility Evaluation Metrics

A discussion and survey was conducted individually with 8 legislators and 8 lobbyists, who evaluated the system after each of the six tasks, and once at the end regarding the overall system. The average scores for each of the usability metrics, for each of the task groups are provided in Table 3 and Table 4. Since a noticeable difference was noted in the evaluations of delegates and senators to the system, Table 3a and 3b breaks down the average utility scores between the two legislator types. The full set of questions used in the survey is available in Appendix D. In all cases, the average scores from the questionnaires supported the system having utility, i.e. were higher than 4. A summary of the feedback received related to the usability or lack of usability of the prototype for the particular task follows each of the tables.

4.3.2.1. Legislator Evaluations

	Speed	Performance	Productivity	Effectiveness	Ease	Usefulness
Browse Legislation	5.9	5.6	5.8	5.9	5.6	5.8
Browse Content	6.4	5.8	5.9	6.1	6.1	6.3
Search Content	5.3	5.5	5.5	5.4	6.0	5.5
Assess Content	5.4	5.5	5.3	5.3	5.5	5.4
Questions and Requests	5.9	6.1	6.3	6.3	6.4	6.6
Profile	5.4	5.0	5.0	5.4	5.5	5.3
Overall	5.9	5.9	5.9	6.0	5.9	5.9

Table 3: Average utility scores from legislators (1 = Extremely Unlikely, 7 = Extremely Likely)

	Speed	Performance	Productivity	Effectiveness	Ease	Usefulness
Browse Legislation	6.2	5.8	6.0	6.2	5.8	5.8
Browse Content	6.8	6.2	6.4	6.6	6.6	6.8
Search Content	5.8	5.4	5.4	5.2	6.0	5.2
Assess Content	5.6	5.8	5.4	5.4	5.8	5.6
Questions and Requests	6.4	6.2	6.4	6.4	6.6	7.0
Profile	5.6	5.0	5.0	5.6	5.8	5.4
Overall	6.2	6.2	6.2	6.4	6.2	6.2

Table3a: Average utility scores from Delegates (1 = Extremely Unlikely, 7 = Extremely Likely)

	Speed	Performance	Productivity	Effectiveness	Ease	Usefulness
Browse Legislation	5.3	5.3	5.3	5.3	5.3	5.7
Browse Content	5.7	5.0	5.0	5.3	5.3	5.3
Search Content	4.3	5.7	5.7	5.7	6.0	6.0
Assess Content	5.0	5.0	5.0	5.0	5.0	5.0
Questions and Requests	5.0	6.0	6.0	6.0	6.0	6.0
Profile	5.0	5.0	5.0	5.0	5.0	5.0
Overall	5.3	5.3	5.3	5.3	5.3	5.3

Table3b: Average utility scores from Senators (1 = Extremely Unlikely, 7 = Extremely Likely)

Browse Legislation

Legislators felt the system provided a lot of useful features, well beyond the capabilities and information currently available. The fact that it would be a central, integrated system was also looked upon favorably. Its organization and break down of information into

simple terms would make searching for legislation easier. Some of the aspects commented on as being particularly useful are: searching by keywords, sponsor, committee, hearing schedule, intended votes, and controversy information. In contrast, some expressed that they would not use: how others are intending to vote, searching for sponsors by county, searching by content type, or a bill's filing and introduction dates. The information about legislation was seen as being particularly useful for understanding bills outside their committee and responding to constituents about legislation.

Support for the system's utility however was clarified to be contingent on its information being accurate, reliable, and trustworthy. Legislators would want to be aware of who (legislative staff, a legislator, a lobbyist, etc.) and how each piece of information was added to the system. As such, it was questioned who would be responsible for adding and updating the system's information. Also due to this concern about accuracy, suppositions and non-factual information like controversy or vote counts were seen by some as having questionable utility.

Comparisons were also made to the current electronic bill tracking and bill information webpages provided by the Maryland Legislature. It was noted that several of the demonstrated features can be done with the current legislative system, but information dealing with controversy and positions are new. Also, while the current system has its shortcoming, it is used and people have become comfortable with it, so getting them to adopt a new system will be a challenge. One aspect of the current system that was appreciated is the ability to add personal notes about bills, which would be useful in the

proposed system. Some legislators also explained that they generally rely upon caucus meetings, committee meetings, and staff to keep current with legislation, and technology is a fallback.

Several implementation issues were also raised. It was explained that bills change during the process, and the system would need to be able to handle versioning, and that committee votes for bills are hard to know in advance. Also, an additional bill status question to support answering is whether the bill even received a vote in committee. A common question was, “Who would have access to the system?” The extent that the public would have access compared to legislators, staff, and advocates was seen as having a direct impact on the quality of information and the likelihood for counter-productive behavior. Lastly, it was noted that a real (stress) test of the system would be during the last couple days of session when there is a need for getting information and research quickly under tense times and political pressures.

Browse Content

The primary features that attracted the interest of legislators was the ability to have an electronic, internet accessible bill file, which would allow them to have immediate access to testimony, who took positions on each side, and make it easier to research and look into bills outside their committees. It was explained by some that they could see it as useful during committee hearings or floor session for getting information, talking points, and reviewing available information on a laptop, and save the hassle of carrying around paper binders or folders. In addition, particular items identified as useful were seeing: the

types of information available, and the name and position of people involved. It was requested though that when listing lobbyists by name, to include next to their name the client they are representing in that instance. Overall, it was seen as useful to have a warehouse of quality research on issues, but it would need to have all the documents in the system, not just those favored by the majority party or DLS.

Concern was expressed however that the system would overcomplicate things and that it's possible to do most of what's here elsewhere. It was seen as being easier to ask questions of the committee chairman and others about bills, information of interest, or people involved. Additionally, the information about the number of people asking questions was seen as not useful, and some doubted that they'd enter their intended votes on bills.

Reservation was also expressed by a legislator that this information would encourage following, and not independent thinking/voting by legislators, increasing decisions based on special interests and politics, not what's good for the state.

Comments were also provided regarding implementation. It was advised that the more the system uses pre-populated information, e.g. the searcher's committee, and minimizes the need for manually entering information, the better. Some noted that many bills are not serious and so, do not need to have the same intense preparation of information.

Lastly, some legislators who were not inclined to research legislation suggested that the system would be more useful to their staff than to themselves.

Search Content

This set of features had mixed reviews. On the useful side, legislators thought the electronic personal bill file, as a place to store information of interest to oneself, would be useful. Also, some thought the ability to make use of information about people and their position, and to sort and search content by its type would be useful. Others thought new legislators might find it useful since they probably would not yet know much about the other legislators and lobbyists. In general, the system could be useful for searching and doing research, particularly for staff, so long as the information is accurate.

There were several concerns about the system however. There was reluctance by some to have evaluations of people and concern about the reliability and trustworthiness of the information about providers, reputation, and other subjective information. Many won't provide personal or evaluative information about people on principle or for concern about backlash. And if available, users of the information would want to know how the provided information was determined and who provided it. Similarly, privacy controls were wanted to limit who would have access to the system, to have anonymity levels, and to specify who could see the information provided. It could be dangerous having the system be a public forum.

On the practical level, it was expressed as important to keep in mind that legislators make the decision about who to trust, that cost information about a bill is particularly important, that there are age and style differences in the Legislature regarding the use of technology, and that attention should be given to supporting legislative assistants. And

for some, information about the estimated reading time would not be used, since they at least skim all the documents on bills they care about, but one legislator did find that information helpful. The desire to have the lobbyist client with the lobbyist name and to have support for audio and video files was expressed again.

Overall, some thought having a searchable library like this for doing research was the most useful feature, others indicated that they browse everything and wouldn't use these search features and that the breadth of information provided by the system would be hard to get and might make it harder to find basic information.

Assess Content

Several aspects of this set of features were seen as useful. The system would make it easier to research documents, and the use of summary information would be particularly helpful, especially for those not on the bill's committee. Similarly, the features would make it easier to research and dig deeper, or find items/information heard about offline. The information would be useful, but the set of useful information will vary based on context. Information about the accuracy of provider and document would be desired, if that information can be objectively produced. The ability to highlight and hide information was useful and would be useful elsewhere in the system where there is a lot of information being presented. The ability to see related items was seen as valuable, and the system was perceived as being useful for developing talking points.

Other legislators were not impressed. The system provides a lot of information, but thought it perhaps had too much and might make the process harder or more complicated. It might be useful to staff or librarians, but not legislators who are usually not research oriented people. The system should be simplified, should filter out what's needed and not needed, and should improve the flow for getting this information, e.g. verified or not and can see details if wanted. There's minimal time during the legislative session and legislators get a lot of information, so system should better reflect this reality. Generally have to trust other committees and realize that the further into the analysis, the more subjective the issues and information will become. As presented, it could be useful at times, but not frequently needed.

There was also concern that the system would be too narrow if it only had lobbyist information and that it could go from being a predominantly analytical tool to a predominantly political tool. Some did not like seeing the community ratings and were concerned about inaccuracies in the descriptions of people and providers. Additionally, there were questions about the process of who would enter information, how information would be determined and danger if the system did not have privacy settings incorporated throughout.

Questions and Requests

The ability to have a one-stop shop for asking questions about bills of interest would be very useful. That the questions and answers would be part of a permanent, historical record and that they can see who is asking question, what others are asking, and how they

are being answered were seen as good. It was expected to be helpful in saving time by avoiding redundant, repetitive questions, and could be used to ask questions about bills in other committees, e.g. in preparation for answering questions at district meetings. It could also eliminate the difficulty of trying to determine whom to contact with questions. However, since the tone and manner of how a question is asked or answered can be important, the ability to support audio and video was requested as an improvement. Lastly, it was noted that the question and answer format better reflects the current style/thinking of legislators than the information lists used in earlier sessions. Several caveats were raised however. The system could be useful, but people may still rely on asking particular people off the record and at the committee hearings. And most of the time, lobbyists come to the legislator; it's not the legislator going to the lobbyist. It would be important for legislative aids to have access to the system, since they would do a lot of the work. Also, legislators would want to have different types of anonymity/privacy when posting questions, e.g. hiding their name or limiting who can see the question.

Profile

Profiles were seen as helpful since it centralized and made more accessible, extensive information about legislators and lobbyists. The information presented would be helpful in better understanding fellow legislators and lobbyists, and is easier to use than the current information system that only has information about legislators. For some, information about lobbyists was of particular value, while information about legislators was generally known through relationships and interactions, or the legislator's biography

page. For others, the legislator information was seen as most beneficial as it would help with their shortcomings in knowing their fellow legislators and could help them be more influential with them.

Some legislators also identified drawbacks and concerns. The system provides much more information about people than what is currently available, but current legislator profile system would have most of what would be wanted from this expanded set and some dislike having subjective, reputation information so public and visible. There was appreciation for increased transparency, but there was concern/sensitivity about some of the information, such as warnings, information about family, and possible misuse of information in identify theft, and who would add that information. Privacy controls were requested. Particular concern was expressed about the subjective and evaluation information. Some had a dislike for information about reputation and personal evaluations, which could open the door to intentional and malicious inaccuracies and back and forth claims. Also, scheduling meetings were perceived as something best done through email, not through a system like this. Two improvements requested were for profiles of the lobbyist's organization / special interest and linking profiles to mentions of people earlier in the system.

Overall

Overall, legislators thought the system was very comprehensive, and having all that information in one place would be beneficial. The system would be useful in cutting through large amounts of information when doing research, and would be helpful when

preparing for meetings in district about bills not in their committee. Particular features seen as useful were: the electronic, organized/catalogued bill file, profiles of legislators and lobbyists, ability to verify/assess information, using pre-populated personal information, and the personal, private electronic bill file.

There were also several criticisms. For some, they could only see using a fraction of the features and information presented. Much of the information they wanted was available in other formats or through people they trusted, which were easier and more direct to use. One legislator who was not inclined to computer systems said he probably wouldn't use it, that there's too much information and depth, and "real" information would be outside the system. Other legislators noted that the system seemed very complex, had reliability and privacy concerns, would require staff and processes for keeping up to date, and might disclose personal, private information. These evaluators preferred and appreciated quick access to objective information, but advised avoiding subjective and personal information. Indeed, there was dislike by some for the rating, reputation, and relationship aspects, since they move into a grey area that is difficult to validate, and without validity, that information is best avoided. The assessment of the system in practice would also be impacted by whether it would be for use by the general public or professional lobbyists. Lastly, concern about how the system would impact the decision-making and political dynamics was conveyed.

Some improvements were also suggested. Improvements to the system would entail having a tutorial, getting input about the system from legislative aides and DLS staff,

visually pre-separating content based on its verification status and level of controversy, increasing the attention given to budget and cost information, and supporting inclusion of committee meeting webcasts and audio.

4.3.2.2. Lobbyist Evaluations

	Speed	Performance	Productivity	Effectiveness	Ease	Usefulness
Browse Legislation	5.8	5.8	5.6	5.6	5.9	6.1
Browse Content	5.8	5.9	6.1	6.0	5.9	6.4
Submit Content	5.6	5.3	5.9	5.5	5.6	5.8
Submit Reaction Content	5.3	4.9	4.8	4.9	5.1	5.0
Tracking Profile	5.3	5.5	5.6	5.6	6.0	5.4
Overall	6.6	6.3	6.3	6.3	6.6	6.4
	6.0	5.8	5.8	5.8	6.0	6.1

Table 4: Average utility scores from lobbyists (1 = Extremely Unlikely, 7 = Extremely Likely)

Browse Legislation

The set of information presented related to identifying legislation about which to submit knowledge was overall seen as useful. Lobbyists took particular note of the breadth of information available, commenting that the system provides a useful suite of information that has all the information expected to be there, and has greater breadth and depth than existing information sources available. Some of the information available is hard to get in practice, such as the lobbyist on a bill prior to the committee hearing or the intended votes of people involved. Indeed, having the information in the computer would less the burden of having to rely on memory or to look up information in inefficient ways. This said, to be valuable, the system would need to be kept up to date, reflecting the changing

realities that occur throughout the legislative process. Further, the system would need to establish trustworthiness over time, and should provide more information about the source of meta-data presented.

The system was also valued for its features. It was pointed out that identifying relevant legislation can be a thorough, manual process, but this would be a more sophisticated system that would help with that process by reducing the need for people or people-hours to review legislation, and could help lobbyist be more effective at strategizing and keeping track of proposed bills as they come up or change. Other particular features of the system were noted as useful, namely: seeing intended votes of legislators and lobbyists, seeing a list of the people and groups on each of the sides, using legislative process information like committee assignment, hearing schedule, and legislative sponsors, having historical information about the bill, identifying bills by the lobbyist's subjects of interest, and overall the ability to more effectively search legislation than what MLIS provides. However, the usefulness of particular features will depend on the situation and the breadth of bills that are liable to intersect with a lobbyist's interests. For lobbyists with a narrow, particular focus, the system will not have much value, and features will have more importance early in the legislative session than later in the session.

Browse Content

The module of the system intended for browsing content provided about a bill, was valued for its centralization. It was commented that the ability afforded by the system to

have a centralized place for all this information, to see if someone submitted/snuck something in after a hearing, to track legislation, and to skim the electronic bill file would be particularly useful. When browsing available content, the following pieces of information were noted as particularly useful: who is for and against, the list of content types, who asked questions about the bill, and intended votes of people involved with the bill. Indeed, lobbyist currently had to know most of the information provided in the system, but the overall information provided in the system is more comprehensive and detailed than any system currently available.

Caveats to the usefulness of the system were also provided. The ability of the system to list the distribution of content types across each position was noted as something new, and while one particularly liked that feature, others doubted its value. Additionally, it was pointed out that the official committee hearing and bill file is the record that matters, and that as extensive as information in the system is, some things are behind-the-scenes, off-the-record, so it should be understood that the system is not the complete set of information. Similarly, it would be an improvement if the source of the meta-data was presented along with the data.

Submit Content

Among the features presented regarding the providing of knowledge about legislation, some were noted as particularly valuable, namely: providing documents electronically, providing information as parts, not just as whole documents, targeting submissions to particular people, and answering questions and requests. On the last feature, it was noted

that seeing how many asked questions or who made requests would be helpful in seeing who is interested in the bill.

Comments were also made on the cultural impact of the system. The ability to submit documents and information over time instead of just at hearing, or chasing after legislators, and the potential to get all of this information and shed light on “shenanigans” would have interesting, unforeseeable impacts on the dynamics of the legislative process and public access.

Criticism of the system was also provided. It was noted that the system is more complicated than the simple, current process of just emailing people, delivering paper and/or indicating support or opposition, but may help and save time in more complex submissions involving groups or committees. Similarly, due to time allocation issues, adding details about submissions would depend on the lobbyist or one of their staff people having the extra time to do it. A caveat was also given regarding the ability of the system to aggregate content parts, e.g. all policy recommendations. It was explained that context is important, and so when showing the aggregated part, it would be useful to show the content part in / along with its parent document. And again, the usefulness of the system would be connected to the extent that legislators and other lobbyists use it and the extent that is up-to-date.

Feedback was also given on the improvements. Additions to the existing features set were proposed, such as: the ability to add information to the system that would be private, but

optionally shareable with allies, the ability to target DLS staff and other lobbyists, to have the position options of support with friendly amendment and support with significant amendment positions, and have clarity about what information is subjective and objective, what is partisan or from a neutral party, and how the information was added to the system.

Submit Reaction Content

The set of features for reacting to content in the system had mixed evaluations. It was held by some that the ability to have open dialogue about content, such as adding labels or discussing questions and comments, could be positive, but could also lead to a negation of all sides and an ongoing back-and-forth without cutoff. There is also concern about knowing and controlling who can see the back-and-forth. For example, the ability to provide proposed amendments would be useful, but the option to limit whom is able to see the proposed amendment would also be wanted. Lastly, practical considerations were expressed. It was considered unlikely that tagging problems and/or providing suggested replacement text would result in the provider making a change to their submission, and unlikely that they'd use some features due to the time it would take to review and react to documents, but that information would be helpful if someone else, like DLS staff, provided it. Similarly, it would be hard to get consensus on objective tags, and tagging something publicly as wrong or problematic might be avoided, so as to not create negative personal relationships or animosity, though the ability to privately message people might mitigate that concern.

Tracking

The ability to track content after submission would be a new ability that would be useful, or at the least, satisfy a curiosity, presuming the information is accurate and trusted, e.g. accuracy of indication of whether reader understood the document. It was noted that the ability to see the number of views and who viewed would be helpful, particularly for seeing which legislators seem to care about the topic. At the same time, the ability to browse privately, and not have a record of what one is viewing would be desired. As for improvements, it was suggested that there be positive labels in addition to the negative ones, and that the rating data be divided between those from legislators and those from lobbyists. The only concern expressed was that DLS and providers of content might be concerned about public scrutiny of their documents.

Profile

Profiles were considered by some the most useful part of the system, providing a centralized, up-to-date, comprehensive place to get information about legislators and fellow lobbyists. All of the information in the profiles was considered useful, but particular mention was given to the information about: affiliations, how they'd like to receive information, their careers outside the Legislature, legislator vote records, lobbyist subject areas, and ethics commission filings. The ability to schedule meetings through the system was also mentioned as particularly useful.

Improvements and additional features were requested, such as being able to add private notes about people, identifying the source for all the pieces of information, having

profiles of special interest groups in addition to individual lobbyists, and 3rd party moderation of the adding and removing of information. Also, while all information could potentially be useful, the interface should reflect that some information is more useful and frequently relevant than others.

Several concerns were also raised. It was suggested to leave out the color-coded warning scale about people. Having all that information public has the potential for nastiness, and some may not register if not required by law in order to avoid having a profile about them. Not all that information should be public. Similarly, there was concern about how the system would stay current.

Overall

Overall, the system was seen as interesting and would be useful, but depended on the needs, roles, and context of a situation. The features presented made sense, and having a central place with relevant information that can be quickly accessed would be helpful. Particular beneficial mention was given to the ability to submit content electronically, to see the positions of legislators, to have accurate, in-depth profiles of people, and to be able to easily access historical information. It was further noted that the system replicates and expands upon what is currently available from the information systems in the Legislature, and would be very useful if people bought into the system. Indeed, while the system would be an additional and analogous process to what is done now by phone, email, person, or letters, it had potential to fix/improve communication by adding structure and information focus to the currently informal process.

All participants evaluated the system as useful, but there were several suggestions and concerns raised. Questions and concerns were raised regarding: who and how the system would be overseen and administered, how all the information would be entered into the system, the time that would be needed to enter and update information, overcomplicating a fairly simple, human process, increasing information overload, and general issues related to adoption in the Legislature. Suggestions were made regarding: improving the interface, adding support for coalitions and generating reports, displaying the date when the information was entered, and having different versions of the systems, such as for mobile phones, for the Legislature as a whole, DLS, and for individual legislator and lobbyist offices.

4.4. Application of the Design Science Guidelines

This dissertation has been guided by the seven guidelines of Design Science research, and this section adds details based on the aforementioned results to the brief summary of Section 3.5.

The first guideline, Design as an Artifact, stipulates that design-science research must produce a viable artifact in the form of a construct, a model, a method, or an instantiation. These results have detailed three such artifacts. The conceptual model is a variable artifact in the form of a model. It provides insights for research and developers on the foundations of controversial knowledge, information desired about actors and content, and design considerations ranging from challenges to feature requests. It has been shown to be viable through its usage in this dissertation to develop a formal model and a

prototype KMS. The formal model is the second viable artifact in the form of a model. It is an ontology that reflects the insights of the conceptual model and has been shown to be a viable model for supporting the information and functional needs of a prototype KMS. The third viable artifact produced took the form of an instantiation and was the prototype KMS. The prototype KMS was an instantiation of the conceptual model guidelines and formal model knowledge representation and was shown to be viable in its usage to test the utility of a system based upon the conceptual model and formal model.

