

**Citizen Use and Comprehension of Government Accounting Information: Applications of Design  
Science Research Methodology**

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## ABSTRACT

This dissertation seeks to explore how accounting can alleviate, but also aggravate, the tensions of informed democratic participation. The behavior of accountants and the format of disclosures in governmental accounting have a powerful effect upon how citizens perceive and make decisions about their community. Because accounting research has only recently begun considering citizens as a central actor, there has been limited synthesis of this knowledge between researchers and practitioners.

This dissertation seeks to bridge the gap between governmental accounting practitioners and researchers, and employs the theoretical lens of design science to do so. Design science, originally developed by accounting researchers, is used in other disciplines to bridge similar gaps.

This dissertation provides three contributions to the existing literature. First, this dissertation contributes an epistemological innovation by using a design science perspective to examine this research topic and show how design science remains a valuable tool for accounting research. Second, this dissertation finds evidence supporting Baber & Gore's (2008) supposition of governmental GAAP compliance in a novel context. Third, this dissertation uses design science methodology to become the first research that shows how practitioners developed and implemented Citizen-Centric Reporting (CCR) and how this has negatively impacted CCR effectiveness.

These contributions begin in Chapter II with a genealogical literature review to show how the earliest uses of design science involved synthesizing the governmental accounting knowledge of both researchers and practitioners.

In Chapter III, a design science paradigm synthesizes practitioner behavior around disclosures with correlational evidence from Washington State that school districts may be forced to choose between GAAP compliance and better performance on citizen-salient metrics, in keeping with Baber and Gore's (2008) resource-constraint prediction.

Finally, in Chapter IV, the design science DAGS Framework is used to analyze the CCR and its creators' design goals. The CCR was deployed based on practitioner experience rather than an explicit design model, and there has been limited study of the CCR's intent or effectiveness. Chapter IV involves interviewing the surviving creators of the CCR to determine the implicit design decisions, and judging whether the CCR fulfills its intended purpose under the constraints of those design decisions.

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## CHAPTER 1: INTRODUCTION

## INTRODUCTION

Effective democratic governance requires that citizens, the ultimate decisionmakers, be able to make *informed* decisions about the economic<sup>1</sup> outcomes of their decisions (Bull, 2013; Fishkin, 2018; Fung, 2006; National Research Council, 1996; Petts & Brooks, 2006). However, as governments and their accounting systems become progressively more complex, it becomes harder for citizens to make such informed decisions (Groff et al., 2017; Jordan et al., 2017; Justice & Dülger, 2009; Marsh & Montondon, 2005). This difficulty can be illustrated by the significant changes in citizen behavior when improved disclosures are provided to them (Brunner et al., 2020; Saiewitz & Piercey, 2020), such that the public's policy preferences on fiscal questions can be swayed based on the structure rather than content of financial documents. This ability to alter citizens' decisionmaking faculties by disclosure format alone illustrates a tension in democratic institutions. As society advances and governance becomes more complex, it becomes more difficult to effectively disclose to citizens, which in turn reduces how well citizens can engage in informed decisionmaking. When citizens lack the ability to receive timely, accurate, and understandable information, the end result is a deterioration of democracy and of the ability of communities to self-govern in a just or equitable manner (Callahan, 2002; Fung, 2006; Koppell, 2005). While governments produce financial documents both internally and for public consumption, these documents are generally dense, technical, and opaque to regular citizens, making it difficult for citizens to make informed decisions (Irvin & Stansbury, 2004).

Both the Financial Accounting Standards Board (FASB) and the Government Accounting Standards Board (GASB) consider "Understandability" as a critical qualitative characteristic. However, FASB Concept

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1 This is equally relevant to social or political outcomes, but accounting's close relationship to economic perspectives suggests that we as a discipline would have an easier time accounting for economic outcomes than for social or political outcomes, even if knowledge of all three is sorely needed.

Statement Number 8 (Financial Accounting Standards Board, 2018) limits Understandability to being understandable to “users who have a reasonable knowledge of business and economic activities and who review and analyze the information diligently”. The GASB’s original definition of Understandability does not limit its scope of acceptable users in such a way (Government Accounting Standards Board, 1987), given that democratic accountability and transparency is supposed to be available to all members of the community in a more egalitarian manner. However, in the Basis for Conclusions to Statement No. 34, GASB altered its definition to be more in line with FASB’s “The information provided should be understandable to reasonably knowledgeable users” (Government Accounting Standards Board, 1999). Further, GASB’s guidance on understandability as a practical matter is limited to conformance with its standards, and there are few resources for practitioners who wish to make disclosures more understandable to citizens. Into this gap of formal guidance, numerous practitioners have been attempting to find ways to disclose governmental accounting information in a way that is more in keeping with the original egalitarian spirit of GASB’s understandability-for-all. However, the design intent and success of these disclosure experiments has been studied in a very limited context.