The second guideline, problem relevance, stipulates that the objective of design-science research is to develop technology-based solutions to important and relevant business problems. The important, relevant problem addressed in this dissertation is the submission and retrieval of controversial knowledge. Controversial knowledge is found in many domains, including business, such as the knowledge competing to influence the decision of a CEO and Board regarding where to locate a new factory. Existing systems and approaches to controversial knowledge however have been weak and limited. This dissertation develops and presents a technology-based solution in the form of a prototype knowledge management system, as well as a conceptual model and formal model, which can be used by others to develop other solutions, to support and improve the submission and retrieval of controversial knowledge.

The third guideline, design evaluation, stipulates that the utility, quality, and efficacy of a design artifact must be rigorously demonstrated via well-executed evaluation methods. In this dissertation, each artifact was thoroughly evaluated. 4 Legislators and 4 lobbyists

who had domain knowledge and experience to provide meaningful agreement, disagreement, and modifications to the conceptual model evaluated its accuracy through reading the conceptual model and discussing their sense of its accuracy. The ontology was evaluated for quality and efficacy through being populated with the information needed by the KMS, through being shown capable of executing the queries needed by the KMS, and through a review by two ontology engineering experts. The prototype was evaluated for utility based upon videos demonstrating the capabilities of the system by 8 legislators and 8 lobbyists through qualitative interview discussions and utility questionnaires.

The fourth guideline, research contributions, stipulates that effective design-science research must provide clear and verifiable contributions in the areas of the design artifact, design foundations, and/or design methodologies. The results of this dissertation make contributions to several areas, such as Knowledge Management, Issues Based Information Systems, and Ontologies. Contributions are made to Knowledge Management through the results establishing a new type of knowledge and artifacts for producing new knowledge management systems. Issue Based Information Systems would benefit from the insights it provides regarding information about actors, processes, and content that it could include in its knowledge maps and systems. The domain of ontologies is advanced through the creation of a robust ontology for representing controversial knowledge that can be used to store, organize, and reason over controversial knowledge and be expanded or modified to the needs of other systems or domains.

The fifth guideline, research rigor, stipulates that design-science research relies upon the application of rigorous methods in both the construction and evaluation of the design artifact. This dissertation applied the mature methods of case studies, document analysis, interviews, questionnaires, and grounded theory analysis. The case study approach was utilized to study the Maryland Legislature and develop a conceptual model, formal model, and prototype KMS to support the submission and retrieval of controversial knowledge in that domain. Document analysis was used to review the explicit knowledge available in the Legislature for insights relevant to the conceptual model. Interviews were conducted for gain insights and evaluations from legislator and lobbyists for the conceptual model, as well as to evaluate the prototype KMS. Questionnaires were used to evaluate the prototype KMS. Lastly, a grounded theory approach was used to integrate the document analysis and interview data to form the conceptual model.

The sixth guideline, design as a search process, stipulates that the search for an effective artifact requires utilizing available means to reach desired ends while satisfying laws in the problem environment. Each of the three artifacts produced in this dissertation was the result of an iterative process of generating and testing. Many iterations were conducted entailing re-categorizations of data and rewriting of statements when synthesizing the insights from the document analysis and interviews to form the conceptual model. Each generation was tested to see that its categories and statements were distinct from each other, were relevant, and were representing the spectrum of insights collected. Iterations were conducted when developing the ontology as elements from the conceptual model were mapped onto ontology elements, as attempts were made to add data to the system

and execute needed queries, and as feedback was received from ontology engineering experts. The testing checked that conceptual model elements were expressible in the ontology, that the desired data could be stored, and that the desired query could produce the intended results. The development of the prototype KMS made use of iteration when designing its user interfaces and the script of what to demonstrate and how to explain it during the evaluation videos. Iterations were tested to assess whether the interface expressed the information or capability clearly, whether the demonstrated task would be understandable and exemplary, and whether the script was comprehensible and succinct.

The seventh guideline, communication of research, stipulates that design-science research must be presented effectively both to technology-oriented as well as management-oriented audiences. This dissertation will reflect this guideline through its intended publications. The results of this study are planned to be communicated through venues in fields dealing with Knowledge Management, ontologies, e-Government and e-Democracy, computer supported dispute resolution, and other intersecting disciplines.

5. Chapter 5: Discussion

5.1. Discussion of Artifacts

This dissertation has produced three artifacts: a conceptual model of information needs and design parameters for a KMS that supports the submission and retrieval of CK, a formal representation as an ontology of the conceptual model, and a prototype KMS based upon the conceptual model and ontology. Each of these artifacts has a unique value, significance, and applications.

The conceptual model provides insights and details that can establish the reality of controversial knowledge and guide development of systems to support its submission and retrieval.

The findings of this study establish controversial knowledge as a real and important type of knowledge. The existing literature on knowledge taxonomies (Alavi and Leidner 2001) mentions types of knowledge from tacit, to explicit, to social, to causal, to conditional, and others, but not controversial. This research found that knowledge exists that competes with other knowledge, that the description and challenges outlined in the introduction are accurate, and that there is empirical support for an updating of the knowledge taxonomy.

The articulation of information and design components to support the submission and retrieval of CK in the Legislature significantly expands upon existing data structure and designs for organizing CK. For example, the prominent Issue Based Information System

(IBIS) taxonomy and conceptualization for organizing knowledge on complex issues (Kunz and Rittel 1970; Conklin 2006; Institute 2007), dating back to 1970 and largely unchanged in modern systems, provides high level concepts, such as issue, question, pro, con, note, reference, etc. as the basis for classifying and relating nodes and links on complex subjects through a knowledge map. These however do not address information about actors, relevant processes, or sub-types and attributes of content. The results provided in the conceptual model can enable improvements in the IBIS taxonomy, and the set of IBIS software tools, with better support for representing actors, processes, and content relevant to controversial knowledge. These results can also augment groupware systems, e.g. improved profile information in discussion forums, a more robust set of tags and meta-data for content management systems, or updated design guides for computer supported collaborative work systems to handle computer supported competitive work.

The conceptual model is also significant due to the potential application of its methodology and findings in other important domains. The methodology articulated in this study has been shown to be effective at identifying domain-specific information needs and design considerations for submitting and retrieving controversial knowledge. It is believed that this methodology and its results could also be applied in significant domains like:

- Military Intelligence Analysis - to understand and improve providing controversial knowledge around raw intelligence that policy and decision makers can retrieve, e.g. knowledge based input on how to understand and react to an intercepted phone recording or satellite image

- Business - to understand and improve the processes for handling controversial matters at the group, management, and executive levels, e.g. systems for a CEO to retrieve controversial knowledge from executives regarding proposed cost-saving measures.
- Law - to understand and improve the organization of documents and knowledge provided by the prosecution, defense, and interested 3rd parties on particular court cases, e.g. improving the organization of legal law libraries.
- Finance - to understand and improve providing controversial knowledge regarding profitability and risk of investments, e.g. controversial knowledge from analysts regarding the profit potential of a company's stock.

The ontology formal representation of the conceptual model provides a shared, expandable foundation for controversial knowledge research, controversial knowledge management systems, and semantic reasoning systems for controversial knowledge. The ontology presented in this dissertation is both a first iteration and domain specific. The nature of an ontology however makes it amenable to use, extension, and improvement by others and for other domains. For example, an open-source community might take the ontology, improve the wording of the terminology, provide documentation, create an abstract upper ontology, generate a new domain ontology for their particular fields, or add additional reasoning support through restrictions, domains, ranges, and other ontology modeling structures that support reasoning over the ontology. The ontology as it is however can currently be plugged into existing systems and be utilized to provide a replacement or auxiliary data structure for storing knowledge. A content management system for example can keep its existing structure of meta-data, but use the ontology to

provide additional meta-data that might be relevant to the content it stores and publishes. As alluded to earlier, an ontology is well suited to semantic reasoning, and this ontology can be utilized to develop and improve agents that can aid human users by reasoning over the data, such as systems that recommend controversial knowledge that would be of interest to them, automated processing of documents in a system or across the entire internet that can auto-tag / fill in the relevant ontology parts found in the document, or computer generated ratings of people in the system.

The prototype KMS based on the conceptual model and ontology offers an example of how the two artifacts might be used that developers and researchers can improve and tailor to their particular domains. The prototype presented is a comprehensive knowledge management system for supporting the submission and retrieval of controversial knowledge in the legislature. Its style and approach have yet to be seen in other knowledge management system or systems for handling controversial knowledge. As such, it presents new ideas that can be considered, incorporated, and/or improved by those involved with supporting systems for submitting and retrieving controversial knowledge in a domain. For example, someone involved with the building of a system for a law court can review the prototype and, without reading the conceptual model or reviewing the ontology, gain insights into possible information to include, features to support, and interface mechanisms to use.

In addition to these three artifacts, the results regarding the utility of the prototype are of great importance. There is a big difference between being accurate and being useful.

The conceptual model and ontology were based on real-world insights and validated by real-world people, so they were believed to reflect true information; however, it is not clear if or how this information would actually be useful. The prototype and its utility measures helped answer how useful it would be.

Quantitatively, both legislators and lobbyists gave positive marks to the system on each of the usefulness factors. Qualitatively, insights were gained to give more meaning to those scores and advise where improvements are needed. Lobbyists were particularly interested in the features related to identifying and understanding relevant legislation, having an electronic bill file, and being able to get detailed information about legislators and lobbyists. Legislators differed on whether they were senators or delegates, but most appreciated features related to understanding legislation, the electronic bill file, and having a clearinghouse for asking questions and getting answers. Both legislators and lobbyists generally had the same concerns. There were issues of the accuracy and reliability of the information, data provenance issues such as being aware of who entered information and how it was determined, the logistics of how the system would be implemented and who would have access, the interface of the system, and getting the critical mass of usage in order for it to be valuable. Both also came to similar conclusions about improvements. Most notably, legislators and lobbyists wanted clear privacy controls, the ability to have simple presentations of information with frequently needed information and features present and the option for more robust presentations as needed, the inclusion of who, what, when, and how information in tooltip labels for each

bit of information, support for multimedia, and getting the input and support of legislative aides and legislative staff.

Overall, the prototype demonstrated that the conceptual model and ontology could be utilized to create a functioning knowledge management system for the submission and retrieval of controversial knowledge in the Maryland Legislature. Moreover, the findings of the perceived usefulness questionnaire and discussion of the system's utility showed that the system would indeed be useful along several factor, and insights were gained into what in particular would be useful, not useful, of concern, and should be improved. As such, this dissertation is able to claim that not only is controversial knowledge a real entity, but that a KMS for supporting its submission and retrieval can provide utility and is worth research and development attention.

5.2. Discussion of Questions and Insights

Several insights and questions emerged over the course of this dissertation research that are worth discussing. These dealt with the aspects of controversial knowledge, the Maryland Legislature, the methodology, and adoption issues.

5.2.1. Controversial Knowledge

Amongst the questions asked about controversial knowledge is the extent that controversial knowledge can move from being controversial to non-controversial.

History is replete with examples of knowledge that at one time was rejected or considered alternative, but later became the accepted knowledge of the society. Examples of knowledge that have made this shift towards acceptance range from knowledge regarding

the Copernican astronomical model, to the germ theory of disease, to the subjective theory of value. The outlook developed from this dissertation is that whether something is controversial is not a binary state, but a spectrum. On one end of the spectrum, knowledge is very controversial, that is to say, it is generally considered wrong, and on the other end, knowledge is very non-controversial, that is to say, it is generally considered to be true. Where some knowledge lies in this spectrum is dynamic, based on its current status in competing with other knowledge and its acceptance in the society of which it is a part. As knowledge gains acceptance others wane in their acceptance, and what may gain acceptance in one community may continue to be rejected in others. This being said, instances of controversial knowledge will always be controversial knowledge due to its intentions and its competitive context. A position paper from a lobbyist, even if every statement is generally agreed upon in the society, is still in competition with other knowledge to influence a decision maker. So yes, controversial knowledge can become the generally accepted knowledge in a society and not be thought of in a society as controversial, but the reality still remains that it is controversial, that it has just moved further towards the end of the spectrum of acceptance, and that at another time, it could fall back to being considered controversial.

Another area of discussion is how this research would address irreconcilable, controversial knowledge when trying to make a decision. While some topics have competing knowledge that can be easily merged together, for many topics, there is knowledge that is so fundamental and so much in competition with its countering knowledge, that no compromise seems possible. Knowledge regarding the permissibility

of abortion, regarding the proper role of government, or regarding social values are some examples where the knowledge and the communities accepting it seem inherently irresolvable. Where one gains, the other loses. An insight on this challenge emerged from the domain of the Legislature, where many competing beliefs and knowledge converge. The Legislature is not just about power, but having a mechanism for making decisions where neither side must agree with the other, but they must accept the outcome of the procedure. The politics of democracy and representative government allow “conservative” citizens to maintain and compete for their knowledge, even if “liberal” policies are enacted, and vice versa. Controversial knowledge does not exist in a vacuum, and the political dynamics of the knowledge can be as important as the knowledge itself. This dissertation does not claim to be able to remove controversy, but rather, it recognizes that it is there and tries make it more organized.

But sometimes competing knowledge seems to be a matter of one being true and honest, and the other being malicious or having misinformation, and so there is a question regarding how such a situation would be addressed. For example, a scientific study may rigorously aim to be grounded in evidence, reason, and muted claims, while a popular or political presentation of that study may misrepresent or exaggerate its findings and claims. This is handled in the system through integration and meta-data. Someone viewing a political document that goes beyond the claims of the research would be able to see related documents, such as the original study, as well as meta-data regarding controversy surrounding the misrepresentation of the study. The key is that while this critical information may be available offline and through other mediums, the system

proposed in this dissertation creates a centralized infrastructure for providing and seeing it, in contrast to the informal, disjoint process of the status quo.

Also asked is whether this organization of controversial knowledge will not just be rearranging chairs on the titanic. Decision makers can often be overwhelmed with knowledge, and so an electronic system may make that knowledge more organized, but would still be presenting more knowledge than a decision maker could reasonably be expected to read and understand. An insight gained from this dissertation regarding controversial knowledge is that there will often be more information than an individual or group can process, but by providing rich semantic information about it, a knowledge management system can greatly augment human processing capabilities. Semantic reasoning agents can process the knowledge stored in the ontology to make suggestions, highlight or demote content, identify areas of agreement and consensus, or identify what the divergent views are. The output of this reasoning can presumably help people make decisions and cut through the clutter and magnitude of knowledge on controversial subjects. Again, the aim is not to remove controversy, but to recognize it and better handle it.

Indeed, a key insight of this dissertation is that most of the knowledge that knowledge management systems deal with is treated as non-controversial, even if it is controversial. When someone is retiring, a video recording of an interview with that person discussing knowledge of how to do that job is liable to be stored, shared, and applied with little thought to the controversy surrounding that person's knowledge. Yes, that may be what

was done for thirty years, but it may have worked poorly and the people working for that person may have competing knowledge about how the job should be done. A lot of the knowledge in the real-world is not objective or non-controversial, but subjective, controversial, and in competition with other knowledge. Knowledge management systems should better reflect this reality.

5.2.2. Maryland Legislature

As indicated in the results, the utility scores given to the prototype were noticeably different between delegates and senators. Why this difference occurred was not fully examined, but initial thoughts have emerged, centered around the role and staff of the two legislative types. Delegates usually have one assistant, who is either half or full time, and so they are often doing a lot of legislative work themselves. They also represent relatively smaller districts and are part of a larger legislative body that is tasked with dealing with the details of legislation. In contrast, senators have 1.5 full time employees, represent larger district, and are part of a smaller legislative body that is tasked with seeing the larger picture. These differences lead to different perspective and approaches to controversial knowledge. Delegates would want a system that can make them more efficient given their limited staff, help them perform necessary research, and be responsive to their constituents. Senators have these same desires, but to a lesser extent due to their staff size and expected role in the Legislature. As such, while senators still found utility in the system, delegates saw a greater perceived likelihood of utility in their roles.

Also worthy of discussion are two concerns that did not emerge from the evaluation. The first was concern about the loss of power. One might think that the system would be seen as weakening the power that an influential legislator or lobbyist would have by making more knowledge and knowledge providers available. Upon reflection, two reasons emerge for why this concern was not raised. The first reason is that the system was presented as not open to the public, but intended for registered lobbyist and legislators. As such, if one had access now, one would still have access and would not be diminished by an increase in competitors. In contrast, if the system were presented as open to the public, it is expected that the concern about loss of power would be prominent. The second reason is that a lobbyist's power comes from who they represent and their quality as an information source, neither of which would be changed by this system. A lobbyist representing an organization with thousands of members will still be representing that organization, and someone known for providing good information will be highlighted, not ignored. Indeed, some lobbyist saw the system as expanding their power and influence since they would be able to provide more of their knowledge, target that knowledge, and gain credit, as it were, in the system by getting positive feedback and would be elevated above competitors who provided less quality knowledge. If the system made everyone equal, concern about it lessening their power and influence would likely have been seen, but that was not the approach suggested or taken in this dissertation.

Another concern that did not emerge was that the knowledge provided would now be seen as controversial, even if it is factual, objective, or true. What was found is that legislators and lobbyists are well aware, and are expected to be, self-interested parties.

They are paid to represent their clients or elected to represent their districts. Further, for lobbyists, the knowledge they provide is connected with their client, not themselves, since they may end up arguing the opposite position during another session. Since no one currently had the impression or expectation of absolute truth tellers, the paradigm of seeing knowledge as controversial was not a shift in thinking, but rather, closer in line to how they currently view the knowledge they submit and retrieve.

5.2.3. *Methodology*

Several aspects of the methodology are worth further discussion. First is the extent that formal and informal processes were captured. The Maryland Legislature is a domain where deliberation is institutionalized and discussion has a formal process. At the same time, there is the informal level, which is how the submission and retrieval of controversial knowledge are actually done. Each of these were captured in their own way. The formal process was observed during the acclimation phase, e.g. observing committee hearings, reviewing the formal guidelines published by the Department of Legislative Services, e.g. how a bill becomes a law, and analysis of documents for what is being formally and explicitly done and provided. The informal processes were understood through the interviews conducted with legislator and lobbyists. During these interviews, the tone used and questions asked aimed to convey the situation that superficial answers were not sought, but their experiences and insights about what actually happens off the record was desired. Intention was also placed on making them feel comfortable to share their reality without being criticized or judged, or concerned that it will come back to hurt them. In these ways, the conceptual model was able to have

information about both the formal, structured processes of submission and retrieval, and the informal and unstructured processes.

Second is how the different responses of legislators and lobbyists were handled. The answer is that credence was not given to any one interview subject, but an integration of the multiple perspectives was conducted based on a larger view. In some cases, the minority view was rejected, whereas in others, it was understood to be a meaningful insight that the others had not seen. This can best be seen during the validation of the conceptual model. The goal of the validation interviews was to conduct a member check of the conceptual model across a diverse set of legislators and lobbyists. While the majority may have indicated agreement with a particular statement, one subject would mark modify or disagree on that statement. That person's feedback would then be evaluated for whether it was a misunderstanding, a matter of merely clarifying the text, or a serious disagreement. In most cases, the first two cases applied, however, in some, the disagreement was recognized as an insight that others had not provided, e.g. concerns about the impact of the system of lobbyist professionalism. This dissertation did not parrot what interview subjects provided, but processed and integrated them through the filter of the overall insights and knowledge collected.

Along this line, a key leap of faith of this methodology was in my ability to understand what people were saying and in my ability to translate that effectively into the conceptual model and qualitative evaluation assessments. While saying seemingly the same thing, people would say them differently, and in those differences provided nuances and

insights to be understood. As such, every statement, word, and recording was thoughtfully considered to try to sense the meaning and insight it conveyed, so that, for example, when aggregating a paragraph of responses into a sentence, the result was honest to what it was saying. It should also be noted that the formative and summative validity that was demonstrated provided confidence and logic for that faith.

Lastly, two design choices are important to discuss. First is the choice to not run a statistical evaluation study. The surveys were used in this dissertation to provide quantitative measure to inform and augment the qualitative insights from the semi-structured interviews. Due to the novelty of the system, it was considered more important to have in-depth discussions of utility, but requiring a quantitative measure on that feedback. This being said, the evaluations are amendable to creating a statistical evaluation study. This could be done by making the evaluation slideshow and videos into a website, and the survey and interview questions into a web-based survey. This could then be emailed to a large number of legislators and lobbyists across the country, providing the sample sizes and demographic distributions needed for a meaningful statistical analysis of the system's usefulness.

The second choice was to make a desktop application, as opposed to a web-based application. The answer here is that the desktop application provided the interface features and system controls that would be more difficult to implement in a web-based system. Moreover, due to time and learning constraints, the researcher's existing skill with developing Java desktop applications was a deciding factor. However, there is

recognized value to having web-based application, and could be built by a web developer using the ontology and the Java code as a foundation.

5.2.4. Adoption

Since utility was found for the prototype system, it is important to discuss questions and issues of adoption. One question is who would own such a system, to maintain it and be its gatekeeper. The answer to this question will differ based on the domain but in the Legislature, it currently seems to make sense that it would be the Department of Legislative Services (DLS). DLS is trusted as a non-partisan, supporting institution in the Legislature. They are trusted to understand the needs of Legislators and are currently trusted to own the information systems used in the Legislature. In terms of the overhead of who would do the data entry and monitoring work, there are several approaches, but a mix of institutional staff and crowdsourcing seems appropriate. DLS currently employs people to enter information into their information systems. To the extent that this system would replace and improve those system, it seems sensible for those staff members to have responsibility to perform data entry tasks in the system. In addition, some information is not known or knowable by DLS and needs to be left to the community. Similar to how Wikipedia has been populated, those in the community with knowledge and/or interest in populating the system will do so, but rules and staff must be in place to monitor and edit that information. A key thing to remember is that a lot of the information needed by the system is currently known or produced, it is just not organized or shared yet in a central system. If a system is created where there is value to having the information and an efficient mechanism for adding it is available, it is expected that DLS

staff and the community will be able to populate the ontology with the necessary information.