Much of government accounting as a discipline is an attempt to mitigate this tension between the importance of informed decisionmaking, and difficulty in actually informing citizens. As stewardship and care for stakeholders besides investors and creditors has faded from financial accounting (Williams & Ravenscroft, 2015), governmental accounting has been forced to diverge from financial accounting and continue wrestling with the normative question of what disclosures are of actual value to unsophisticated users. While positive accounting research can plausibly point to market equilibriums indicating the Efficient Market Hypothesis<sup>2</sup>, government accounting, especially of disclosures for

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2 An argument that many would quite reasonably critique (Reiter & Williams, 2002) but which is outside the scope of this thesis. Even accepting *arguendo* that positivist accounting research is broadly true, the assumptions that make it true do not hold for government accounting, where unsophisticated

unsophisticated and non-standard users of economic information, do not form anything resembling an efficient market. As a result, attempts to develop a disclosure format of use to citizens require a degree of normativity that much of modern accounting research has shied away from. In such a vacuum, disclosure-development attempts have mostly been practitioner-led (Fritzlen, 2010; Rubin, 2009; Sharp et al., 1998), with researchers either following along behind (Jordan et al., 2017; Yusuf et al., 2013) or entirely absent (Kidwell & Lowensohn, 2011). When these attempts successfully increase transparency for citizens, it often materially alters their policy preferences (Alt & Lowry, 2010; Brunner et al., 2020; Callahan, 2002; Justice & Dülger, 2009; van Prooijen, 2012; J. Yusuf et al., 2013). When the attempts to provide effective government accounting disclosures fall behind the increasing complexity of modern governments, we instead see negative outcomes ranging from disenfranchisement in decisionmaking (Killian, 2011), fund capture by corrupt elites (Chung & Windsor, 2012; Kurpierz & Smith, 2020; Reinikka & Svensson, 2011), to the destruction of both physical and social support infrastructure (De Renzio & Wehner, 2017; Peck, 2014). The normativity of these practitioners in pursuit of a positivist goal has even altered language: practitioners often use “comprehensibility” to indicate the same concept as understandability, while not conflating the practical concept with either “readability” (Smith & Taffler, 1992) or with the Standards Boards’ qualitative characteristic.

This tension between the need for informed decisionmaking (Bingham et al., 2005) versus the increasing difficulty of informing citizens (Irvin & Stansbury, 2004), and the ad-hoc, practitioner-led nature of disclosure-development efforts (Fritzlen, 2010; Rubin, 2009; Sharp et al., 1998; Yusuf & Jordan, 2015) suggests two intertwined research questions. First, what is the nature of this tension? And second, is

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consumers (citizens and elected officials) are in an agency-theoretical problem with one another and also with the government accountants who actually create the disclosures; pricing of information is limited to up-or-down votes on complex packages rather than marginal trades of discrete economic units; and trades are executed on the order of years via elections and policy implementation rather than as rapid and maximally-efficient as possible transactions.

there a normative model or theory that can mitigate or resolve this tension? While both questions are relevant to modern governance, it is the second question that accounting research has a comparative advantage in answering. Accounting research has a long history of studying the perception and presentation of economic information, and while a positivist economic model that tries to avoid normativity has been the dominant paradigm since Ball & Brown (1968) and Jensen & Meckling (1976), normative accounting research predates this era. As illustrated by the deployment of such disclosure formats at EBITDA, ESG, PFRs, or XBRL, normative accounting is perhaps achieving prominence once again by practitioner demand. One of the most telling examples of such a change is the 2019 Business Roundtable's "Statement on the Purpose of a Corporation", which repudiated the shareholder-primacy model of purpose that the organization had previously held for decades. While it is possible that this new integration of non-standard financial information and stakeholder participation is merely marketing (Harrison et al., 2020; Taylor, 2019), the challenge remains: the largest firms accounting researchers study have decided that there are normative decisions to be made regarding their financial and non-financial disclosures to society. The only options seem to be denial of this fact, or adaptation to the new reality of measuring economic activity in the 21<sup>st</sup> century.