Another concern is that by making invisible, behind-the-scenes processes more visible, the system will either break down or not be used. This is expected to be true, and is why the need for privacy controls described in the conceptual model and evaluations are important. While the Legislature is a somewhat distinct domain due to its having public transparency laws, this does not mean that there is no room for privacy and confidentiality in an eventual real-world implementation of this system. It should also be noted that concern had been raised about the impact that bill tracking, public vote records, legislator emails, and other new information systems would have on the Legislature, but these are now used as valuable systems and taken for granted. It is expected that in an implementation, there will be an initial mix of excitement, curiosity, and concern, but in the end, it will be seen as just another institutional system that some like and use, and other dislike and avoid.

And along those lines, questions arise of what the short and long term benefits would be to counteract the initial costs and effort of getting the system running. The answer is that the benefits would depend on the person, but due to the robustness of the system, it is expected to benefit most people in some meaningful way. One of the findings from the evaluation of the prototype was that even features that were considered to have little value by some, were seen as a key feature by others. A legislator who thought they'd never use the lobbyist profiles expressed great appreciation for the features related to

asking questions and requesting content. If the system is implemented as a comprehensive system as suggested by the conceptual model, then it is expected that the disparate and distinct needs of the people in the Legislature will be satisfied, in both the short term, and in the long term.

Another issue that arises from long term adoption of the system is scaling and archiving. Each session has thousands of bills, each bill has many documents, and so over several years, the ontology could become quite large. This is addressed by comparing it to the alternative. The Legislature must currently archive all of the paper documents, for which it has dedicated staff and large warehouses. In comparison, the amount of information that can be stored in a box of hard drives is orders of magnitude more than the amount of paper that box can store. As such, concerns about the space needed to store and archive the large amount of data that would accumulate is not expected to be too problematic.

What is seen as a problem and potential area for research however is how to visualize the extensive amount of knowledge that will be available through this system. The standard list of pros and cons will still have a role, but so will natural language summaries of analysis, social maps to show relationships, charts and graphs for statistics, and to-be-determined visualization mechanisms for handling subjective information.

A final adoption note worth discussing is the importance of lobbyists in the legislative process. There is a temptation for e-Democracy and Legislative systems to focus on constituents and legislators. However, a finding from this study is that constituents often

depend on lobbyists to effectively represent their view and legislators often rely on lobbyists to provide them needed information. As such, an insight gained from this dissertation is that if a Legislature wishes to support legislators and citizens, it must also support professional lobbyists. It is hoped that this dissertation will have demonstrated how this support might be provided, what this support might look like, and that this support would have utility for both lobbyists and legislators.

6. Chapter 6: Conclusion and Future Work

6.1. Summary

Knowledge that competes with other knowledge to influence decision makers exists in many vital domains, but is not well supported by current information systems. There is limited meta-data about the actors, processes, and content relevant to making sense of controversial knowledge, and the feature sets of systems do not fully reflect the needs of controversial knowledge. This dissertation seeks, as a first step towards addressing this problem, improving support for the submission and retrieval of controversial knowledge in the deliberative, decision-making context of the Maryland Legislature by addressing three research questions. The first question asked: what is a conceptual model of the information needs and design parameters for a KMS to provide this support? This question has been answered through a conceptual model discussed in sections 3.2 and 4.1. The second question asked: what is a formal representation of the conceptual model for such a KMS? This question has been answered through an ontology discussed in sections 3.3 and 4.2. The third question asked: what utility does a prototype KMS based upon the conceptual model and formal representation provide for submitting and retrieving controversial knowledge in a deliberative, decision-making context? This question was answered through evaluation of video demonstrations of a system based upon the conceptual model, which showed that a prototype could be developed and did provide utility, and is discussed in sections 3.4 and 4.3.

6.2. Contributions

These artifacts make a significant step in answering the question of how to design a knowledge management system (KMS) that would improve the submission and retrieval

of controversial knowledge in a deliberative, decision-making context. The conceptual model validates the reality and nature of controversial knowledge and provides insights into the information needs and design considerations that researchers and developers can utilize in their own cases. The ontology provides a detailed knowledge representation that developers can utilize and improve for storing controversial knowledge and supporting submission and retrieval features. Lastly, the prototype system demonstrated how the conceptual model and ontology might be used to build a system, and the evaluation of the prototype system supported the position that a system based on the conceptual model and ontology would provide utility to legislators and lobbyists. Important contributions are also made to the literature of several areas of research. Contributions are made to the field of Knowledge Management through the empirical identification of controversial knowledge, which existing knowledge taxonomies do not identify or describe. Additionally, guides in the literature for designing knowledge management systems have not addressed the needs of controversial knowledge, but the conceptual model produced in this dissertation offers a meaningful guide to KMS developers for supporting the submission and retrieval of controversial knowledge. Issue Based Information Systems is advanced by this dissertation. The artifacts produced could help improve the representation of actors, processes, and content in issue based information systems and identify additional functionality that such systems should support. Collaborative Comment Systems benefit from seeing additional ways that groups could share input and knowledge centered around documents. Argumentation benefits from the rich taxonomy of types of controversial knowledge to expand upon its theories of the structure, taxonomy, and usage of arguments. Dispute Resolution gains

insights about how to support the submission and retrieval of controversial knowledge related to a dispute. Rhetoric is able to study the controversial knowledge submitted to see how it tries to persuade and the extent that it is successful. Content Management is improved by having an enumeration of extensive meta-data information to use when describing people and content to improve the organization of explicit documents and knowledge. Ontologies are also advanced through the creation in this dissertation of an ontology that provides a robust knowledge representation for controversial knowledge.

6.3. *Limitations*

Along with the strengths and significance of this dissertation, there are also weaknesses and limitations. A fundamental weakness in the analysis, design, and decision-making was the fact that I did not have a second person who was familiar with all the details who could object to a coding or grouping in the document analysis, or the wording when expressing the point of an interview response. My advisor and committee members have been incredibly helpful in dealing with high-level questions and concerns, however, qualitative methods and analysis are improved by having a counter-balancing voice through the process. The use of validation with domain experts is believed to make up for this weakness.

Each of the artifacts also has weaknesses. The conceptual model is strong with respect to design for the Maryland Legislature, but is not fully generic enough to be immediately understandable or applicable across all/any deliberative, decision-making contexts. Designers of a KMS in finance for example can definitely gain insight, but will need to interpret and translate it to their domain. The ontology is weakened by its focus on

identifying the ontology elements, and not also focusing on adding documentation and description to those elements, or making it the most efficient for handling millions of triples and complex queries. It is currently left to users of the ontology to figure out on their own what the ontology terms mean, how things are related, how to build queries, and how to handle the scale of data the ontology will be tasked with storing. The prototype system built is limited by its role as a prototype. The features shown in the demonstration videos are from a real, working system; however, features alluded to by the interface but not demonstrated were not implemented. For instance, a bill could be identified by the people connected to the bill, and a list of actor types is listed, from DLS staff to special interests; however, only the search by special interest that was demonstrated was fully operational. As such, while the prototype does convey the possible features of the system, it is far from being a deployable system. The evaluation of the prototype also has shortcomings due to the evaluation approach utilized. Demonstration videos with contrived examples potentially removed from the personal needs or habits of the evaluators were shown, instead of what may have been the preferable situation of a fully functional, interactive system that they could use to play with the features and perform a set of real-world tasks they believe most relevant to themselves. Consequently, the evaluation metrics are based on their remote perceptions and mental extrapolations. Further, the number of evaluators used was sufficient to show utility ratings on some utility aspects, but more would be needed to perform meaningful statistical tests.

Along with weaknesses, there are three main limitations of this dissertation. First, this research has focused on the submission and retrieval of controversial knowledge, which is just the first part of the knowledge cycle. The important phases of sharing and application of controversial knowledge were not directly addressed. Lobbying and legislating is often a team/group effort and knowledge is provided and retrieved towards its application of influencing/making a decision. The submission and retrieval of controversial knowledge is a significant first step that can provide a foundation for researching sharing and application, but until those aspects are addressed, research into controversial knowledge will be limited. Second, this research has focused on information and knowledge, while avoiding political issues. Factors such as elections, jockeying for position/status, the influence of legislative and political leaders, or vote trading can be expressed as information in the system, but admittedly they are not given the importance or role in the layout and design of the system corresponding to the real-world importance they have in the culture of the Maryland Legislature and other controversial knowledge contexts. Lastly, this dissertation does not address issues of adoption and implementation in a real-world domain. Issues such as how currently unavailable or hard to get information would get into the system, the administration and moderation of the system, the amount of public access to the system, how the system would remain current, or how it would fit into or change the culture of the Legislature were not addressed.

6.4. *Future Directions*

Future work will aim to address the three aforementioned limitations. A methodology similar to that used in this dissertation, entailing observation, document analysis,

interviews, and evaluation of a prototype system for understanding and improving the sharing and application of controversial knowledge would address the last two phases of the knowledge lifecycle. This study could also include political and adoption aspects into its scope. The Maryland Legislature has shown itself to be an accessible and usable domain, and so this work would likely continue there; however, there is interest in exploring research in a new domain.

Attention will also be paid to making improvements to the artifacts. There is interest in making the conceptual model more generic and easily applicable to other domains. The ontology would be more useful to developers if its terms were improved, documentation added, and it was separated into an upper and domain ontology. Regarding the prototype, designing a smoother interface, implementing the suggestions made by legislators and lobbyists, adding more of the design guides features in a useful way, and evaluating the system in a more real-world context, including with legislative aides and staff, are top priorities.

Interesting areas of future research also appear in the application of this dissertation through the fields of Artificial Intelligence, Social Computing, and Decision Analysis. These fields offer the potential of utilizing large groups of people, computer reasoning, and insights into controversial knowledge to support and analyze the individual and social activities of deciding upon controversial subjects that significantly impact humanity.

Two areas of Artificial Intelligence show promising applications for supporting the submission and retrieval of controversial knowledge through a KMS. The first is recommender systems, which would utilize user profiles, controversial knowledge usage tracking, attributes of available controversial knowledge, and state-of-the-art recommendation algorithms. Providers of controversial knowledge could be advised by these algorithms of what content is probably desired and by whom. Retrievers of controversial knowledge could be greatly aided when they are confronted with a large supply of controversial knowledge with recommendations regarding which particular items would be appropriate for them based on their explicit or tacit knowledge desires, e.g. polling in their district, or the controversial knowledge liked by legislators with similar profiles or browsing habits.

The second AI application for improving a controversial knowledge management system (CKMS) is ontology-based semantic and linguistic analysis and classification.

Controversial knowledge is usually provided in the form of text intended for human readers. As a consequence, real people must spend time and effort to read, understand and organize it. However, using research from the field of natural language processing, computers can be enabled, using an ontology and training, to read available controversial knowledge content, identify and tag content, understand the content enough to form automated summaries or trend analysis, and automate the organization of controversial knowledge. This could be applied to augment library research databases, e.g. EBSCO or LexisNexis, with automated meta-data creation for browsing their repositories using information relevant to the competition amongst content and information regarding the

actors and content pertinent for understanding the controversial knowledge.

Additionally, this ontology-based linguistic analysis and classification can support a tailored search engine for indexing, organizing, and presenting controversial knowledge available on an intranet or the Internet as a whole.

In the area of social computing, interesting future research paths emerge in the use of crowdsourcing and social network platforms in a CKMS. In a way, legislators currently crowdsource their knowledge needs to decentralized, often superficially known special interests and citizens, who return to them controversial knowledge. While this appears to work in terms of generating controversial knowledge, questions exist as to how this crowdsourcing might be used to populate not just the raw data that becomes available, but to provide the information about actors and content identified through this research. For a small group to tag content parts, determine information about actors, identify content meta-data, verify information, etc., would be a daunting task, but may be more efficient and effective if delegated to the community.

The articulated framework for a controversial knowledge management system could also benefit from using existing social network platforms. Knowledge, and particularly controversial knowledge, implies and requires a community. This research has shown the important role that understanding actors and their relationships has in submitting and retrieving controversial knowledge. Research into social platforms have shown the importance of profiles, news feeds, tagging, commenting, linking, promoting, etc. and developed the technical capabilities to realize them. As such, future developments of a

CKMS are likely to benefit from using a social networking platform for the technical underpinnings of the system and the findings of this research for the theoretical and design elements. For example, the social networking platform would provide the technical support for tailored profile pages, and the findings from this dissertation would inform what information would be valuable to store in those user profiles.

Lastly, intersections are also seen between this research and decision analysis.

Controversial knowledge implies both a competition to influence a decision, and a decision that must be made. This research has identified an extensive set of information about actors and content, and a taxonomy of content parts. When this information and taxonomy are incorporated into a system along with the ability to track usage by individuals, research becomes possible into how controversial knowledge is utilized and evaluated to come to decisions. Analysis could potentially reveal types of actors based upon patterns of knowledge usage or evaluation, e.g. a “scientific decider” who only reviews scientific research, the “centrist decider” who looks for consensus, the “partisan” who judges knowledge by group affiliation, or the “follower” who evaluates whether to retrieve knowledge by its social ranking. Differences in decision-making on controversial issues when handling controversial knowledge in isolation, e.g. an individual voting on a referendum, or in an interactive environment like a committee considering whether to support a referendum, could also be studied to improve theories of both controversial knowledge and decision analysis.

For now though, this research provides a significant advance in understanding and supporting the submission and retrieval of controversial knowledge, and builds a foundation for wider research into the controversial knowledge lifecycle and intersections between controversial knowledge and other fields of research.

Appendix A: Document Types

Document Types Found in a Legislative Bill File

Amendment Related Document - A document pertaining to the modification of legislation being considered.

Annotated Document - A printed document with handwritten or otherwise added notes or messages.

Bill Version - The introduced, revised, or final text of proposed legislation.

Committee Vote Sheet - A listing of committee members and their recorded vote on the legislation at the committee level.

Constituent Communication - Emails and letters from individuals in a legislator's district with thoughts, requests, or information regarding legislation.

Fact Sheet - A listing of purported facts produced by a special interest on a specific subject.

Fiscal and Policy Note - An official analysis for each bill containing a summary of the policy proposed, estimated revenue and expenditure impact on state and local governments, and impact on small businesses.

Floor Report - An official summary from a legislative committee for the larger legislative body regarding a piece of legislation providing a description of the legislation, committee actions, and relevant people.

Handwritten Note - A handwritten note or message relevant to a piece of legislation or to a particular legislator.

Internal Correspondence - A communication between or from legislative staff, lobbyists, or legislators regarding a piece of legislation.

Newspaper Opinion - An editorial published in a newspaper regarding pending legislation or a subject before the legislature.

Official Opinion - Research or analysis from an official government organization or authority solicited by or submitted to a legislative body in order to answer or clarify a question or ambiguity relevant to a piece of legislation.

Policy Brief - A succinct document produced by a special interest describing a problem, state of affairs, the urgency of addressing it, and/or proposed policy solutions to be considered or adopted by legislators.

Position Paper - A generally one-page summary by an interested party requesting a particular vote on an issue, along with an explanation and defense of that request.

Presentation Printout - Paper version of electronic slides related to a piece of legislation.

Publication - Newspaper, magazine, research, or other article relevant to legislation.

Witness List - A listing of those who testified at a committee hearing and basic information about them.

Written Testimony - A written version of an oral statement presented by a witness to a legislative committee, along with additional documents relevant to the testimony.

Department of Legislative Services Publications

"90 Day Report" Publication - A summary of the year's legislative session, describing "Major Issues" and legislation that session relevant to 12 pre-defined major policy areas.

"Best Seller" Publication - A listing of bills receiving calls from the public and whether that bill passed both chambers.

"Executive Orders" Publication - Provides the text of, and an index to, the Governor's Executive Orders.

"Final Status of Proposed Legislation" Publication - Indicates the final status and date of the last action on each bill, and a list of those passed by both chambers.

"Ghost Hunting: Discovering Legislative Intent" Publication - A guide for where to look in trying to determine the history and meaning of legislation.

"Issue Papers" Publication - A compilation of research conducted by the Department of Legislative Services providing insight into issues likely to be considered during the legislative session.

"Laws of Maryland" Publication - Aka Session Laws, it contains the final versions of the bills that become law along with enacting and effective date clauses, preambles, and other uncodified provisions.

"Legislative Lingo" Publication - Defines phrases and terms likely to be heard in legislative dialogue.

"Legislative Wrap-Up" Publication - A short, neutral narrative of selected legislation along with a brief digest of the past week's newspaper articles concerning legislative action and events of statewide importance.

"Major Issues Review" Publication - Summarizes legislative activity over a four-year term, including discussions of major issues, significant bills that did not pass, and gubernatorial vetoes of major legislation.

"Maryland Clipper" Publication - A collection of newspaper clippings about the activities of the General Assembly, the Executive and Judicial Branches of Maryland government, issues related to pending legislation, relevant activities of the federal government and other states, and other items pertinent to the duties and responsibilities of the General Assembly.

"Maryland Documents" Publication - A monthly listing of publications cataloged by the Department of Legislative Services during the previous month.

"Maryland Legislator's Handbook" Publication - An overview of the legislative process, the organization of the General Assembly, and the services and facilities available to members of the General Assembly.

"Subject Index Thesaurus" Publication - An official listing of legislative subjects along with their narrower, broader, and related terms.

"Vetoed Bills and Messages from the Governor of Maryland" Publication - A listing of vetoed bills along with the Governor's veto message.

Bill Information Page - The official page on the General Assembly website with information and documents for each piece of legislation.

Chamber Journal - A log of committee recommendations on bills, floor amendments, bill histories and summaries, floor roll call votes, and actions on any motion from each chamber for each day of a session.

Committee or Commission Report - An official publication of a legislatively authorized commission directed to study a particular problem or a committee directed to handle legislation of a particular subject.

Effective Date Summary - A listing of bills, along with a summary of the legislation, which will take effect on a given date.

Index of Proposed Legislation - Indicates the status and date of the last actions on each bill, organized by subject, sponsor, legislative committee, or effected statute.

Legislative Process Overview - A guide to the basic process of how bills are introduced and become law.

Notice of Legislation Signing Status - A letter listing and describing bills signed, or scheduled to be signed, by the Governor on a specified date.

Roster - A listing and description of legislative members and committees.

Schedule - A published listing of deadlines, agenda items, or calendar information relevant to the legislative process.

Synopsis - An official summary for each introduced bill, each legislative day, and each legislative session.

Ethics Commission Documents

Forms

- Member Of General Assembly Financial Disclosure Statement Form
- Certification Of Financial Disclosure Statement Amendment Form
- Financial Disclosure Statement Form
- Board And Commission Members Financial Disclosure Statement Form
- Request For Secondary Employment
- General Assembly Preliminary Substantial Change Financial Disclosure Statement Form
- General Lobbying Activity Report
- Lobbying Registration Form
- Disclosure Of Gifts Of \$75 Or More Special Activity Report - Single Employer Form
- Individual Lobbyist Business Transactions With Official Disclosure Form
- Individual Lobbyist Expenditure Disclosure Of Gifts \$75 Or More
- Individual Lobbyist Personal Expenditure Elected Executive Officials Gift Of Meals And Or Beverages - Special Activity Report

- Individual Regulated Lobbyist - Campaign Contribution Report Form
- Meal Or Reception Legislative Unit Invitation - Regulated Lobbyist Disclosure
- Regulated Lobbyist Employer Expenditure On Meals And Or Beverages - Elected Executive Officials Special Activity Report
- Lobbyist Disclosure Report Of Contributors Form
- Request To Add Position To Financial Disclosure List Form
- Request To Delete Position From Financial Disclosure List Form
- Regulated Lobbyist Meal Or Reception Legislative Unit – Fourteen Day Report
- Regulated Lobbyist Serving On A State Board Or Commission Disclosure Of Interest- Business Relationship With State Government Form
- Regulated Lobbyist Serving On A State Board Or Commission Disclosure Of Interest- Interest In Business Entity
- Regulated Lobbyist Serving On A State Board Or Commission Disclosure Of Interest- Representation Before A State Agency Form
- Regulated Lobbyist Serving On A State Board Or Commission Statement Of Recusal Form
- Request To Add Person To Financial Disclosure List Form
- Request To Delete Person From Financial Disclosure List Form

Webpages

- Commission Informational Memos
- Commission Members Listing
- Contact Us
- Ethics Question Of The Month
- Financial Disclosure Filer Identification Manual
- Financial Institutions Doing Business With The State
- General Information - Ethics
- General Information - Lobbying
- Goals
- List Of Forms
- Lobbying Reporting System
- Lobbyist Listings
- Mandatory Lobbyist Training
- Maryland State Ethics
- Privacy Statement
- Programs
- Special Bulletin
- Special Ethics Law Memo
- Special Ethics Law Memo 2
- Standards Of Conduct
- State Ethics Commission Homepage
- Welcome To Electronic Filing

Reports

- Lobbyist List By Employer
- 2008 State Ethics Commission Annual Report
- Lobbyist List By Lobbyist

Appendix B: Interview Guide Templates

Lobbyist Interview Guide

- Thank for meeting with me and get settled in
- Explain my research
 - I'm a PhD candidate researching the submission and retrieval of CK
 - Intersection with Legislature
 - Case study of deliberative, decision-making body where Controversial Knowledge is submitted and retrieved/received
 - What I've done so far
 - Document Analysis of bill files, DLS publications, and Ethics Commission forms and reports
 - Talked with librarians, OIS
 - Have book and document knowledge, looking for real-life experiences and insights to learn from
 - Introduce and hand over copy of IRB Consent Form
 - Explain each part
 - Ask if they have any questions so far
 - If they ask what CK is, ask what they think it means (quality of term part of research)
 - Knowledge that competes with other knowledge (to influence a decision-maker), e.g. K about the economic impact of a bill, how to interpret a poll
 - Contrast w/ info.; experience, insights, meaning, understanding\
 - build up from declarative, procedural, etc. using legal examples, e.g. law terms, filing procedures, what the verdict should be
 - Outline of Interview (show outline and note form)
 - Topics that will be covered (Receiving/Retrieving; Challenges; Desired Features & Information; feedback on previous interviews)
 - Style of Interview
 - Ask for clarification / can say you don't know
 - Q, then response, then follow up questions from me
 - Can ask to go back at any time
 - Interjections to keep on focus and on time

- Ask how strict the 45 minutes is (est. end time?)
 - 1st formal Lobbyist Interview, please excuse any missteps
 - Get IRB signatures on 2 copies (one for him); ask if ready to start the interview
- Start recording if allowed (put closer to interviewee)

Transition: Going to ask some initial questions to help get us on the same page and help improve the rest of the interview

- Background/demographic questions
 - How long have you been employed in the lobbying profession?
 - Years
 - Number/Range of Clients
 - Subject Areas Lobbied
 - Can you please describe your current responsibilities related to the production of knowledge for the legislative system?
 - Submission of knowledge to the legislative system
 - Do you do more management/oversight, on-the-ground/details, or both?
- I'd like you to think about the term "controversial knowledge." What comes to your mind when you hear this term?
 - What do you think it means?
 - Alternate/Better Terms / Terms he Mentions
 - Examples given
 - What it's known as in domain
 - Ask myself: Is interviewee's working definition/understanding of CK okay?
 - Give my description of CK afterwards so we're on the same page?
 - Knowledge that competes with other knowledge (to influence a decision-maker), e.g. K about the economic impact of a bill, how to interpret a poll
 - Contrast w/ info.; experience, insights, meaning, understanding
 - Does this change his understanding of examples of CK?
 - If need be: build up from declarative, procedural, etc. using legal examples, e.g. law terms, filing procedures, what the verdict should be

- Identify a bill/topic to ground conversation
 - Can you think back to this last session and recall a bill that you actively lobbied for and would consider the subject of the legislation controversial.
 - list of possible/probable bills on next sheet
 - Will use this bill as a reference.... transition to next section re: receiving and retrieving CK
- Submission of CK
 - I'm curious about how CK gets to legislators. Can you discuss the approaches you used to get CK to them regarding the legislation you mentioned?
 - In general, can you describe
 - How those with knowledge get it to them (out of comm.)
 - Mediums used
 - People involved
 - What works well in these approaches? What do you like about them? Why?
 - What would you prefer changed about these approaches? Why?
 - Of what you submit
 - What do you think they look at?
 - What do you think they ignore?
 - What K do you feel they are generally getting/looking for?
 - Use of bill files by yourself/legislators (if not used, why not)
 - What role does legislative aid play in
 - Receiving CK from you
 - Asking for CK from you
 - Analysis of CK
 - Doing more than being a go-between / gate keeper?
 - What role does your staff or co-workers play in
 - Submitting CK

- Analysis of CK
 - Doing more than being a go-between / gate keeper?
 - If possible, try to summarize what I've just learned and get feedback
- Challenges – Transition from description to evaluation
 - Please indicate whether you agree, disagree, or would slightly modify the following perceived challenges faced by lobbyists in submitting CK to legislators/legislative decision makers. (Describe each)
 - Tracking who is seeing/using what you submit
 - Getting access to communicate with decision makers
 - Scheduling meetings / time to talk
 - Having to condense or remove good info/CK in what you submit
 - Quickly providing your personal information, e.g. credentials, reputation, and other background information (Ask what else would like to provide)
 - Knowing what decision makers will want to receive
 - Knowing the background of a recipient of CK / legislator
 - Being aware of what CK other lobbyists are providing to legislators
 - Commenting on what knowledge other lobbyists are providing, e.g. rebuttals, links to critiques, etc. Other comments?
 - Knowing who else is lobbying on your bill/issue
 - Being able to communicate with them
 - Submitting knowledge to the right person/people, i.e. knowing who this is
 - Controlling access to what you submit, i.e. privacy
 - What controls might you want?
 - Lobbyists relying on memory and cognition
 - forget things
 - prejudice in judging information / misunderstandings
 - complex things oversimplified
 - attention span

- Ask for others after listing mine
 - If time, move to the general/other
 - What challenges come to mind when trying to submit knowledge to legislators
- Desired Features/Abilities – Transition from challenges to possible solutions
 - I'd like your sense as a CK provider of the likely value of the following features/abilities in a computer system designed for improving how CK is submitted. Please indicate whether you think the following would be desired or undesired by lobbyists.
 - Ability to receive elec. requests for specific information from legislators, e.g. economic impact of proposal on their district
 - Ability to submit information parts separate from whole documents, e.g. polling data, new research findings
 - Ability to see tracking reports of how the CK you submit is being used, e.g. number of hits, number of times shared, ratings, comments, etc.
 - Other metrics you'd like?
 - Ability to interact/debate with other lobbyists in an online medium, e.g. new information, comments, critiques, rebuttals, etc.
 - A medium that legislators can monitor?
 - Ability to quickly videoconference with legislators, e.g. contemplating compromise and want input of particular legislator
 - Electronically schedule in-person or telephone meetings
 - Ability to have an online profile with pertinent information about you, e.g. could be attached to electronic submissions of yours.
 - Ability to submit CK as electronic documents to legislators, e.g. Word docs, PDFs, PPT files to bill file
 - Submit electronically to the bill file record
 - Ability to submit video to the legislative record, e.g. video presentation regarding pending legislation
 - Ability to identify status of information, e.g. popular positions, new information, whether knowledge is controversial or accepted in the community, etc.

- In general: an information system designed for the submission and retrieval of controversial knowledge about legislation and legislative subjects
 - Ask for other suggestions
- Desired Information – continuing with ideas for improvements, in this case, information
 - Clarify that this can be new, currently unavailable information or existing information
 - When you approach a legislator with information you'd like them to consider, what would you like to know about that legislator? Again, can be currently unavailable.
 - “pet issues”
 - people they trust
 - publications they read
 - Power/influence
 - How might you measure this?
 - Past Interactions
 - Others
 - What elements of reputation do you think are important in evaluating a provider of CK?
 - Education
 - Bias
 - Experience
 - Success Rate
 - Esteem in Community
 - Power/Influence
 - How might you measure this?
 - Others
 - Any additional info related to lobbyists/submission you'd like?
 - Feedback on insights from previous interviews

- Would you agree, disagree, or modify the following assessments:
 - The concept of “competition” is appropriate for understanding the interplay between knowledge provided by lobbyists
 - Types of CK submitted to legislators: Political, Personal, Policy
 - Points raised by OIS:
 - Confidentiality/privacy controls needed
 - Timeliness/real-time info
 - OIS oversight needed as trusted monitor/arbitrator of electronic system
 - Technology augments/facilitates direct human lobbying interactions, won't replace it
 - If time
 - Hierarchy of mediums of communication
 - Multiple information feeds, several unwritten/oral (Describe)
 - Rationalization vs. reasoning
- Concluding Stuff
 - Questions he has for me?
 - Information he thinks I should know
 - Questions I should have asked
 - Recommendations for
 - Lobbyists to follow up with next
 - use of org. members for interviews, validation, or evaluation
 - roles of people I should talk with
 - Advice on how I might proceed with the research / study of CK
 - Ask if interested in participating in validation of model or evaluation of system later on
 - Thank again for time and consideration
 - Turn off Recorder

Legislator Interview Guide

- Thank for meeting with me and get settled in
- Explain my research
 - I'm a PhD candidate researching the submission and retrieval of CK
 - Intersection with Legislature
 - Case study of deliberative, decision-making body where Controversial Knowledge is submitted and retrieved/received
 - What I've done so far
 - Document Analysis of bill files, DLS publications, and Ethics Commission forms and reports
 - Talked with librarians, OIS
 - Have book and document knowledge, looking for real-life experiences and insights to learn from
 - Introduce and hand over copy of IRB Consent Form
 - Explain each part
 - Ask if they have any questions
 - If they ask what CK is, ask what they think it means (quality of term part of research)
 - Knowledge that competes with other knowledge (to influence a decision-maker), e.g. K about the economic impact of a bill, how to interpret a poll
 - Contrast w/ info.; experience, insights, meaning, understanding
 - build up from declarative, procedural, etc. using legal examples, e.g. law terms, filing procedures, what the verdict should be
 - Outline of Interview (show outline and note form)
 - Topics that will be covered (Receiving/Retrieving; Challenges; Desired Features & Information; feedback on previous interviews)
 - Style of Interview
 - Ask for clarification / can say you don't know
 - Q, then response, then follow up questions from me
 - Can ask to go back at any time
 - Interjections to keep on focus and on time
 - Aim is around 45min, but understand we have until 11am
 - 1st formal Leg. Interview, please excuse any missteps

- Get IRB signatures on 2 copies (one for him); ask if ready to start the interview
 - Start recording if allowed
- Transition: Going to ask some initial questions to help get us on the same page and help improve the rest of the interview
- To start off, I'd like you to think about the term "controversial knowledge." What comes to your mind when you hear this term? What do you think it means?
 - Alternate/Better Terms / Terms he Mentions
 - Examples given
 - What it's known as in domain
 - Ask myself: Is interviewee's working definition/understanding of CK okay?
 - Give my description of CK afterwards so we're on the same page?
 - Knowledge that competes with other knowledge (to influence a decision-maker), e.g. K about the economic impact of a bill, how to interpret a poll
 - Contrast w/ info.; experience, insights, meaning, understanding
 - Does this change his understanding of examples of CK?
 - If need be: build up from declarative, procedural, etc. using legal examples, e.g. law terms, filing procedures, what the verdict should be
- Identify a bill/topic to ground conversation
 - Can you think back to this last session and recall a bill that you were actively lobbied about and would consider the subject of the legislation controversial.
 - list of possible/probable bills on next sheet
 - Will use this bill as a reference.... transition to next section re: receiving and retrieving CK
- Receiving and Retrieving of CK
 - I'm curious about how CK gets to legislators. Can you discuss the approaches used to get CK to you regarding the legislation you identified?
 - In general, can you describe
 - How those with information/CK get it to you (out of comm.)
 - Mediums used

- Who are these people (e.g. lobbyists, etc.)
 - What do you like about these approaches? Why?
 - What would you prefer changed about these approaches? Why?
- Use of bill files by yourself/legislators (if not used, why not)
- If time: Of what you receive
 - What do you look at? Legislators in general?
 - What do you ignore? Legislators in general?
- How do you get your own information, i.e. retrieve CK? Leg. in general?
 - Where do you look?
 - Who involved?
 - What K are you generally getting/looking for?
- What role does your staff play in: (prepare to have to focus discussion)
 - Receiving CK
 - Retrieving CK
 - Analysis of CK
 - Doing more than being a go-between / gate keeper?
- If possible, try to summarize what I've just learned and get feedback
- Challenges – Transition from description to evaluation
 - Please indicate whether you agree, disagree, or would slightly modify the following perceived challenges faced by legislators in receiving or retrieving CK in the legislature. (Describe each)
 - Assessing what's true/accepted or partisan/controversial, e.g. is a statistic questionable, is research finding agreed upon, etc.
 - Having to read/hear/see whole things in order to get/find the part interested in, e.g. hear whole testimony just to hear job impact figure
 - Knowing the desired background of a provider of CK
 - Relying on one's memory and cognition (frame in general, i.e. legislators)

- forget things
- prejudice in judging information / misunderstandings
- complex things oversimplified
- attention span (long docs, long hearings)
- Overload
 - Information overload, i.e. too much CK to read and integrate it all
 - Document overload, i.e. too many docs to read and integrate them all
 - Similarly CK is spread out over too many documents or too many locations
 - Decision overload, i.e. too many bills to vote on to thoughtfully consider each of them (leaving one to focus on just a few)
 - Est. of avg. time able to spend on a bill/controversial subject
- CK is too disorganized
 - not sure where to look for particular controversial knowledge
 - stored CK is too paper-based and not accessible online
- Limited time to spend on any given bill
 - people randomly approaching you / can't control this
- Ask for others after listing mine
- If time, move to the general
 - What challenges come to mind when trying to receive knowledge being given to you?
 - What challenges come to mind when trying to retrieve knowledge from a source or a person?
- Desired Features/Abilities – Transition from challenges to possible solutions
 - I'd like your sense as a legislator and LDS chair of the likely desirability of the following features/abilities in a computer system designed for improving how CK is submitted and retrieved. Please indicate whether you think the following would be desired or undesired by legislators, and briefly explain why.
 - Ability to electronically post requests for desired information from lobbyists involved with bill, e.g. Want their input on the prevalence of problem in your district, how bill will affect local industry

- Ability to observe debate occurring between lobbyists on legislation, e.g. new information, comments, critiques, rebuttals, etc.
- Ability to quickly/easily videoconference with lobbyists or electronically schedule in-person or telephone meetings, e.g. contemplating compromise and want input of particular issue org. representative
- Ability to retrieve docs submitted by lobbyists as electronic documents, e.g. PDFs of committee bill file contents, Word docs, PPT files
- Ability to receive video from the legislative record, e.g. video presentation regarding pending legislation
- Ability to retrieve labeled parts of documents, e.g. economic impact claims from position paper, new research findings from report
 - Ability to select or filter out specific types of info from docs, e.g. list of all polling data on subject, remove contentious knowledge
- Ability to quickly identify status of knowledge received, e.g. popular positions, new information, whether knowledge is controversial or accepted in the community, etc.
- Ability to filter, block, or promote/highlight information from specific people and sources, e.g. local newspaper, unreliable advocate
- In general: an information system designed for the submission and retrieval of controversial knowledge about legislation and legislative subjects
- Ask for other suggestions
- If Time: As the Chair the LDS committee, can you briefly summarize the progress and direction of computer systems to support the
 - legislative process
 - lobbying process
 - What remains to be done?
 - Ask if helpful for me to see minutes, reports of committee
- Desired Information – continuing with ideas for improvements, in this case, information
 - Clarify that this can be new, currently unavailable information or existing information

- When a lobbyist comes to you with CK they'd like you to consider, such as in the bill you identified, what would you like to know about that lobbyist?
Again, can be currently unavailable
 - Client
 - Political contributions of ind. or org.
 - Expertise
 - Power/influence
 - Others
- What elements of reputation do you think are important in evaluating a provider of CK?
 - Education
 - Bias
 - Experience
 - Success Rate
 - Esteem in Legislative/Lobbying Community
 - Power/Influence
 - Others
- What information/CK might you want lobbyists to tell you that they currently don't? won't? (reference example bill if answers are vague)
- Given a *document* (e.g. position paper, fact sheet) containing CK about legislation, before reading it, what information would you like to have about it?
 - Who from
 - Type, e.g. position paper, fact sheet, etc.
 - Length
 - Popularity / rating / evaluation
 - List of information provided in it
 - Others
- Feedback on insights from previous interviews

- Would you agree, disagree, or modify the following assessments? Please briefly explain why:
 - The concept of “competition” is appropriate for understanding the interplay between knowledge provided by lobbyists
 - Types of CK submitted to legislators: Political, Personal, Policy
 - Points raised by OIS:
 - Confidentiality/privacy controls needed
 - Timeliness/real-time info
 - Customizability of technology
 - OIS oversight needed as trusted monitor/arbiter of electronic system
 - Technology can augment/facilitate direct human lobbying interaction, but won’t replace it
 - If time
 - Hierarchy of mediums of communication, not all equal
 - Multiple information feeds, important ones unwritten/oral (Describe)
 - Rationalization vs. reasoning
- Concluding Stuff
 - Questions he has for me?
 - Information he thinks I should know
 - Questions I should have asked
 - Recommendations for
 - Legs. to follow up with next
 - use of LDS committee members for interviews, validation, or evaluation
 - roles of people I should talk with
 - Advice on how I might proceed with the research / study of CK
 - Ask if interested in participating in validation of model or evaluation of system later on

- Thank again for time and consideration
- Turn off Recorder

Legislative Assistant Guide

- Thank for meeting with me and get settled in
- Explain my research
 - I'm a PhD candidate researching the submission and retrieval of CK
 - Intersection with Legislature
 - Case study of deliberative, decision-making body where Controversial Knowledge is submitted and retrieved/received
 - What I've done so far
 - Document Analysis of bill files, DLS publications, and Ethics Commission forms and reports
 - Talked with Legislators, Lobbyists, librarians, OIS
 - Have book and document knowledge, looking for real-life experiences and insights to learn from
 - Introduce and hand over copy of IRB Consent Form
 - Explain each part
 - Ask if they have any questions
 - If they ask what CK is, ask what they think it means (quality of term part of research)
 - Knowledge that competes with other knowledge (to influence a decision-maker), e.g. K about the economic impact of a bill, how to interpret a poll
 - Contrast w/ info.; experience, insights, meaning, understanding
 - build up from declarative, procedural, etc. using legal examples, e.g. law terms, filing procedures, what the verdict should be
 - Outline of Interview (show outline and note form)
 - Style of Interview
 - Ask for clarification / can say you don't know
 - Q, then response, then follow up questions from me
 - Can ask to go back at any time
 - Interjections to keep on focus and on time
 - Ask what the hard end time is (usually ~45min)

- 1st Legislative Assistant I'm interviewing, so please excuse any missteps
 - Get IRB signatures on 2 copies (one for them); ask if ready to start the interview
 - Start recording if allowed
- Transition: Going to ask some initial questions to help get us on the same page and help improve the rest of the interview
- Background/demographic questions
 - Experience in the legislature?
 - Titles/Positions
 - Years
 - Number/Range of Offices
 - Specialized Subject Areas
- Clarify the difference between Leg. Staff and Leg. Aide
- I'd like you to think about the term "controversial knowledge." What comes to your mind when you hear this term? What do you think it means?
 - Alternate/Better Terms / Terms he Mentions
 - Examples given
 - What it's known as in domain
 - Ask myself: Is interviewee's working definition/understanding of CK okay?
 - Give my description of CK afterwards so we're on the same page?
 - Knowledge that competes with other knowledge (to influence a decision-maker), e.g. K about the economic impact of a bill, how to interpret a poll
 - Contrast w/ info.; experience, insights, meaning, understanding
 - Does this change his understanding of examples of CK?
 - If need be: build up from declarative, procedural, etc. using legal examples, e.g. law terms, filing procedures, what the verdict should be
- How would you describe your role(s) in receiving/handling CK (from lobbyists? From others?) in your time in the Legislature
- Identify a bill/topic to ground conversation

- Can you think back to this last session and recall a bill that you were actively involved with that entailed CK and would consider the subject of the legislation controversial.
 - list of possible/probable bills on next sheet
- Will use this bill as a reference.... transition to next section re: receiving and retrieving CK
- Receiving and Retrieving of CK
 - I'm focusing on Legs and Lobs, but am also curious about the role and experience of those in-between Legs and Lobs and those who assist them.
 - Based on your own direct experiences in the legislature or those of others you are aware of, what role do assistants/staff play in:
 - Receiving CK , e.g. Lob. drop off, sit-in on meetings, etc.
 - Retrieving CK, e.g. going to library, internet research, contact DLS, etc.
 - What kind of info are Legislators (or Lobs) asking for?
 - Analysis of CK, e.g. reports, folders, suggestions for vote
 - What reports are usually created for legislators? E.g. call tally
 - Doing more than being a go-between / gate keeper, e.g. review CK and suggesting vote
 - Do Aids lobby other Legs? Are aids lobbied? Is leadership? How?
 - Discuss diversity of uses of aids across Legislative offices, e.g. secretaries, policy experts, etc.
 - Based on your experiences with the Majority Leader, what's Maj. Leader's role? What CK is provided to legislators from them? How is it submitted/received? **(ask each)**
 - Explain/discuss Political leverage and pressure used by Leadership, e.g. election support, support for other bill, appointments, etc.
 - What CK/information goes through staff 1st, or is intended for staff primarily?
 - How do Legislators get their own information, i.e. retrieve CK?
 - What info do they ask for?
 - Role of staff
 - Role of DLS in providing knowledge

- Where do you look?
 - Who involved?
- Does anything stand out as something you like about these approaches of how Legislators or Aids receive/handle CK? Why?
 - Something you dislike or wish could be improved/changed? Why?
 - What are the challenging parts? Time consuming? (use for transition)
- If possible, try to summarize what I've just learned and get feedback
- Desired Features/Abilities – Transition from challenges to possible solutions
 - I'd like your input given your experience and insight in the Legislature on the following challenges and possible features.
 - I'm going to describe a perceived challenge/problem for Legs. Or Leg. Aides. Please indicate if you agree, disagree, or would modify my description. Briefly explain why.
 - I'll then describe a feature/ability in a computer system designed for improving how CK is submitted and retrieved that I think will help. Please indicate whether you think the following would be desired or undesired by staff or legislators in general. Briefly explain why.
 - Challenge: Information and Document overload; too much CK to read and integrate it all; CK is spread out over too many documents or too many locations; stored CK too paper-based (**ask, get response to each**)
 - Ability to have a centralized electronic repository that categorized available CK. (Electronic bill file / library records; useful for creating reports for Legs?)
 - Challenge: Knowing desired background info of a provider of CK
 - Ability to access an electronic profile of a provider that lists out pertinent/useful information about them, and linked to CK they provide
 - Challenge: The CK legislators or legislative offices receive is not what is wanted/needed, e.g. missing CK, irrelevant CK, etc.
 - Ability to electronically post requests to community of lobbyists involved with legislation for desired information, e.g. Want answer to specific question of concern, their input on the prevalence of problem in your district, how bill will affect local industry,