However, this adaptation back towards normative accounting cannot be a free-for-all that discards the value of quantitative research and intellectual rigor. The challenge is in producing a normative guidance system that has some form of rigor and predictive utility, rather than being a mere selection of ethical injunctions chosen for their aesthetic appeal. Fortunately, accounting research is firmly situated amongst the "sciences of the artificial", the class of disciplines that have anthropic (human-produced) and teleological (human-purposive) components (Simon, 1969). Sciences of the artificial, also known as "design sciences", are positivist in action, but contain explicated normative goals. In other words, while the study of a natural science like physics must accept that the universe need not run by human-

comprehensible rules or towards a human-desired purpose, accounting is a tool (an “artifact”) developed by humans to serve human ends, and as such can be judged on its ability to serve its desired purpose. Accounting research’s presence as a design science gives us both the ability to make normative judgments of the artifacts it designs, and the ethical duty to develop artifacts that are consonant with human flourishing. By explicating the normative intent of an accounting artifact, researchers can then judge how effective it is in achieving that intent. As a result, design science allows a rigorous examination of an accounting artifact, while still being aware that the ethical and purposive components of normativity must be placed alongside it as important yet distinct questions.

Given the value of a design-science lens, this dissertation treats the challenge of effectively informing citizens as a problem that can be solved by developing accounting tools suited to such a task, and then using those tools as a blueprint for further developments in other contexts. Some of this work involves the collection and synthesis of extant knowledge, some of it requires the testing and validation of currently-implemented practitioner knowledge, and some of it requires the development of new social technology adapted to modern challenges. This dissertation devotes a chapter to each of these aspects, seeking in turn to understand how to effectively define the problem, understanding the environment the problem has developed in, and quantifying the normative intent of a disclosure format for the future goal of testing disclosure formats against its stated goals.

The first chapter, a historical literature review of design science methodology in accounting research, takes a theoretical study of what Herbert Simon characterized as “The Sciences of the Artificial” (Simon, 1969). Sciences of the Artificial are the class of sciences which study human-created things, whether they are urban development, economics, or even cybernetics. Such sciences have a normative component, in that they serve a purpose for humans. For example, there is no reason for gravity or

entropy (as natural phenomena) to serve human welfare or give account to why they do not. By contrast, accounting and governments both are made by humans, and thus should be turned towards human-beneficial ends. In the cases that they are not, they must be made to account for themselves as to *why* not. Simon's earliest work was in government accounting (Ridley & Simon, 1938), and design science methodology has woven in and out of accounting research since (Kurpierz & Smith, 2020).

A review of the design science literature is important because the citizen/practitioner relationship in government accounting is understudied, especially from a behavioral standpoint, with citizens never having been the central subject of governmental behavioral accounting research (Kidwell & Lowensohn, 2011) until 2020, when a singular paper appeared in *Behavioral Research In Accounting* (Saiewitz & Piercey, 2020). Practitioners fare somewhat better as an independent object of study, but the relationship between practitioners and citizens is likewise understudied and ripe for future research. However, the dearth of extant research suggests that more common accounting research paradigms might be less effective at studying citizens and governmental accountants, and that research on citizens and practitioners requires methodologies adapted specifically to them, such as design science (Barzelay & Thompson, 2010; McCarthy, 2012). The pedigree of design science research in accounting is rich and complex, and there is not yet a road map nor history of how design science as a philosophy or methodology aligns with related fields such as public administration, political science, and information systems. Design science in accounting has a hybrid lineage, being used independently by accounting information systems (Geerts, 2011; McCarthy, 1979, 2012), by public-policy aligned accounting researchers (including Herbert Simon himself) (Ridley & Simon, 1938; Simon, 1946), and independently applied several more times (Kasanen et al., 1993; Schnitkey & Sonka, 1986). Each of these streams of design science is filtered through a different discipline, which means that the norms, expectations, and strategic problem-solving choices differ. Therefore, to effectively investigate a problem at the

confluence of accounting, public administration, and information systems requires a thorough review of the previous developments in each of those disciplines regarding the presentation and perception of financial information to non-specialists.

The second chapter is a regression analysis of the effects of GAAP compliance on graduation rates in Washington State school districts. There is a common theme in critical accounting that places positivism at odds with effective critical analysis. There is no particular reason that this adversity is required (Everett et al., 2015), and in fact this reluctance to use positivist models might be contrary to the goal of justice. This is especially true in design science research methodologies, which must iterate between quantitative positivist artifact design and qualitative practical artifact usage. Being able to use a wide variety of analytical lenses is important for converting theoretical knowledge into practical results for citizens. Baber and Gore's (2008) model raises the question of why, if schools receive better debt options when using GAAP, do not more school districts follow GAAP? Baber and Gore provide several possible reasons, but do not select between them. This chapter, in replicating their research by testing one of their suggested reasons in a new context, provides evidence that good financial governance and effective educational provision may be in conflict with one another. This chapter further argues that this tension needs to be better understood given the high value society places on both good financial governance and effective educational provision.