- Challenge: Seeing the stakeholder debate/discussion occurring between advocates/Lobs. on legislation, new information, comments, critiques, rebuttals, alternative proposals, etc.
 - Ability to observe discussion/debate occurring between lobbyists on legislation via a website
- Challenge: Having meaningful, expressive communication with lobbyists on short notice
 - Ability to page Lobbyists. e.g. call, come by office, where to find, others?
 - Ability to quickly/easily videoconference with lobbyists or electronically schedule in-person or telephone meetings, e.g. contemplating compromise and want input of particular issue org. representative
- Challenge: Leg. aides relying on memory and cognition, e.g. forget things, out of sync with process, attention, oversimplification, etc.
 - Ability to have more information and status info electronically available.
- Challenge: Documents provided by lobbyists are too paper-based. From DLS?
 - Ability to receive/retrieve docs submitted by lobbyists as electronic documents, e.g. PDFs of committee bill file contents, Word docs, PPT files
- Challenge: Limited availability or access to quality CK presented in video form
 - Ability to (easily) receive video from lobbyists and the legislative record, e.g. video presentation regarding pending legislation
- Challenge: Having to read the entirety of a document to get/find the part(s) you want, e.g. new research findings, poll results, impact assessments
 - Ability to retrieve labeled parts of (electronic) documents, e.g. economic impact claims from position paper, new research findings from report
 - Ability to select or filter out specific types of info from docs, e.g. list of all polling data on subject, remove contentious knowledge

- Challenge: Identifying the popularity, newness, or level of controversy of CK
 - Ability to quickly identify/see status of available knowledge, e.g. popular positions, new information, whether knowledge is controversial or accepted in the community, etc.
 - Challenge: So many sources of CK, but organized equally. Filtering info/docs.
 - Ability to filter, block, or promote/highlight information from specific people and sources, e.g. local newspaper, unreliable advocate
 - Challenge: Creating aggregate reports for legislators
 - Ability to have tailored forms and program for recording: 1) office visits 2) yea/nay contacts 3) **others?**
 - Challenge: Gate-keeping, filtering access to the legislator.
 - Ability to have lists of wanted/unwanted people. History of past visitors
 - In general: an information system designed for the submission and retrieval of controversial knowledge about legislation and legislative subjects
 - Ask for other suggestions
 - What abilities might help you perform your job/roles better? Key challenges faced by aids/leg staff receiving or providing CK?
 - Vote Counting?
 - What are staff currently using technology to help with, e.g. spreadsheet of yea/nay calls on each bill
 - Any other thoughts/insights/creative ideas come to mind from this conversation so far
- Desired Information – continuing with ideas for improvements, in this case, information
 - Clarify that this can be new, currently unavailable information or existing information
 - Indicate whether information I propose would be useful/irrelevant
 - What do you think would be useful to know about a legislator (by others in the system (Lobs, Legs, etc.)? Again, can be currently unavailable.
 - “pet issues”
 - people they trust

- whether they're decided or on-the-fence
 - publications they read
 - Power/influence
 - Title; Committee roles; how Legs. view them; rel. with leadership
 - How might you measure this?
 - Notes from Past Interactions
 - Former employment
 - News channels they watch
 - Non-profits they support or involved in
 - Trustworthiness, reliability of: vote indication, under pressure
 - Others
- What elements of reputation do you think are important in evaluating a provider of CK
- Credibility
 - Session Events
 - Other metrics
 - Political intelligence
 - Education
 - Political Bias
 - Ethics law infractions
 - Understanding of legislator's situation and needs
 - Former employment
 - Experience (Years in Annapolis)
 - Success Rate
 - Public speaking / presentation skills
 - Esteem in Legislative/Lobbying Community
 - Power/Influence
 - Ability to get votes
 - Asked about by Leg.
 - Clients
 - Pay Rate
 - Donations
 - Political contributions
 - Others

- What information might help you better perform your role as Leg. Assistant or Majority Leader Advisor? E.g. list of Legs who are decided or on the fence
- What info/CK are you providing to Legs regarding CK? e.g. summaries
- What info/CK are Lobs and Legs providing to you about CK? e.g. highlights
- What info/CK are you providing to Lobs about CK? e.g. who else is lobbying, what they're saying
- Feedback on insights from previous interviews
 - Would you agree, disagree, or modify the following assessments? Please briefly explain why:
 - The concept of “competition” is appropriate for understanding the interplay between knowledge provided by lobbyists
 - Comment on evenness of playing field and competitors (= opportunity, != outcome/skill/arguments/positions)
 - Insights about “fair play” between competitors
 - Types of CK in the legislative process: Political, Personal, Policy
 - That the type of CK provided changes during the session. Their sense of transitions b/w Political, Personal, Policy.
 - In the legislative domain, Legislators are the primary recipients of CK and Lobbyists are the primary submitters of CK (checking role of aids, others).
 - That if seriously considering a bill, a legislator might spend 15-30 minutes contemplating a vote
 - Predominant challenge is short, limited time and attention to spend on each bill
 - Support of Legislative Leadership is required in process for legislation to advance, they largely determine the outcome. What's their role/importance?
 - That there is a lot of waste in the system.
 - Wasted time in committee hearings as people ignore/miss testimony or testimony is repetitive
 - Wasted paper as bills and reports are distributed to everyone who usually trash it or just need a few items
 - # of inconsequential bills
 - Other instances of waste or inefficiency?
 - The commonality of providing a rationalization narrative to/for Legs., beyond just basic info/CK

- Prominence and desirability of unwritten, unrecorded, secretive information is in tension with the value and utility of transparency of/for everyone (benefits of open-hand for Lobs)
 - Legislative aids are becoming more involved in analysis and decision-making for legislators, more than a go-between or secretary.
 - If Time
 - Hierarchy of mediums of communication, not all equal
 - Multiple information feeds, important ones unwritten/oral (Describe)
 - Other insights about legislature, role of aides or in-between actors in handling CK, I should know. People? Processes? Content?
- Concluding Stuff
 - Questions for me?
 - Information you think I should know
 - Questions I should have asked
 - Recommendations for
 - People to follow up with next
 - Advice on how I might proceed with the research / study of CK
 - Ask if interested in participating in validation of model or evaluation of system later on
 - Thank again for time and consideration
 - Turn off Recorder

Appendix C: Prototype Script

Legislator Prototype

Identifying bills on which to get knowledge

- The first task supported by this system is identifying relevant legislation on which to retrieve knowledge.
- In the center is a table listing basic information about all the legislation available in the system, such as bill #, year, title, and synopsis. This listing is updated based on the criteria and information provided on the left.
- Demonstration 1
 - This first demonstration identifies legislation based on some common searchers.
 - For example, legislation can be searched based on some information about the bill relating to the legislative process ...
 - (Open Property combo box)
 - ..such as bill number, vote outcome, status, hearing date, etc.
 - for now, the Committee Assignment feature will be used and the Budget and Taxation committee selected from the pre-populated list of legislative committees.
 - (Apply search)
 - After hitting apply, the list of legislation now shows only legislation from the Budget and Taxation committee.
 - The system can also identify legislation based on a keyword search of all the information available about a bill...
 - In this case, bills dealing with either pension or retirement will be sought
 - (type Retirement Pension into search text field and Apply)
 - The list of legislation now shows only legislation from the Budget and Taxation committee that deals with Pension and Retirement
 - Legislation is also searchable by its sponsor...
 - This system lists all the legislators to search upon. For this example, Delegate Melaney Griffith will be used.
 - (Select Delegate Melaney Griffith from the popup and Apply)
 - After the search, the system shows that there is only one bill that was sponsored by Delegate Griffith, was assigned to the Budget and Taxation committee, and deals with Pension and Retirement.
 - After double-clicking on this bill, a detailed presentation of all the information available about that bill is shown.
 - There is basic information such as its committee assignment, status, subjects, and synopsis
 - The listing of its sponsors name, party, and district
 - documents related to the legislative process like bill versions and its fiscal and policy note
 - The bill's legislative process events, with description and date

- A listing of the people and organizations who have stated a position on the bill
 - Information about the controversy around a bill, such as a description of areas of agreement and disagreement
 - Related bills, such as previous introductions, its crossfiled counterpart, and bills that share the same committee, sponsor, or subject
 - A basic listing of the available content for that bill, like its type, position, and provider
 - And a browser for viewing all the types of information about the bill, such as knowledge about the bill's implications, its purpose, development context, and lobbying activity.
 - [close window]
- Demonstration 2
 - The previous example reflects common, existing ways in which legislation might be identified. This system can also identify legislation using more complex specifications.
 - Along with a simple criteria like a bill still being “in committee”
 - Criteria can be created using information about the person doing the browsing, such as identifying sponsors not by name or county, but “My County.”
 - Information about the amount of available content can also be utilized, such as having a high amount of content submitted.
- Demonstration 3
 - Legislation can also be found based on the types of content associated with the bill and yes/no conditions.
 - For example, suppose someone is reviewing bills in their committee for mistakes in order to propose friendly amendments.
 - They can specify that the system should only show bills where the bill's committee assignment **is** one of My Committees
 - And when specifying legislation types, it can be stated to show bills which **do have** mistake information, e.g. loopholes, wording mistakes, etc, and **does not** have any amendments.
 - After hitting Apply, the system returns a new listing of bills that meet these requirements.
- Demonstration 4
 - The system also can make use of schedule information and information about the intended votes of legislators.
 - For example, criteria can be created such that a bill must have a committee vote within a given time period
 - Also, the intended votes of particular legislators can be used, or the overall vote intentions known to the system. In this case, supported by Del. Susan Lee and where the number of committed yea votes is greater than the number of committed nay votes.
- Summary / Closing Thought on Section
 - [Summary Slide]

- These examples have demonstrated some of the capabilities of the system for identifying legislation, such as through:
 - information about people and their relationship to the legislation, such as their name, sponsorship, or county
 - content available about the legislation, such as amendments and possible mistakes
 - information about the legislation itself, such as subjects, keywords, or its status in the process
 - information available about the person doing the retrieving, such as the county they represent or their committee assignment
 - legislative process information, such as scheduled vote date or intended vote balance
- The system also supports viewing the breadth of information available about legislation, such as related bills, implications, controversy, and legislative history.

Big Picture of Available Knowledge

After identifying a bill of interest, the system supports reviewing what content is available for that item.

- Demonstration 1
 - On the left is a browser for skimming the content available about a bill, similar to skimming a paper legislative bill file.
 - [Click forward a few and back a few]
 - In addition to viewing text, images, and PDF documents, the browser can sort the content, such as by the date it was submitted, or the vote outcome that the content item aims to support.
- Demonstration 2
 - The system also presents a variety of descriptive information about the content available for the bill.
 - At the basic level, it shows the number of items available, in this case 34...
 - ...a breakdown of how much of the available 34 documents supports each of the possible vote options is also provided.
 - Beyond numbers, this system can present a list of the types of documents available and how many documents of each are available. Here, it can be seen that there is an achievability assessment, a discussion of how the document provides an environmental benefit, a story, a trend, and more.
 - There is also a listing of the names of providers of content and their clients.
 - Information is also available about the overall the usage of the content such as number of viewers, the number who understood the content, and the number of questions asked related to the content
- Demonstration 3

- In addition to descriptive information, the system can also highlight whether commonly desired types of content are available.
- For example, there is a designated location for the Fiscal and Policy Note and any other DLS documents...
- ...documents providing summary information and documents providing more detailed analysis...
- ...and documents from political parties
- Summary / Closing Thought on Section
 - These examples have demonstrated some of the capabilities of the system for helping users comprehend what knowledge is available about a piece of legislation, such as:
 - Skimming and sorting through the pieces of content available
 - Viewing descriptive information about the overall available content such as the types of document available, who provided content, and how much content is provided for each outcome.
 - Seeing if types of content that are commonly looked for are available, such as DLS documents, party publications, or summary documents

Identify content of interest

Beyond just browsing content, this system supports searching the content by using filters to only show items with a set of desired qualities.

- Demonstration 1
 - On the left are some filter panels for identifying content and on the right is a listing of all the available content for a bill, along with a viewer.
 - [Scroll through list and show a few items in the viewer]
 - The provider panel allows searching for content along an extensive list of descriptive information. From advocacy priority information to whether they're known to tell the whole story, or just their side.
 - A possible filter with this panel might be to have the system only show information where the provider's reputation as an information source is good and they are connected with a particular place, such as Baltimore.
 - After hitting apply, the set of files shown in the file list table has been reduced based on the entered provider requirements.
 - The content information panel similarly allows searching for content based on a variety of descriptions. For example:
 - the estimated reading time is 2 minutes
 - where the type of knowledge discussed is policy in nature, as opposed to being about politics or personal knowledge.
 - That discusses children
 - Has a Good rating
 - And where the intended audience is legislators, as opposed to the general public, fellow lobbyists, or legislative staff
 - [Apply Search]

- The time information panel allows searching for content based on time values associated with the content. For example, content that was submitted in the month of February.
- [Apply]
- Demonstration 2
 - [New Panel]
 - Another way that the system supports searching for desired content is by type and position.
 - This system has an extensive list of the types of content that might be submitted about legislation, from information about how something is being abused or an assessment of the achievability of a proposal, to witness lists and who is affected by the legislation. [Show in panel]
 - If interested in trends, stories, and visuals, these types can be entered like this.
 - After applying the search, the file list at the bottom is now populated with items whose type of information is a trend, or a category of story or category of a visual.
 - In addition to searching by type, the position of the items can be used. For example, the system can show which are for, against, or neutral regarding the bill.
- Demonstration 3
 - If some of the content found would be considered useful to keep on file and be readily accessible, this system provides an electronic, personal bill file. By checking off the box next to items, and clicking Store, the system will add the checked items to a personal reference folder for that particular bill, which can be returned to at a later time.
- Summary / Closing Thought on Section
 - These examples have demonstrated some of the capabilities of the system for identifying and searching for content of interest through information about:
 - The provider, such as their location and reputation as an information source
 - The content itself, such as its estimated reading time and keywords
 - Time information, such as when it was submitted
 - The type of information provided, such as information about trends, stories, or visuals.
 - The position the content intends to support.
 - The system also supports storing content of interest in personal reference folders.

Reading and assessing a particular piece of content

When an item of interest has been found, this system supports seeing more detailed information about it to help read and assess it.

- Demonstration 1

- To support assessing a piece of content, this system presents along side the content item a variety of descriptive information.
- First, there is a table listing any available information about controversy surrounding the item, such as areas of agreement...disagreement...or changes.
- To its right is a listing of information from the community, such as its rating for objectivity and clarity or the number of questions asked about it.
- Objective information is also available, such as the items length and estimated reading time, its funding source, how new it is, the vote it intends to support, and whether the content is primarily policy, political, or personal.
- Information about the provider of the content is also available, such as their subjects areas of interest, location, and quality as an information source, such as whether they tell the whole story and their expertise.
- The summary information box provides information such as the list of information types it contains (list some), organizations and people mentioned, subjects, and descriptions of its purpose and relevance.
- Lastly, information about relationships between this item and other available content is provided, such as items it is known to directly support, oppose, balance, respond to, and augment.
- Demonstration 2
 - Along with all the information that is available, the system also recognizes that some information may be more relevant than others, or that some may be prejudicial or undesired.
 - To reflect this, color highlights can be used to highlight descriptive information considered desired based on the user's pre-determined preferences [select highlight button]
 - Similarly, a filter can be used to hide information that is not wanted.
- Demonstration 3
 - Lastly, to support reading and assessing available content, the system can print to paper the content item, along with the information provided to the its right.
 - [Click Print... Button]
- Summary / Closing Thought on Section
 - These examples have demonstrated some of the capabilities of the system for reading and assessing available content, such as:
 - Seeing information about:
 - The controversy surrounding the item, such as areas of agreement...disagreement...or change.
 - information from the community, such as its rating for objectivity and clarity or the number of questions asked about it.
 - Objective information, such as the item's length and estimated reading time, its funding source, how new it is, the vote it intends to support, and whether the

- information provided is primarily policy, political, or personal in nature.
 - Information about the provider of the content such as their subjects areas of interest, location, and quality as an information source.
 - Summary information such as the list of information types it contains (list some), organizations and people mentioned, subjects, and descriptions of its purpose and relevance.
 - Information about its relationships, such as items it is known to directly support, oppose, balance, respond to, and augment.
- The system also supports:
 - Hiding and highlighting available information
 - Printing content along with its descriptive information.

Asking questions and Getting Answers

After reviewing a bill or a document, this system supports asking questions and requesting additional content.

- Demonstration 1
 - For a bill, this system allows users to see what questions have been asked about it and see how they have been answered.
 - The table at the top lists a variety of questions, such as “Can someone clarify section 2? It’s unclear what the new requirement will be.”
 - Along with the question is information about who provided it, the type of question, and the number of answers it has received.
 - When a question is selected, the table below it lists the answers provided, who provided it, and whether there is a document attached in addition to a simple text answer.
 - [Click on a few answers to show document]
 - Questions can be submitted about the bill by typing it here, optionally specifying a type, and clicking Add.
 - [submit question “Is this bill in-line with what our neighbor states are doing? Of type Legislative]
 - [Select answer in the Questions list]
 - The Question list now shows the question, and that it doesn’t have any answers yet.
 - [Open 1b]
 - A similar process is supported for documents, as well as legislation.
 - Here, a policy brief is being reviewed, and question have been asked such as...
 - “Why is there such a large difference between the statistics quoted here and what your opponents are providing?”
 - The ability to view answers and submit questions is the same.
- Demonstration 2

- In addition to submitting questions, this system supports being able to request particular content.
- For example, “Can someone provide examples of bills on this topic passed in other states?” is requesting Research and has received # replies
- The system show there are # responses which can be viewed by selected the request.
- Requests can be submitted in the same fashion as questions.
- [Enter request “Can someone provide pictures of what the neighborhood currently looks like that this bill is meant to help improve” of type Research]
- These examples have demonstrated some of the capabilities of the system for asking questions and requesting content, such as:
 - Seeing what questions and requests others have made, along with the type of question or response, and who submitted it
 - Seeing what the responses have been and who has been responding
 - And submitting one’s own questions and requests.

Profiles

- In addition to a focus on legislation and the content associated with it, this system support reviewing information about legislators and lobbyists through profiles
- Demonstration 1
 - Through the legislator profile, the system supports seeing a variety of information.
 - There is a photo of the legislator along with their name, and basic representation information, such as their district, party, leadership role, and committee.
 - Next to the photo is a color representation of whether there are ethics infractions or warnings from others for this person.
 - The affiliations table lists the name, type, and duration of known affiliations, such as boards they serve on, joint committees, caucuses, associations, committees and sub-committees, task forces, and schools they’ve attended.
 - Beneath, we can gain access to this person’s ethics commission filings. Double-clicking would show the submitted filing.
 - Through the contact information box, any information about phone numbers, mailing addresses, emails, screen names, and websites are shown.
 - The recent activity of the legislator can also be seen, such as requests posted, questions asked, bills sponsored, documents read, and votes cast. Double-clicking would show the object of the activity, such as the content item or bill.
 - A more focused listing is given for votes, listing all the bills on which they have casted a vote, along with the vote, its type, and date.

- The legislation table lists legislation related to that legislator. For example, bills they have sponsored, bills assigned to their committee, or bills with subjects similar to their subjects of interest.
- Similarly, the content table shows related content, such as content read, questioned, tailored for them, about a bill they sponsored, or about a bill in their committee.
- Lastly, there is a comprehensive listing of all descriptive information about the legislator on a variety of topics, such as information about their agenda, biography, such as birthday, career, and family, political intelligence, relationship with aide and groups, awards, bias, stats, preferred information and delivery, and voting pattern.
- The profile also supports adding and removing information.
 - Information about their vote reliability can be added [add and show]
 - And information can be removed [remove and show]
- In addition to seeing information about people, the profile supports off-line interactions. Messages can be sent to people through their profile and the system will deliver that message using the available information about how to contact them.
- Also, if an in-person meeting is desired, that can be setup by clicking the Schedule Meeting button.
- Demonstration 2
 - Similar profiles also exist for lobbyists, but provides slightly different information.
 - The basic representation box instead lists the lobbyist's current clients and the affiliations box lists all their past and present clients and duration.
 - Information about ethics filings, contact information, activity, and position present similar information.
 - The legislation list shows bills that intersect with their subjects of interest and bills where they have submitted content.
 - The content pnel shows items they have submitted, rated, and commented upon.
 - In the extensive information listing, there is information about their agenda, historical information, political information, and quality as an information source information.
- Summary / Closing Thought on Section
 - These examples have demonstrated some of the capabilities of the system related to profiles for legislators and lobbyists, such as:
 - Seeing their photo, name, and basic representation information
 - Warnings about ethics infractions or other issues, as well as a list with access to their ethics commission filings
 - Listing of affiliations, such as committees and non-profits, or special interests hiring them.
 - Details for contacting the person such as phone numbers and emails

- Their recent legislative activity such as votes and sponsorships, or testimony and content submissions.
- Legislation and content related to that person
- Extensive descriptive information, ranging from their biography to their reputation.
- Adding and removing information.
- Sending messages, and scheduling in-person meetings.

Lobbyist Prototype

Identifying bills on which to submit knowledge

- The first task supported by this system is identifying relevant legislation on which to submit knowledge.
- In the center is a table listing basic information about all the legislation available in the system, such as bill #, year, title, and synopsis. This listing is updated based on the criteria and information provided on the left.
- Demonstration 1
 - This first demonstration identifies legislation based on some common searchers.
 - For example, legislation can be searched based on some information about the bill relating to the legislative process ...
 - (Open Property combo box)
 - ..such as bill number, vote outcome, status, hearing date, etc.
 - for now, the Committee Assignment feature will be used and the Budget and Taxation committee selected from the pre-populated list of legislative committees.
 - (Apply search)
 - After hitting apply, the list of legislation now shows only legislation from the Budget and Taxation committee.
 - The system can also identify legislation based on a keyword search of all the information available about a bill...
 - In this case, bills dealing with either pension or retirement will be sought
 - (type Retirement Pension into search text field and Apply)
 - The list of legislation now shows only legislation from the Budget and Taxation committee that deals with Pension and Retirement
 - Legislation is also searchable by its sponsor...
 - This system lists all the legislators to search upon. For this example, Delegate Melaney Griffith will be used.
 - (Select Delegate Melaney Griffith from the popup and Apply)
 - After the search, the system shows that there is only one bill that was sponsored by Delegate Griffith, was assigned to the

Budget and Taxation committee, and deals with Pension and Retirement.

- After double-clicking on this bill, a detailed presentation of all the information available about that bill is shown.
 - There is basic information such as its committee assignment, status, subjects, and synopsis
 - The listing of its sponsors name, party, and district
 - documents related to the legislative process like bill versions and its fiscal and policy note
 - The bill's legislative process events, with description and date
 - A listing of the people and organizations who have stated a position on the bill
 - Information about the controversy around a bill, such as a description of areas of agreement and disagreement
 - Related bills, such as previous introductions, its crossfiled counterpart, and bills that share the same committee, sponsor, or subject
 - A basic listing of the available content for that bill, like its type, position, and provider
 - And a browser for viewing all the types of information about the bill, such as knowledge about the bill's implications, its purpose, development context, and lobbying activity.
 - [close window]
- Demonstration 2
 - The previous example reflects common, existing ways in which legislation might be identified. This system can also identify legislation using more complex specifications.
 - The system supports identifying bills based on people involved with the bill. Options include experts, DLS staff, aides, particular lobbyists, and more. This example will search by special interest and select Maryland Watermen's Association from the populated list of all registered special interests. (Scroll / show whole list of special interests).
 - A search based on understandings of the legislation is also possible, such as impacted populations. Here, the system is asked to show bills where business is impacted.
 - Information about the intended vote of legislators can also be used, such as the bill status [show status options] and the positions and requests of legislators. For example, this system supports seeing bills where anyone in the committee has an undetermined, to-be-determined position on the bill and has made a request for additional information.
- Demonstration 3
 - Legislation can also be identified using information about the person doing the searching.
 - The subject of legislation and a pre-supplied list of subjects that interest a lobbyist can be used to identify relevant legislation. Here,

instead of selecting from the exhaustive list of legislative subjects, the My Subjects option can be used and any bills that have any of those subjects of interest will be shown.

- Legislative schedule information can also be used. Here, bills can be identified where its schedule committee hearing occurs within a given timeframe, for example in the month of March.
- Information about the content submitted about legislation is also incorporated into the system. Along with keeping track of the amount of material available, information about the types of materials are utilized. Using the Available Content Type panel, there is an extensive listing of content types, from Analogies, to Historical Data, to Written Testimony.
- For now though, this search will simply ask for bills where there hasn't been much submission activity and the bill has an anecdote in the st of information provided about it.
- Summary / Closing Thought on Section
 - [Summary Slide]
 - These examples have demonstrated some of the capabilities of the system for identifying legislation, such as through:
 - Information related to the legislative process, such as committee assignment, status, vote outcome, or hearing date.
 - Information about people related to the legislation, such as special interest groups, individual lobbyists, DLS staff, and sponsors.
 - Information about the intended votes of legislators and whether they have made any requests for information.
 - Information about the legislation itself, such as impacted populations, subject, and keywords
 - Information about the person doing the searching, such as their subject areas of interest
 - Information about the content available about the bill, such as the amount of material provided, and the types of material submitted.
 - The system also supports viewing the breadth of information available about legislation, such as related bills, implications, controversy, and legislative history.

Browsing Submitted Knowledge / Getting Sense of Landscape

After identifying a bill of interest, the system supports reviewing what content is available about that legislation.

- Demonstration 1
 - On the left is a browser for skimming the content available about a bill, similar to skimming a paper legislative bill file.
 - [Click forward a few and back a few]

- In addition to viewing text, images, and PDF documents, the browser can sort the content, such as by the date it was submitted, or the vote outcome that the content item aims to support.
- [Sort by position]
- Demonstration 2
 - The system also presents a variety of descriptive information about the content available for the bill.
 - At the basic level, it shows the number of items available, in this case 40...
 - ...a breakdown of how much of the available 40 documents supports each of the possible vote options is also provided.
 - Beyond numbers, this system can present a list of the types of documents available and how many documents of each are available. Here, it can be seen that there is a chart, a discussion of existing efforts, including one regarding industry's efforts, and four personal stories.
 - There is also a listing of the names of providers of content and their clients.
 - Information is also available about the overall usage of the content such as number of viewers, the number who understood the content, and the number of questions asked related to the content
- Demonstration 3
 - This system can also present other summary information about the content available.
 - For example, at the top, the system lists any information requests legislators have made about the bill and how many responses they've received.
 - Next, there is a tabulation of any intended vote information about both legislators and lobbyists connected to the bill
 - Lastly, the distribution of each content type across the positions is shown. In this case, it can be seen that the opposition has not provided a corresponding view about efforts from industry or journal articles, and the supports have not provided any countering example stories or surveys.
- Summary / Closing Thought on Section
 - These examples have demonstrated some of the capabilities of the system for comprehending what knowledge is available about a piece of legislation, such as:
 - Skimming and sorting through the pieces of content available
 - Viewing descriptive information about the overall available content such as quantity, types of content, the names of who provided content, and overall usage of the material.
 - Seeing what content has been provided by the competing sides, the intended votes of people connected to the bill, and the status of informational requests about the bill.

Submitting Content

Beyond seeing bills and what is already available, this system supports submitting knowledge in a variety of ways.

- Demonstration 1a
 - On the left is a file browser for identifying documents on a computer to submit to the system about a bill. For example, a Position Paper in the form of a PDF document.
 - Along with the file, some basic information about the document can be provided to help others find and retrieve it.
 - First, there is the document type. This is an extensive list of the types of documents generally submitted about a bill, from Advisory Opinions, to in depth research and vote reports. For this document, Position Paper would be found under the Lobbying Document type.
 - Next, the outcome the document is intended to support can also be specified.
 - There are also options for linking an information user profile to the document, providing document keywords, and having the system print and include a paper version of the the electronic document in the official legislative bill file.
- Demonstration 1b
 - This system also supports submitting pieces of information, rather than whole documents.
 - For example, a lesson from another state can be entered and in the listing of content parts, under Lesson, LessonFromOtherPolicy can be selected.
 - [Delaware has passed a similar version of this law and has seen a 10% drop in vandalism.]
- Demonstration 2
 - The information pieces of a document can also be specified after it has been submitted.
 - On the left is the text of a submitted document, and on the right is a list of known types of information that might be provided in a document. A piece of text can be selected, along with a type, and labeled.
 - [Label a couple text items – PolicyAnalysis, Example of Problem, Policy Recommendation]
 - Once labeled, these pieces of text can be retrieved by others looking for particular types of information. For example, someone looking for Policy Recommendations will see all the text from all the available documents on a bill labeled as providing a Policy Recommendation.
- Demonstration 3
 - Beyond basic information about content, this system also allows a broad array of descriptive information to be added.
 - For example, given a Policy Brief that was submitted, the provider can submit information about
 - List of sources used [Agency Report, Public Opinion Survey, Research Journals]

- Information about who funded the work [State Research Grant, Non-Profit Donors]
 - It's subjects [Alcohol, Taxes, Children]
 - The intended audience type [Legislators]
 - That it deals primarily with policy knowledge, not personal or political knowledge
 - An executive summary [Discusses the health effects of "alcopops" and advocates for changing its tax category.]
- Demonstration 4
 - Knowledge can also be submitted in this system in response to questions and requests from legislators.
 - Questions and requests are listed about a bill along with the number of responses to it and the name of the legislator who asked the question or made the request.
 - Clicking on each will show the responses given.
 - To respond, text can be entered, and/or a document can be attached.
 - For example, to answer the first question, about businesses leaving, the following text could be used and a document with further information attached.
 - Or, to answer the request for amendments, just the proposed amendment file can be attached.
 - [Submit and show update]
 - These answers and request responses are now added to the set of available knowledge about the legislation
- Demonstration 5
 - This system also supports the tailoring of content to legislators.
 - If a lobbyist wishes to create some content customized to a particular legislator or group of legislators, this can be reflected by identifying who it is tailored for.
 - Here, a document is provided along with a listing of individual legislators and committees. Through these checkboxes, the target legislators and committees can be selected. [Hit submit]
 - Now, when a legislator goes to retrieve information on the bill, they will be able to see which content is customized to them or their committee.
- Summary / Closing Thought on Section
 - These examples have demonstrated some of the capabilities of the system for submitting knowledge about legislation, such as:
 - Submitting information in the form of text and electronic documents
 - Identifying the informational parts of documents, such as policy analysis, recommendations, lesson from another state, or example
 - Providing a range of descriptive information about a submission, such as the type of document, its sources, funding, and subjects

- Submitting knowledge in response to questions and requests from legislators
- And tailoring and targeting content to particular legislators and committees.

Submitting Content Based on Existing Content

In addition to submitting content on its own, this system supports submitting content in connection with content previously submitted by others and one's self.

- Demonstration 1
 - On the left is a list of the content submitted about a bill.
 - When submitting a related document, the type of relationship can be specified, such as supports, summarizes, or counter balances.
 - The type of item being submitted can also be specified.
 - [Browse through type list a bit]
 - When submitting a related item, a file can be attached or some text typed and then linked to that content item.
 - For example, given a details item, content can be submitted to summarize it.
 - [Demonstrate]
 - When legislators look at either of this detail item or the new summary item, they will also be able to see the relationship between them.
- Demonstration 2
 - The system also supports submitting ratings, and comments to existing content.
 - Given a selected document from the list of items submitted about a bill, ratings can be given about the item's clarity, objectivity, usefulness, and relevance.
 - Similarly, a generic comment or a comment on these four attributes can be attached to the document.
 - [I found this particularly useful in clearing up ambiguities left from the committee hearing.]
- Demonstration 3
 - Beyond ratings and comments, additional descriptive information can be added about available content.
 - For example, given a research paper, information can be provided about the controversy surrounding it, such as its level of factuality or controversy, or areas of agreement, disagreement, or change. In this case, a description of opposition will be added [Opponents believe further study is required to learn about other possible solutions]
 - Additionally, information can be added about its funding sources, time periods covered, subjects, newness, estimated reading time, or summary. Here, critical funding information will be added [This study was mainly sponsored by corporations seeking to avoid regulation]
 - Relationships between the document and other items can also be specified, such as that the report augments an anecdote.
- Demonstration 4a

- This system also supports proposing and requesting changes to legislation and other people's content.
- For legislation, an Alternative Proposal can be added to the set of information through text and documents. When submitted, the proposal can be easily reviewed by those considering amendments.
- Demonstration 4b
 - When dealing with content submitted by others in which there is a problem, the system supports two main ways of reacting.
 - First, labels can be applied to the text in question, about which the provider of the item will be notified. For example, some text can be identified as misleading, a logical fallacy, or simply inaccurate. These labels can be seen by others when they review the document.
 - Second, a public or private request can be sent to the provider, including a rationale for the request and a possible replacement.
- Summary / Closing Thought on Section
 - These examples have demonstrated some of the capabilities of the system for submitting content in reaction to other items, such as:
 - submitting new content and connecting it to another item, such as adding a summary to a detail item.
 - submitting ratings to existing content, such as about the item's clarity or objectivity.
 - Submitting comments about existing content, such as about its usefulness
 - Submitting descriptive information about items, such as about the controversy surrounding it, its funding source, or its relationship to other content
 - Submitting proposed amendments to legislation
 - And labeling questionable parts of other people's submissions and sending modification requests to providers.

Usage Tracking

After submitting content, this system supports tracking its usage.

- Demonstration 1
 - To support tracking of content, this system provides a listing of the content submitted by a lobbyist, each with metrics reflecting the number of views, the number of viewers who understood it, and the number who had questions.
 - The system also supports seeing further details for individual items [select CriticismOfBehavior item from list.]
 - The readers listing provides the name and type of the individual people who read the item, and whether they understood or had questions about it.
 - In the labels panel, any tags are listed along with the text involved and the person doing the tagging. For example, there are tags about text considered inaccurate, fallacious, or misleading, and tags meant to

- identify the type of information some text provides, such as the identify of a key decision maker.
- The ratings panel provides information about the range of scores the item received, such as the most frequent score for clarity and the average score for usefulness.
- Lastly, there is a listing of the comments along with the name of the commenter and the type of comment, such as whether it a general comment or a comment about its objectivity.
- Summary / Closing Thought on Section
 - These examples have demonstrated some of the capabilities of the system for following content after it has been submitted, such as:
 - Seeing a summary listing of the metrics for the knowledge provided
 - Seeing details for individual submissions, such as readers, ratings, tags, and comment.

Profiles

- In addition to a focus on legislation and the content associated with it, this system support reviewing information about legislators and lobbyists through profiles
- Demonstration 1
 - Through the legislator profile, the system supports seeing a variety of information.
 - There is a photo of the legislator along with their name, and basic representation information, such as their district, party, leadership role, and committee.
 - Next to the photo is a color representation of whether there are ethics infractions or warnings from others for this person.
 - The affiliations table lists the name, type, and duration of known affiliations, such as boards they serve on, joint committees, caucuses, associations, committees and sub-committees, task forces, and schools they've attended.
 - Beneath, we can gain access to this person's ethics commission filings. Double-clicking would show the submitted filing.
 - Through the contact information box, any information about phone numbers, mailing addresses, emails, screen names, and websites are shown.
 - The recent activity of the legislator can also be seen, such as requests posted, questions asked, bills sponsored, documents read, and votes cast. Double-clicking would show the object of the activity, such as the content item or bill.
 - A more focused listing is given for votes, listing all the bills on which they have casted a vote, along with the vote, its type, and date.
 - The legislation table lists legislation related to that legislator. For example, bills they have sponsored, bills assigned to their committee, or bills with subjects similar to their subjects of interest.

- Similarly, the content table shows related content, such as content read, questioned, tailored for them, about a bill they sponsored, or about a bill in their committee.
- Lastly, there is a comprehensive listing of all descriptive information about the legislator on a variety of topics, such as information about their agenda, biography, such as birthday, career, and family, political intelligence, relationship with aide and groups, awards, bias, stats, preferred information and delivery, and voting pattern.
- The profile also supports adding and removing information.
 - Information about their vote reliability can be added [add and show]
 - And information can be removed [remove and show]
- In addition to seeing information about people, the profile supports off-line interactions. Messages can be sent to people through their profile and the system will deliver that message using the available information about how to contact them.
- Also, if an in-person meeting is desired, that can be setup by clicking the Schedule Meeting button.
- Demonstration 2
 - Similar profiles also exist for lobbyists, but provides slightly different information.
 - The basic representation box instead lists the lobbyist's current clients and the affiliations box lists all their past and present clients and duration.
 - Information about ethics filings, contact information, activity, and position present similar information.
 - The legislation list shows bills that intersect with their subjects of interest and bills where they have submitted content.
 - The content pnel shows items they have submitted, rated, and commented upon.
 - In the extensive information listing, there is information about their agenda, historical information, political information, and quality as an information source information.
- Summary / Closing Thought on Section
 - These examples have demonstrated some of the capabilities of the system related to profiles for legislators and lobbyists, such as:
 - Seeing their photo, name, and basic representation information
 - Warnings about ethics infractions or other issues, as well as a list with access to their ethics commission filings
 - Listing of affiliations, such as committees and non-profits, or special interests hiring them.
 - Details for contacting the person such as phone numbers and emails
 - Their recent legislative activity such as votes and sponsorships, or testimony and content submissions.
 - Legislation and content related to that person

- Extensive descriptive information, ranging from their biography to their reputation.
- Adding and removing information.
- Sending messages, and scheduling in-person meetings.

Appendix D: Evaluation Surveys

Set of Surveys for Legislator Tasks

The features of the system would enable me to accomplish tasks related to identifying bills on which to retrieve information more **quickly**

likely | | | | | | | unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would improve my **performance** when identifying bills on which to retrieve information.

likely | | | | | | | unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would increase my **productivity** when identifying bills on which to retrieve information.

likely | | | | | | | unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enhance my **effectiveness** at identifying bills on which to retrieve information.

likely | | | | | | | unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would make it **easier** to identify bills on which to retrieve information.

likely | | | | | | | unlikely
extremely quite slightly neither slightly quite extremely

I would find the features of the system **useful** when identifying bills on which to retrieve information.

likely | | | | | | | unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enable me to accomplish tasks related to browsing information available about a bill more **quickly**

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would improve my **performance** when browsing information available about a bill.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would increase my **productivity** when browsing information available about a bill.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enhance my **effectiveness** at browsing information available about a bill.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would make it **easier** to browse information available about a bill.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

I would find the features of the system **useful** when browsing information available about a bill.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enable me to accomplish tasks related to identifying content of interest more **quickly**

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would improve my **performance** when identifying content of interest.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would increase my **productivity** when identifying content of interest.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enhance my **effectiveness** at identifying content of interest.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would make it **easier** to identify content of interest.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

I would find the features of the system **useful** when identifying content of interest.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enable me to accomplish tasks related to reading and assessing documents more **quickly**

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would improve my **performance** when reading and assessing documents.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would increase my **productivity** when reading and assessing documents.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enhance my **effectiveness** at reading and assessing documents.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would make it **easier** to read and assess documents.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

I would find the features of the system **useful** when reading and assessing documents.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enable me to accomplish tasks related to asking questions and requesting information more **quickly**

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would improve my **performance** when asking questions and requesting information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would increase my **productivity** when asking questions and requesting information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enhance my **effectiveness** at asking questions and requesting information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would make it **easier** to ask questions and request information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

I would find the features of the system **useful** when asking questions and requesting information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enable me to accomplish tasks related to retrieving information about legislators and lobbyists more **quickly**

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would improve my **performance** when retrieving information about legislators and lobbyists.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would increase my **productivity** when retrieving information about legislators and lobbyists.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enhance my **effectiveness** at retrieving information about legislators and lobbyists.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would make it **easier** to retrieving information about legislators and lobbyists.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

I would find the features of the system **useful** when retrieving information about legislators and lobbyists.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

Using the set of system features would enable me to accomplish tasks related to the overall process of retrieving information about legislation more **quickly**

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

Using the set of system features would improve my **performance** in the overall process of retrieving information about legislation.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

Using the set of system features would increase my **productivity** in the overall process of retrieving information about legislation.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

Using the set of system features would enhance my **effectiveness** at the overall process of retrieving information about legislation.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

Using the set of system features would make the overall process of retrieving information about legislation **easier**.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

I would find the set of system features **useful** in the overall process of retrieving information about legislation.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

Set of Surveys for Lobbyist Tasks

The features of the system would enable me to accomplish tasks related to identifying bills on which to submit information more **quickly**

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would improve my **performance** when identifying bills on which to submit information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would increase my **productivity** when identifying bills on which to submit information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enhance my **effectiveness** at identifying bills on which to submit information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would make it **easier** to identify bills on which to submit information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

I would find the features of the system **useful** when identifying bills on which to submit information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enable me to accomplish tasks related to browsing information available about a bill more **quickly**

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would improve my **performance** when browsing information available about a bill.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would increase my **productivity** when browsing information available about a bill.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enhance my **effectiveness** at browsing information available about a bill.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would make it **easier** to browse information available about a bill.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

I would find the features of the system **useful** when browsing information available about a bill.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enable me to accomplish tasks related to submitting information more **quickly**

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would improve my **performance** when submitting information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would increase my **productivity** when submitting information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enhance my **effectiveness** at submitting information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would make it **easier** to submit information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

I would find the features of the system **useful** when submitting information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enable me to accomplish tasks related to submitting information in reaction to other information more **quickly**

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would improve my **performance** when submitting information in reaction to other information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would increase my **productivity** when submitting information in reaction to other information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enhance my **effectiveness** at submitting information in reaction to other information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would make it **easier** to submit information in reaction to other information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

I would find the features of the system **useful** when submitting information in reaction to other information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enable me to accomplish tasks related to tracking the usage of submitted information more **quickly**

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would improve my **performance** when tracking the usage of submitted information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would increase my **productivity** when tracking the usage of submitted information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enhance my **effectiveness** at tracking the usage of submitted information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would make it **easier** to track the usage of submitted information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

I would find the features of the system **useful** when tracking the usage of submitted information.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enable me to accomplish tasks related to retrieving information about legislators and lobbyists more **quickly**

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would improve my **performance** when retrieving information about legislators and lobbyists.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would increase my **productivity** when retrieving information about legislators and lobbyists.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would enhance my **effectiveness** at retrieving information about legislators and lobbyists.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

The features of the system would make it **easier** to retrieving information about legislators and lobbyists.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

I would find the features of the system **useful** when retrieving information about legislators and lobbyists.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

Using the set of system features would enable me to accomplish tasks related to the overall process of submitting information about legislation more **quickly**

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

Using the set of system features would improve my **performance** in the overall process of submitting information about legislation.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

Using the set of system features would increase my **productivity** in the overall process of submitting information about legislation.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

Using the set of system features would enhance my **effectiveness** at the overall process of submitting information about legislation.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

Using the set of system features would make the overall process of submitting information about legislation **easier**.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

I would find the set of system features **useful** in the overall process of submitting information about legislation.

likely | ___ | ___ | ___ | ___ | ___ | ___ | ___ unlikely
extremely quite slightly neither slightly quite extremely

Appendix E: Ontology

Classes

- AccessList
 - ConnectAccessList
 - ReadAccessList
 - ReadAndWriteAccessList
 - ViewAccessList
- Account
 - Administrator
 - User
- ActivityLog
- Actor
 - Client
 - Legislator
 - Delegate
 - Senator
 - Lobbyist
- Affiliation
 - CaucusMembership
 - CivilAssociationInvolvement
 - ProfessionalAssociationMembership
- Author
- CommunicationMedium

- ElectronicDocument
- EmailMessage
- FaxMessage
- Meeting
- PaperDocument
- Phone
- TextMessage
- ContactMechanism
 - Address
 - EmailAddress
 - PhoneNumber
 - ScreenName
 - InstantMessengerScreenName
 - SkypeScreenName
 - SocialNetworkingPage
 - FacebookPage
 - TwitterPage
 - Website
 - Blog
 - Homepage
- ContentPart
 - Activism
 - LegislativeProcessStepsRemaining

- LobbyingAdvertisement
- LobbyingCampaign
- PlannedFutureActivism
- Submission
- Advice
 - CampaignAdvice
 - InformalAdvice
 - PolicyAdvice
- AlternativeProposal
- Analysis
 - AnalysisOfLegislation
 - PolicyAnalysis
 - ProConAnalysis
 - PublicOpinionAnalysis
- Background
 - BackgroundOfImportantEvent
 - BackgroundOfActor
 - BackgroundOfControversy
 - BackgroundOfDevelopment
 - BackgroundOfLegalMatter
 - BackgroundOfLegislation
 - BackgroundOfPolicySubjectArea
 - BackgroundOfScientificMatter

- BackgroundOfTechnicalMatter
- Challenge
 - PolicyChallenge
- Change
 - DocumentChange
 - PoliticalChange
 - ProgressAssessment
 - RevisionToLaw
 - StatusQuoChange
 - UsageChange
- Claim
- Clarification
 - AnswerToClarificationQuestion
 - ClarificationOfConfusion
 - ClarificationOfFact
 - ClarificationOfImpactedParties
 - ClarificationOfLegislation
 - ClarificationOfPurpose
 - ClarificationOfStatement
 - ClarificationOfTerminology
 - Explanation
 - ExplanationOfDataTable
 - ExplanationOfGapsInData

- ExplanationOfLobbyingBehavior
- ExplanationOfOpinion
- ExplanationOfPrediction
- ExplanationOfProcedure
- Comparison
 - Analogy
 - ComparisonOfStatusQuo
 - ComparisonOfActors
 - ComparisonOfAlternatives
 - ComparisonOfCaveats
 - ComparisonOfCosts
 - ComparisonOfLegislation
 - ComparisonOfNewAndOld
 - ComparisonToOtherPolity
 - ComparisonOfLegislativeActivityOfOtherPolity
 - ComparisonOfDataFromOtherPolity
 - ComparisonOfGoalsOfOtherPolity
 - ComparisonOfOutcomesFromOtherPolity
 - ComparisonOfSimilaritiesAndDifferencesWithOtherPolity
 - ComparisonToPolicyOfOtherPolity
- Con
 - FinancialCon

- HarmToGroupEffectuated
- Misuse
 - Abuse
- PolicyCon
- Conclusion
 - AgencyFinding
 - ConcludingRecommendationOfCommittee
 - ConclusionFromEvent
 - ConclusionOfCostBenefitAnalysis
 - IndividualConclusion
 - LegalConclusion
 - LegalFinding
 - LegalOpinion
 - ResearchConclusion
 - SurveyConclusion
- Criticism
 - Blame
 - CriticismOfArgument
 - CriticismOfAssertion
 - CriticismOfBehavior
 - CriticismOfFeasibility
 - CriticismOfIndividual
 - CriticismOfLegalNeed

- CriticismOfOversight
- CriticismOfPolicy
- CriticismOfSelf
- CriticismOfSource
- HistoricalCriticism
- LegalCriticism
- Data
 - Fact
 - Statistic
- Economic
 - EconomicAnalysis
 - EconomicEstimate
 - EconomicImpact
 - EconomicImpactOnAgency
 - EconomicImpactOnBusiness
 - EconomicImpactOnFunding
 - EconomicImpactOnGovernment
 - EconomicImpactOnIndustry
 - EconomicImpactOnJobs
 - EconomicImpactOnStateBudge
 - EconomicImpactOnStatusQuo
 - EconomicImpactOnTaxes
 - EconomicPrediction

- EducationalMaterial
 - BackgroundEducationalMaterial
 - EducationalFact
 - IntroductoryEducationalMaterial
 - ProceduralEducationalMaterial
 - TechnicalEducationalMaterial
- Example
 - CaseStudyExample
 - ExampleOfIdeal
 - ExampleOfProblem
 - ExampleOfTrend
 - Exemplar
 - HypotheticalExample
- ExistingEffort
 - ExistingEffortInGovernment
 - ExistingEffortInIndustry
- Explanation
 - ExplanationOfDataTable
 - ExplanationOfGapsInData
 - ExplanationOfLobbyingBehavior
 - ExplanationOfOpinion
 - ExplanationOfPrediction
 - ExplanationOfProcedure

- Goal
- Historical
 - HistoricalData
 - HistoricalEvent
 - HistoricalJustification
 - HistoricalTestimony
 - HistoryOfPolicy
 - LegislativeHistory
 - MemoryFromPreviousLegislativeSession
 - Timeline
- IdentityOfStakeholder
 - DescriptionOfLobbyingLandscape
 - IdentifyOfInitiatorOfProposal
 - IdentityOfAgencyStakeholder
 - IdentityOfBusinessStakeholder
 - IdentityOfCitizenStakeholder
 - IdentityOfInvestigatorStakeholder
 - IdentityOfKeyDecisionMaker
 - IdentityOfLegalStakeholder
 - IdentityOfLegislatorStakeholder
 - IdentityOfOppositionStakeholder
 - IdentityOfPolicyInterestGroupStakeholder
 - IdentityOfSupportingStakeholder

- IdentityOfThoseAffectedByLegislation
- IdentityOfThoseAffectedByProblem
- Implication
 - BusinessImplication
 - EffectedEntities
 - FinancialImplication
 - IndustryImplication
 - LegalImplication
 - PolicyImplication
 - TaxImplication
 - UnrecognizedImplication
 - WhoAffected
- Importance
 - AttentionLevelAssessment
 - EconomicImportance
 - ImportanceDueToNecessity
 - ImportanceDueToSizeOfStakeholders
 - ImportanceDueToTime
 - PoliticalImportance
 - Priority
 - Relevance
- ImportantPoint
 - Finding

- ImportantPointAboutAttributes
- ImportantPointAboutPolicy
- Issue
- TalkingPoint
- Legal
 - Constitutionality
 - CurrentLaw
 - CurrentRegulation
 - LegalAnalysis
 - LegalCase
 - LegalChallenge
 - LegalIssue
 - LegalPurpose
- Lesson
 - LessonFromHistory
 - LessonFromOtherPolity
 - LessonFromPreviousAttempt
- List
 - BulletPointList
 - Checklist
- LogisticalConsideration
 - AchievabilityAssessment
 - ConsiderationOfAdministration

- ConsiderationOfNeededBuyIn
 - ConsiderationOfResources
 - ConsiderationOfTime
- Methodology
 - MethodologyOfCalculation
 - MethodologyOfDataCollection
 - MethodologyOfResearch
- Mistake
 - LegalMistake
 - Loophole
 - TechnicalWordingMistake
- PerformanceAssessment
- PersuasiveAppeal
 - AppealToConsistency
 - AppealToEconomicConsideration
 - AppealToImprovement
 - AppealToPriorities
 - AppealToPublicHazard
 - AppealToResponsibility
 - AppealToSizeOfAffectedGroup
 - AppealToTakingLeadership
 - AppealToTradition
 - AppealToTrend

- AppealToValues
- AppealtoSizeOfProblem
- EmotionalAppeal
- PoliticalAppeal
- Political
 - PoliticalCalculus
 - PoliticalDrama
 - PoliticalHurdles
 - PoliticalNarrative
 - PoliticalProcess
- Position
 - PositionOfDocumentProvider
 - PositionOfGovernor
 - PositionOfIndustry
 - PositionOfLegislativeLeadership
 - PositionOfLegislator
 - PositionOfOfficials
 - PositionOfPoliticalParty
 - PositionOfPublic
 - PositionOfPublication
 - PositionOfSpecialInterest
- Prediction
- Pro

- Advantage
- Benefit
- EconomicPro
- EnvironmentalPro
- FinancialPro
- PerformancePro
- ProblemSolvingPro
- QualityOfLifePro
- Problem
 - PragmaticProblem
 - ProceduralProblem
- PublicOpinion
 - Poll
 - PopularityOfItem
 - PublicExpectations
 - PublicInput
 - PublicTestimony
 - Survey
- QuestionsAndAnswers
 - Answer
 - CommonsQuestionsAndAnswers
 - LegalQuestionsAndAnswers
 - LegislativeQuestionsAndAnswers

- Question
 - RhetoricalQuestion
- Quote
- Rationale
 - Arguement
 - PredicationRationale
 - RationaleForAction
 - RationaleForVote
- Recommendation
 - AmendmentRecommendation
 - AnalysisOfAgreementsAndDisagreementsOfRecommendations
 - PolicyRecommendation
 - RecommendationOfPosition
 - RecommendationOfPublicityCampaign
 - RecommendationToConductDataCollection
 - RecommendationToConductResearchSTudy
- Reference
 - Footnote
 - Link
 - ReferenceToAdditionalData
 - ReferenceToAdditionalInfomration
 - ReferenceToDocument

- ReferenceToElectronicVersion
- ReferenceToGroup
- ReferenceToLegislation
- ReferenceToPerson
- ReferenceToRecord
- ReferenceToRelatedResource
- ReferenceToSection
- ReferenceToSource
- Relationship
 - ConflictOfInterest
- Request
 - FinancialRequest
 - ModificationRequest
 - RequestForAction
 - RequestForAmendment
 - RequestForContent
 - RequestForInformation
 - RequestForSupport
- Response
 - Annotation
 - Comment
 - Reaction
 - ReactionToAssertion

- ReactionToDocument
 - ReactionToMeeting
 - ReactionToOpposition
 - ReactionToOutcome
 - ReactionToProposal
 - ReactionToRationale
 - ReactionToResult
 - ReactionToStatement
- Rebuttal
 - RebuttalToClaim
 - RebuttalToCriticism
 - RebuttalToDocument
 - RebuttalToOfficialOpinion
 - RebuttalToOpposition
 - RebuttalToProposal
 - RebuttalToRebuttal
- RequestedInformation
- StatusQuo
 - AdministrativeStatusQuo
 - BusinessPracticeStatusQuo
 - GoodAspectOfStatusQuo
 - ImplementationStatusQuo
 - LegalStatusQuo

- PerceptionStatusQuo
- ProblemWithStatusQuo
- UsageStatusQuo
- WinnersAndLosersInStatusQuo
- Story
 - Anecdote
 - ExampleStory
 - PersonalStory
- Summary
 - SummaryOfBackground
 - SummaryOfControversy
 - SummaryOfDebate
 - SummaryOfDocument
 - SummaryOfLegislation
 - SummaryOfMessage
- SupplementToDocument
 - Appendix
 - Foreword
 - Glossary
 - Index
 - Preface
- Trend
- Visual

- Chart
- Diagram
- Exhibit
- Figure
- Graph
- Image
- Map
- Multimedia
- Table
- Document
 - AdvisoryOpinion
 - AdviceOfCouncil
 - AgencyOpinionLetter
 - AttorneyGeneralOpinion
 - CommissionMemo
 - GenericAdvisoryLetter
 - AudioVisual
 - Picture
 - Presentation
 - Recording
 - AudioRecording
 - AudioVisualRecording
 - VideoRecording

- CompilationIndex
 - CompilationOfNewspaperArticles
 - LawIndex
 - LegislationIndex
 - SynopsesIndex
- ConstituentRelated
 - ConstituentLetter
 - Petition
 - PetitionWithSignatures
 - Referendum
- Email
 - EmailAttachment
 - EmailThread
- EthicsCommissionFiling
 - ActivityReport
 - CompensationForm
 - FinancialDisclosureStatement
 - RegistrationForm
 - SpecialReportForm
- EthicsCommissionPublication
 - EthicsCommissionMemo
 - LobbyistActivityReport
 - LobbyistCompensationReport

- LobbyistRegistrationIndex
- Fiscal
 - Budget
 - FiscalAndPolicyNote
 - FiscalEstimateWorksheet
- Gubernatorial
 - MessageFromGovernor
 - PlansAndInitiativesOfGovernor
- InDepthResearch
 - Book
 - DLSResearchPublication
 - Dissertation
 - EncyclopediaArticle
 - WikipediaArticle
 - JournalArticle
 - PolicyStudy
 - Report
 - CommissionReport
 - CommitteeResearchReport
 - ReportAboutLegislation
 - SpecialInterestReport
- Informational
 - Guide

- LegislativeLingoGlossary
 - RosterAndListOfCommittees
 - Rulebook
- LegalDocument
 - Agreement
 - Brief
 - CourtDecision
 - Statute
- LegislationRelated
 - Amendment
 - ConferenceCommitteeAmendment
 - FloorAmendment
 - LegislativeHistoryReport
- LegislativeProcessDocument
 - Calendar
 - CommitteeReport
 - ConferenceCommitteeDocument
 - ConferenceCommitteeAmendment
 - ConferenceCommitteeReport
 - FloorReport
 - LegislativeStatusReport
 - ListOfConferenceCommitteeDelegates
 - OfficialMessageToOtherChamber

- RollCallVote
- Schedule
- WitnessList
- LegislativeSessionRecap
 - FinalStatusOfProposedLegislation
 - LegislativeActionSummary
 - MajorIssuesReview
- LibraryResource
- LobbyingDocument
 - AmicusBrief
 - FactSheet
 - Flyer
 - FormLetter
 - Pamphlet
 - PolicyBrief
 - PositionPaper
 - PrintedPresentation
 - PublicationClipping
 - TalkingPoints
 - WrittenTestimony
- Log
 - AttendanceLog
 - ProceedingsLog

- Note
 - AnnotatedDocument
 - ConversationNote
 - EditorsNote
 - MeetingNote
 - Message
 - Page
- PoliticalPartyPublication
- PublicPublication
 - Announcement
 - PressRelease
 - Article
 - MagazineArticle
 - NewspaperArticle
 - Editorial
 - GovernmentPublication
 - IndustryPublication
 - Newsletter
- Record
 - Minutes
 - Recording
 - AudioRecording
 - AudioVisualRecording

- VideoRecording
 - Transcript
- VoteReport
 - VetoMessage
 - VoteTallySheet
 - CommitteeVoteTallySheet
 - FloorVoteTallySheet
- FilterRule
- InformationSource
 - NewsShow
 - Publication
 - TelevisionShow
- Legislation
- LegislativeAction
- LogEntry
- Notification
- NotificationTriggerEvent
- PartyAffiliation
- PermissionGroup
- PositionOnLegislation
- Profile
 - LegislatorProfile
 - LobbyistProfile

- QuestionList
- Rating
- ReferenceFolder
- RequestList
- SubjectArea
- Tag
- Vote

Object Properties

- actorInformationAbout
- addressOfPhoneNumber
- answersQuestion
- answersRequest
- asksQuestion
- augmentsItem
- balancesItem
- belongsToPermissionGroup
- castedVote
- commentBy
- containsItem
- containsQuestion
- containsRequest
- contentRequestAboutLegislation

- didNotUnderstandContent
- hasAccessList
- hasAccount
- hasAccountLevelTrackingInfo
 - hasQuestionsFrom
 - hasRequestsFrom
 - notUnderstoodBy
 - readBy
 - understoodBy
 - viewedBy
- hasAccountTrackingInfo
 - asksQuestion
 - didNotUnderstandContent
 - makesRequestForContent
 - questionedContent
 - readContent
 - requestedContent
 - understoodContent
 - viewedContent
- hasActivityInfo
 - lobbiedAboutLegislation
 - lobbiedLegislator
 - providedContent

- hasActorInfo
 - hasAffiliation
 - hasContactInfo
 - hasEthicsCommissionFiling
 - hasLegislatorInfo
 - hasPositionInfo
 - hasVotingRecordInfo
 - usesInformationSource
 - hasLobbyistInfo
 - hasActivityInfo
 - lobbiedAboutLegislation
 - lobbiedLegislator
 - providedContent
 - hasClient
- hasAddressPhoneNumber
- hasAffiliation
- hasAlliedLegislation
- hasAmendment
 - hasProposedAmendment
- hasAnalysisOfLegislation
- hasAuthor
- hasClient
- hasComment

- hasCompetingLegislation
- hasConferenceCommitteeDocument
- hasContactInfo
- hasContentPart
- hasContentSummary
- hasContentTrackingInfo
 - hasAccountLevelTrackingInfo
 - hasQuestionsFrom
 - hasRequestsFrom
 - notUnderstoodBy
 - readBy
 - understoodBy
 - viewedBy
 - hasQuestionList
 - hasRequestList
- hasCrossfiledLegislation
- hasEthicsCommissionFiling
- hasFilterRule
- hasInterestInSubjectArea
- hasInterestedActor
- hasInvolvedActor
- hasInvolvementWithSubjectArea
- hasLegislationStakeholder

- hasLegislativeAction
- hasLegislatorInfo
 - hasPositionInfo
 - hasVotingRecordInfo
 - usesInformationSource
- hasLegislatorInformation
- hasLobbyistInfo
 - hasActivityInfo
 - lobbiedAboutLegislation
 - lobbiedLegislator
 - providedContent
 - hasClient
- hasLogEntry
- hasPositionInfo
- hasPositionOnLegislation
- hasPreferenceForMedium
- hasPreviousIntroductionOfLegislation
- hasPreviousVersion
- hasPriorIntroduction
- hasProfile
- hasProposedAmendment
- hasQuestion
- hasQuestionList

- hasQuestionsFrom
- hasRating
- hasReferenceFolder
- hasReferenceToContent
- hasRelatedLegislation
 - hasAlliedLegislation
 - hasCompetingLegislation
 - hasCrossfiledLegislation
 - hasPreviousIntroductionOfLegislation
 - hasPreviousVersion
 - hasSimilarSubjectLegislation
- hasReportAboutLegislation
- hasRequestForAmendment
- hasRequestList
- hasRequestedInformationAboutLegislation
- hasRequestedModification
- hasRequestsFrom
- hasResearchAboutLegislation
 - hasAnalysisOfLegislation
 - hasReportAboutLegislation
 - hasRequestedInformationAboutLegislation
- hasResponse
- hasRollCallVote

- hasScheduleInfo
- hasSimilarSubjectLegislation
- hasStake
 - hasInterestInSubjectArea
 - hasInvolvementWithSubjectArea
 - hasStakeInLegislation
- hasStakeInLegislation
- hasSubjectArea
- hasSubmittedContentItem
- hasSummary
 - hasContentSummary
- hasTag
- hasTrackingInfo
 - hasAccountTrackingInfo
 - asksQuestion
 - didNotUnderstandContent
 - makesRequestForContent
 - questionedContent
 - readContent
 - requestedContent
 - understoodContent
 - viewedContent
 - hasContentTrackingInfo

- hasAccountLevelTrackingInfo
 - hasQuestionsFrom
 - hasRequestsFrom
 - notUnderstoodBy
 - readBy
 - understoodBy
 - viewedBy
 - hasQuestionList
 - hasRequestList
- hasTriggerEvent
- hasVotingRecordInfo
- intendedFor
- interestedInLegislation
- inverse_of_hasReferenceFolder
- involvedWithLegislation
- isAccountFor
- isAuthorOf
- labelsUsageOf
- lobbiedAboutLegislation
- lobbiedLegislator
- lobbies
- makesReferenceTo
 - makesReferenceToDocument

- makesReferenceToLegislation
 - makesReferenceToPerson
 - makesReferenceToSection
- makesReferenceToDocument
- makesReferenceToLegislation
- makesReferenceToPerson
- makesReferenceToSection
- makesRequestForContent
- notUnderstoodBy
- notifyAboutLegislation
- opposedBy
- opposes
- opposesItem
- partOfDocument
- performedLogEntry
- positionAboutLegislation
- positionForLegislation
- profileOf
- providedBy
- providedContent
- providedToSupportIntendedVote
- providesAnswer
- providesComment

- providesDetailsFor
- providesRating
- providesTag
- questionAboutContent
- questionedContent
- questions
- ratingBy
- readBy
- readContent
- referencesProfile
- relatedTo
 - augmentsItem
 - balancesItem
 - opposesItem
 - respondsToItem
 - summarizesItem
 - supportsItem
- requestedBy
- requestedContent
- respondsToItem
- retrieves
- sendsPage
- sponsoredBy

- sponsors
- submits
- submittedForLegislation
- summarizesItem
- supportedBy
- supports
- supportsItem
- tagBy
- undecidedAbout
- undecidedBy
- understoodBy
- understoodContent
- usesInformationSource
- viewedBy
- viewedContent
- voteOnLegislation
- wantsNotificationAboutLegislation
- wantsNotificationOf

Data Properties

- hasAccountInformation
 - hasPassword
 - hasUID

- hasUsername
- hasActivismInformation
 - hasActivismDescription
 - hasActivismSuccessAssessment
 - hasPartiesInvolvedInformation
 - hasProgressAssessment
- hasActorInformation
 - hasClientInformation
 - hasClientCampaignContributionInformation
 - hasClientContactPersonInformation
 - hasClientEndDate
 - hasClientLocationInformation
 - hasClientName
 - hasClientReputationInformation
 - hasClientSizeInformation
 - hasClientStakeInIssueInformation
 - hasClientStartDate
 - hasClientWebsite
 - hasStatedPositionOfClientInformation
 - hasLegislatorActorInformation
 - hasAffiliationInformation
 - hasAffiliationRole
 - hasNameOfAffiliation

- hasTypeOfAffiliation
- hasYearAffiliationBegan
- hasYearAffiliationEnded
- hasElectoralInformation
 - hasReportedContribution
 - hasTermLength
- hasInformationAboutConcern
 - hasInformationAboutDistrictConcern
 - hasInformationAboutElectoralConcern
 - hasInformationAboutInformationalConcern
 - hasInformationAboutPersonalConcern
- hasLegislatingStatistic
- hasLegislativeAideInformation
 - hasLegislativeAideNameInformation
 - hasLevelOfInvolvementInformation
- hasLegislatorBiographicalInformation
 - hasBirthdayInformation
 - hasBirthPlace
 - hasBirthYear
 - hasBirthdate
 - hasCareerInformation
 - hasCauseOfDeparture
 - hasElectoralBiographyInformation

- hasReplacementInformation
- hasEmploymentInformation
- hasFamilyInformation
 - hasMaritalStatus
 - hasNumberOfChildren
- hasLifeStory
- hasNumberOfYearsAsLegislator
- hasNumberOfYearsInALeadershipPosition
- hasPoliticalBiographyInformation
 - hasPreviousRoleInformation
 - hasSenioritySuperlative
- hasReligionType
- hasLegislatorReputationInformation
 - hasInformationAboutReputationWithDelegation
 - hasLegislativeAgendaInformation
 - hasLegislativeGoalInformation
 - hasPerspectiveInformation
 - hasPoliticalLabel
 - hasPublicConfidenceInformation
 - hasSeniorityInformation
 - hasValuesInformation
- hasPersonalizationInformation
 - hasContentTailoringInformation

- hasRelationshipBuildingInformation
- hasReceivingInformation
 - hasContactPersonInformation
 - hasContentPreference
 - hasCurrentLocation
 - hasDeliveryPreference
 - hasMediumPreference
 - hasTechnologyUsageInformation
 - hasWillingnessToBeApproched
 - hasWillingnessToReceiveInformation
- hasReponsibilityInformation
 - hasCommitteeReponsibilityInformation
 - hasLeadershipResponsibilityInformation
- hasRepresentationRoleInformation
 - chairsCommittee
 - hasLeadershipPosition
 - hasPartyAffiliation
 - memberOfCommittee
 - memberOfDelegation
 - representsCounty
 - representsDistrict
- hasVotingRecordInformation
 - hasConsistencyBetweenCommitteeAndFloorVote

- hasReliabilityOfIntendedVoteInformation
- hasLobbyistActorInformation
 - hasActivityInformation
 - hasElectoralInvolvementInformation
 - hasKnowledgeProvidedInformation
 - hasLegislationLobbiedInformation
 - hasLegislatorsLobbiedInformation
 - hasStakeholderOrganizationActivityInformation
 - hasLobbyistHistoricalInformation
 - hasLegislationPreviouslyLobbiedInformation
 - hasPreviousClientInformation
 - hasTrackRecordInformation
 - hasLobbyistReputationInformation
 - hasCompensationLevelInformation
 - hasPoliticalContributionInformation
 - hasSocialEventHostingInformation
 - hasLobbyistTypeInformation
 - hasAreaOfGovernmentLobbied
 - hasDescriptionOfLobbyingOrganization
 - hasLevelOfActivityInformation
 - hasLevelOfProminence
 - hasRoleInLargerOrganization
 - hasTypeOfInterestRepresented

- hasTypeOfLobbying
- whetherForProfitOrNonProfit
- whetherPartisanOrNonPartisan
- whetherRegulated
- hasQualityAsInformationSourceInformation
 - hasCommunicationSkillInformation
 - hasCredibilityInformation
 - hasExpertiseInformation
 - hasCredentialInformation
 - hasSubjectOfExpertise
 - hasTypeOfExpertise
 - hasInformationAboutClarityOfProvidedInformation
 - hasInformationAboutQualityOfInformation
 - hasInformationAboutQualityOfProvidedInformation
 - hasIntegrityInformation
 - hasLevelOfTailoringInformationToLegislator
 - hasLevelOfUnderstandingOfLegislatorsPoliticalSituation
 - hasLevelOfUnderstandingOfOpposition
 - hasReliabilityInformation
 - hasResponsivenessInformation
 - hasWhetherWholeOrPartialStoryteller
 - hasWillingnessToAdmitWhenDoesNotKnow

- hasUniversalActorInformation
 - hasAgendaInformation
 - hasAdvocacyPriorityInformation
 - hasLegislationOfInterestInformation
 - hasLegislativePositionInformation
 - hasRelevanceToMissionInformation
 - hasSubjectAreaOfInterest
 - hasBiographicalInformation
 - hasAutobiographicalInformation
 - hasEducationalInformation
 - hasDegreesObtained
 - hasLegislatorBiographicalInformation
 - hasBirthdayInformation
 - hasBirthPlace
 - hasBirthYear
 - hasBirthdate
 - hasCareerInformation
 - hasCauseOfDeparture
 - hasElectoralBiographyInformation
 - hasReplacementInformation
 - hasEmploymentInformation
 - hasFamilyInformation
 - hasMaritalStatus

- hasEmailAddressType
- hasPhoneNumberInformation
 - hasPhoneNumber
 - hasPhoneNumberType
 - whetherAcceptsTextMessages
- hasScreenNameInformation
 - forCommunicationService
 - hasHandle
- hasSocialNetworkingPageInformation
 - hasSocialNetworkType
 - hasSocialNetworkingPageURL
- hasWebsiteInformation
 - hasWebsiteType
 - hasWebsiteURL
 - hasClientWebsite
- useForScheduling
- whetherAcceptsPages
- hasHistoricalInformation
 - hasFormerEmploymentInformation
 - hasLobbyistHistoricalInformation
 - hasLegislationPreviouslyLobbiedInformation
 - hasPreviousClientInformation
 - hasTrackRecordInformation

- hasNoteFromPastInteraction
- hasIdentificationInformation
 - hasActorType
 - hasIdentificationPictureURL
 - hasNameInformation
 - hasFirstName
 - hasHonorific
 - hasLastName
 - hasMiddleName
 - hasNamePrefix
 - hasNameSuffix
 - hasNickname
 - hasSignatureImageURL
- hasInfractionInformation
 - hasDetailsOfInfraction
 - hasTypeOfInfraction
- hasPoliticalIntelligenceAssessmentInformation
 - hasAssessmentOfLevelOfPoliticalRealism
 - hasAssessmentOfPoliticalAnalysisAbility
 - hasAssessmentOfUnderstandingOfCompromise
 - hasAssessmentOfUnderstandingOfOthersSituation
- hasRelationshipInformation
 - hasInformationAboutConflictOfInterest

- hasInformationAboutFamilyRelationship
- hasInformationAboutRelationshipWithAssistant
- hasInformationAboutRelationshipWithGroup
 - hasInformationAboutRelationshipWithAlliance
 - hasInformationAboutRelationshipWithCoalition
- hasInformationAboutRelationshipWithLegislativeLeadership
- hasInformationAboutRelationshipWithLegislator
- hasInformationAboutRelationshipWithLobbyist
- hasInformationAboutRelationshipWithSubjectArea
- hasInformationAboutSphereOfInfluence
- hasInformationAboutTrustedPerson
- hasReputationInformation
 - hasAwardsInformation
 - hasCharacterReferenceInformation
 - hasCredibilityInformation
 - hasEffortInformation
 - hasExpertiseInformation
 - hasCredentialInformation
 - hasSubjectOfExpertise
 - hasTypeOfExpertise
 - hasFundingInformation
 - hasHonestyInformation

- hasInformationAboutReputationWithLegislators
- hasInformationAboutReputationWithLobbyists
- hasLegislatorReputationInformation
 - hasInformationAboutReputationWithDelegation
 - hasLegislativeAgendaInformation
 - hasLegislativeGoalInformation
 - hasPerspectiveInformation
 - hasPoliticalLabel
 - hasPublicConfidenceInformation
 - hasSeniorityInformation
 - hasValuesInformation
- hasLevelOfBehindTheScenesInvolvementInformation
- hasLevelOfPoliticalBullyingInformation
- hasLevelOfPragmatismOrIdeologicalInformation
- hasLobbyistReputationInformation
 - hasCompensationLevelInformation
 - hasPoliticalContributionInformation
 - hasSocialEventHostingInformation
- hasLocationInformation
- hasPerceptionByStaffInformation
- hasPolitenessInformation
- hasPoliticalBiasInformation
- hasPoliticalPowerInformation

- hasProminenceInformation
 - hasRankingInformation
 - hasRatingsInformation
 - hasRespectfulnessInformation
 - hasSuccessRateInformation
 - hasStakeInformation
 - hasConnectionToLegislationInformation
 - hasInterestInSubjectAreaInformation
 - hasInvolvementWithIssueInformation
- hasAlternativeProposalInformation
 - hasAlternativeProposalSourceInformation
 - hasAlternativeProposalText
 - hasDescriptionOfAlternativeProposal
 - hasProposalNewnessInformation
- hasAmendmentInformation
 - hasAmendmentNumber
 - hasAmendmentText
 - hasAmendmentType
 - hasChamberOfAmendment
 - hasDateAmendmentOffered
 - hasStatusOfAmendment
- hasAuthorInformation
 - hasAffiliatedOrganizationInformation

- hasConstituencyInformation
- hasDescriptionOfOrganization
- hasLogo
- hasMissionProgressInformation
- hasMotto
- hasOrganizationContactInformation
- hasOrganizationHistoryInformation
- hasOrganizationLocation
- hasOrganizationName
- hasOrganizationalHierarchyInformation
- hasPurpose
 - hasMission
 - hasObjective
- hasRelationshipWithOtherOrganizationInformation
- hasAuthorReputationInformation
 - hasObjectivityInformation
 - hasStatureInformation
- hasContentProvidedInformation
- hasDemographicInformation
- hasExpertiseInformation
 - hasCredentialInformation
 - hasSubjectOfExpertise
 - hasTypeOfExpertise

- hasFollowupContactInformation
- hasFundingInformation
- hasJobTitle
- hasLocationInformation
- hasRelationshipToRecipientInformation
- hasCommentInformation
 - hasCommentAboutClarity
 - hasCommentAboutObjectivity
 - hasCommentAboutRelevance
 - hasCommentAboutUsefulness
 - hasCommentText
 - hasCommentType
- hasConferenceCommitteeDocumentInformation
 - hasCCDocumentURL
 - hasDocumentDate
 - hasDocumentNumber
 - hasDocumentStatus
 - hasDocumentType
- hasContentInformation
 - hasAssessmentOfControversyInformation
 - hasAreaOfAgreementInformation
 - hasAreaOfDisagreementInformation
 - hasChangedCKInformation

- hasLevelOfControversyInformation
- hasLevelOfFactualityInformation
- hasOppositionCKInformation
- hasSharedCKInformation
- hasContentSummaryInformation
 - hasKeyword
 - hasLevelOfControversyInformation
 - hasListOfContentParts
 - hasListOfOrganizationsMentioned
 - hasListOfPeopleMentioned
 - hasListOfSourcesUsed
 - hasSubjectsCoveredInformation
 - hasSummaryOfPurpose
 - hasSummaryOfRelevance
- hasControversialKnowledgeCategory
- hasDistributionInformation
 - hasConfidentialityInformation
 - hasDeliveryStatusInformation
 - hasIntendedCommittee
 - hasPrivacyInformation
 - hasReasonForReceiving
 - hasRecipientList
 - hasRetentionInstruction

- hasWhetherPrintable
- hasWhetherProvidedInPerson
- hasWhetherRequested
- hasWhetherShouldBePrintedAndStoredInLegislativeBillFolder
- hasIntendedAudienceType
- hasLibraryResourceInformation
 - hasCatalogNumber
 - hasElectronicAccessURL
 - hasNumberOfPages
 - hasPhysicalDescription
 - hasPublisherInformation
 - hasSourceContact
 - hasSubject
 - hasThickness
 - hasTitle
 - hasWhetherRequested
- hasObjectiveDescriptionInformation
 - hasBarcode
 - hasCKType
 - hasContentType
 - hasElectronicAccessURL
 - hasEstimatedReadingTime
 - hasFileType

- hasFormOfContent
- hasFundingSourceInformation
- hasHowToAccessInformation
- hasIdentityOfProducer
- hasLastUpdateInformation
 - hasWhenLastUpdateMade
 - hasWhoMadeLastUpdate
- hasLengthInformation
- hasLocationProduced
- hasMediumOfContent
- hasModificationInformation
- hasMultimediaType
- hasNewnessInformation
- hasNotaryPublicInformation
- hasOfficialDocumentName
- hasSubjectCoveredInformation
- hasTimePeriodCoveredInformation
- hasTimestamp
 - hasCreationTimestamp
 - hasModificationTimestamp
- hasVersionInformation
- hasVoteIntendedToSupport
- hasWhereToAccessInformation

- hasReferenceInformation
 - hasReferencedDocument
 - hasReferencedElectronicVersion
 - hasReferencedGroup
 - hasReferencedLegislation
 - hasReferencedPerson
 - hasReferencedRecord
 - hasReferencedRelatedResource
 - hasReferencedSection
 - hasReferencedSource
- hasSocialInformation
 - hasCommunityUsageTrackingInformation
 - whetherAvoided
 - whetherImportant
 - whetherPopular
 - hasCountInformation
 - hasQuestionCount
 - hasReadCount
 - hasRequestCount
 - hasUnderstoodCount
 - hasViewCount
 - hasEvaluationInformation
 - hasPopularityInformation

- hasTrackingInformation
 - hasCommunityUsageTrackingInformation
 - whetherAvoided
 - whetherImportant
 - whetherPopular
 - hasCountInformation
 - hasQuestionCount
 - hasReadCount
 - hasRequestCount
 - hasUnderstoodCount
 - hasViewCount
- hasContentText
- hasDerivationInformation
- hasDescription
 - hasDescriptionOfAlternativeProposal
 - hasDescriptionOfAssessment
 - hasDescriptionOfGoal
 - hasDescriptionOfLegislation
 - hasDescriptionOfOrganization
 - hasDescriptionOfTrend
 - hasProblemDescription
 - hasStatusQuoDescription
- hasEthicsCommissionFilingInformation

- hasEthicsCommissionFilingDate
 - hasEthicsCommissionFilingType
- hasExample
 - hasExampleOfPro
 - hasExampleOfTrend
- hasGoalInformation
 - hasContextOfGoalInformation
 - hasDescriptionOfGoal
 - hasModificationOfGoalInformation
 - hasReasonForGoal
- hasInformationSourceInformation
 - hasInformationSourceDescription
 - hasInformationSourceName
 - hasInformationSourceType
- hasLegislationInformation
 - hasAssessmentOfControversyInformation
 - hasAreaOfAgreementInformation
 - hasAreaOfDisagreementInformation
 - hasChangedCKInformation
 - hasLevelOfControversyInformation
 - hasLevelOfFactualityInformation
 - hasOppositionCKInformation
 - hasSharedCKInformation

- hasConnectedActorInformation
 - hasIdentityOfConnectedExpert
 - hasIdentityOfConnectedGroup
 - hasIdentityOfConnectedLegislator
 - hasIdentityOfConnectedLobbyist
 - hasIdentityOfConnectedStaff
 - hasIdentityOfConnectedDLSStaffPerson
 - hasIdentityOfConnectedLegislativeAide
 - hasIdentityOfImpactedPopulation
 - hasIdentityOfInterestedPopulation
- hasLegislationAttentionInformation
 - hasAttentionFromPublicInformation
 - hasAttentionFromSpecialInterestInformation
 - hasAttentionInLegislatureInformation
- hasLegislationBasicInformation
 - hasAttorneyGeneralLetter
 - hasBillInformationPageURL
 - hasBillTitle
 - hasFullTitle
 - hasShortTitle
 - hasBillType
 - hasBondBillFactSheet
 - hasDescriptionOfLegislation

- hasEffectiveDate
- hasExpirationDate
- hasFileCode
- hasFiscalAndPolicyNote
- hasFullTextOfLegislation
 - hasChapterVersion
 - hasEnrolledVersion
 - hasFirstReader
 - hasThirdReader
- hasIdentificationNumber
 - hasBillNumber
 - hasHouseBillNumber
 - hasSenateBillNumber
 - hasLRNumber
- hasSessionYear
- hasSponsorInformation
 - hasCommitteeSponsor
 - hasDelegationSponsor
 - hasLeadershipSponsor
 - isSponsoredByAdministration
 - isSponsoredByHouseSpeaker
 - isSponsoredBySenatePresident
- hasSubjectOfLegislation

- hasSummarySynopsis
- hasLegislationContextInformation
 - hasLegislationDevelopmentInformation
 - hasLegislationHistoricalContextInformation
 - hasLegislationPurposeInformation
 - hasLegislationRelationshipToLargerPlanInformation
 - hasProblemAddressedByLegislationInformation
- hasLegislationImplicationInformation
 - hasEnforcementInformation
 - hasLegalImplicationInformation
 - hasLegislationDirectiveInformation
 - hasLegislationProhibitionInformation
 - hasLegislationRequirementInformation
 - hasPunishmentInformation
 - hasStatuteAffectedInformation
 - hasToWhomLegislationDoesApply
 - hasToWhomLegislationDoesNotApply
 - hasWhatLegislationDoesNotDo
- hasLegislationLobbyingActivityInformation
 - hasInformationAboutArguementsPresented
 - hasInformationAboutPositionsTaken
 - hasInformationAboutTestimonyPresented
 - hasLevelOfControversyInformation

- hasLevelOfSubmissionActivity
 - hasLegislationMistakeInformation
 - hasLegalMistakeInformation
 - hasLoopholeInformation
 - hasTechnicalWordingMistakeInformation
 - hasLegislativeProcessInformation
 - hasChapterInformation
 - hasChapterNumber
 - hasChapterURL
 - hasCommitteeAssignmentInformation
 - hasFilingDate
 - hasIntroductionDate
 - hasOutcomeInformation
 - hasScheduleInformation
 - hasDueDate
 - hasEventDate
 - hasHearingDate
 - hasVoteDate
 - hasStatusInformation
 - hasLobbyingActivityLimitationInformation
- hasLegislativeActionInformation
 - hasActionDate
 - hasActionDescription

- hasChamberOfAction
- hasLegislatorPositionInformation
 - hasIntendVote
 - hasInterestInIssueInformation
 - hasUnderstandingOfIssueInformation
 - hasVoteCertaintyInformation
- hasLogEntryInformation
 - hasActivityDescription
 - hasTimeOfActivity
 - hasUserPerformingActivity
- hasNotificationInformation
 - hasWhetherNotifyProviderOfAccess
- hasPageInformation
 - hasFrom
 - hasPageMessage
 - hasTimeSent
 - hasTo
- hasPerformanceAssessmentInformation
 - hasDescriptionOfAssessment
 - hasWhetherMeetingGoal
 - hasWhetherMeetingStandard
- hasPermissionGroupInformation
 - hasPermissionGroupName

- hasPermissionGroupUID
- hasPositionInformation
 - hasCaveatToPosition
 - hasEndorsementInformation
 - hasPositionRationale
 - hasShiftInPositionInformation
- hasPositiveOrNegativeImplication
- hasPredictionInformation
 - hasDirectionOfPrediction
 - hasPredictionFactorInformation
 - hasPredictionIndicatorInformation
- hasProInformation
 - hasBeneficiaryInformation
 - hasExampleOfPro
- hasProblemInformation
 - hasCauseOfProblem
 - hasDescriptionOfProblem
 - hasExampleOfProblem
 - hasReasonForAction
 - hasReasonForConcern
 - hasSignificanceOfProblem
- hasQuoteInformation
 - hasBackgroundOfSpeaker

- hasLocationOfSpeaker
 - hasSubjectOfQuote
 - hasTitleOfSpeaker
- hasRatingInformation
 - hasClarityRating
 - hasObjectivityRating
 - hasRatingScore
 - hasRatingType
 - hasRelevanceRating
 - hasUsefulnessRating
- hasReason
 - hasReasonForGoal
 - hasReasonForStake
- hasRollCallVoteInformation
 - hasNayCount
 - hasRollCallVoteDate
 - hasRollCallVoteType
 - hasVoteChamber
 - hasVoteOutcome
 - hasVoteTallyURL
 - hasYeaCount
- hasTagInformation
 - hasContentPartTag

- hasCorrectnessTag
 - hasFallacyTag
 - hasMisleadingnessTag
 - hasTagType
 - hasTextTagged
- hasTimestampInformation
 - hasDate
 - hasSubmissionDate
 - hasLogNote
 - hasTime
- hasTrendInformation
 - hasDescriptionOfTrend
 - hasDirectionOfTrend
 - hasExampleOfTrend
 - hasExtentOfTrend
 - hasImpactOfTrend
 - hasReasonForTrend
- hasURL
 - hasBillInformationPageURL
 - hasChapterURL
 - hasDocumentURL
 - hasElectronicAccessURL
 - hasImageURL

- hasIdentificationPictureURL
 - hasLogo
 - hasSignatureImageURL
 - hasSocialNetworkingPageURL
 - hasWebsiteURL
 - hasClientWebsite
- hasVoteInformation
 - hasSubjectBillNumber
 - hasVoteCast
 - hasVoteCastDate
 - hasVoteType
 - whetherChangeInVoteOverLegislativeProcess
- whetherAccessNotificationRequested

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