An important aspect of design science is the recognition and integration of research as having practical results on the lives of others. To develop a policy and see it implemented is to alter the life outcomes of anyone affected by that policy. This can be powerfully emancipatory and helpful (Chung & Windsor, 2012) or it can cause or worsen harms if done recklessly and with insufficient understanding of praxis (Barzelay & Thompson, 2010). Therefore, an improved understanding of the context in which local

governments trade off against financial transparency is an important component of determining what value is placed upon financial transparency by citizens. Institutional subject mastery is a core part of design science research, and this paper studies an unresolved question in school district government accounting in a similar way to how Schnitkey and Sonka (1986) resolved a comparable question in agricultural managerial accounting.

The third chapter is an application of design science towards the improvement of citizen's capacity to understand their accounting and accountability situation. Citizens are an incredibly understudied entity in governmental accounting research. There has been no behavioral study of citizens as consumers of governmental accounting information where the citizens are the central focus (Kidwell & Lowensohn, 2011) until Saiewitz & Piercey (2020). In spite of this, numerous practitioner organizations such as the Association of Government Accountants (AGA) and the Government Finance Officers Association (GFOA) have developed and implemented reporting formats for citizens. While organizations each have distinct preferred formats, the general class of reporting formats used for citizens are called Popular Financial Reports (PFRs). These PFRs have a promising theoretical basis for their benefits to citizens, but there has not yet been experimental validation of their effectiveness. Further, there has not even been theoretical development that would produce testable hypotheses of PFR performance, which would require elicitation of the practitioner's tacit knowledge about why such financial reporting formats are an improvement for citizens. An analogy would be that various groups have distributed pills from a "secret family recipe" that they purport to cure headaches, but no medical experiment has been performed to test their efficacy above that of a placebo. Government accountants have strong grounds to believe they know what disclosures are most decision-relevant to citizens, but this knowledge is tied up as tacit practitioner knowledge rather than explicit theoretical models that can be studied by researchers. As a result, the test of PFRs requires study at both ends of the relationship: understanding the implicit theory

of the government accountants that developed the PFR, and also the rigorous experimental verification of that theory when it is operationalized in a PFR format. However, experimental studies are stymied by a lack of foundational and exploratory research to elicit the implicit theories practitioners used when creating their PFRs. As a result, this chapter uses the DAGS Framework (Adams & Courtney, 2004) of the Design Science Research Methodology (DSRM) cycle to determine what phase of artifact-creation government accountants were in when the initial PFR was made, and what benefits government accountants believe accrue to the users of this disclosure format.

Developing an artifact to solve a problem is the purpose of design science. Deploying said artifact is a part of this process, but a known challenge in industry and among practitioners is a habit of deploying before testing, and deploying without the participation or even awareness of academics (Eder, 1998; Frost, 1999; Gill, 1990). In the case of PFRs, the format has been designed, distributed, and promoted by the professional associations that represent government accountants with no test of the efficacy of the format. For example, The Association of Government Accountants' Citizen-Centric Report (CCR) was developed in a thorough, thoughtful, and normative process (Fritzlen, 2010; Groff et al., 2017; Jordan et al., 2017; Yusuf et al., 2013), but almost entirely done by government accountants in consultation with one another outside the view of researchers, and there is yet to be a field test to confirm the effectiveness of this disclosure format in achieving its goals.

These three chapters, motivated by the research gap indicated by Kidwell and Lowensohn, use different aspects of design science in an attempt to investigate the core problem of government financial reporting being incomprehensible to the vast majority of citizens. Disclosure understandability to citizens and its second-order outcomes on accountability are incredibly understudied in current accounting research (Kidwell & Lowensohn, 2011) and research in the area is in such an emerging stage

(Jordan et al., 2017; Yusuf et al., 2013) that it is important to not discard any epistemological tool. As a result, this dissertation is explicitly designed around using standard rigorous tools in a mixed-methods approach, seeing value in solving a complex unexplored problem using whatever paradigms seem to make the problem most tractable (Hatchuel, 2001). This means there is value in applying experimental rigor, critical reflexivity, and quantitative precision to make sense of the challenge facing citizens trying to understand local governments and hold them financially and ethically accountable. In taking these lenses, this dissertation advances our current state of understanding of an understudied population of producers and consumers of non-standard accounting information that have a tremendous effect on how our cities, schools, states, provinces, and tribes deal with economic deliberative decisionmaking by their constituents.

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## CHAPTER 2: A REVIEW OF DESIGN SCIENCE RESEARCH INSIDE, OUTSIDE, AND THROUGH ACCOUNTING

# **A Review of Design Science Research Inside, Outside, and Through Accounting**

## **Abstract**

Design Science is an applied methodology useful for developing accounting tools for novel or unexplored problems. However, its use in accounting research is often limited specifically to Accounting Information Systems (AIS), a limitation not found in other related disciplines such as engineering or public administration. This literature review of design science tracks the development and use of design science methodology in accounting research from its inception as a government accounting tool by Herbert Simon to its current influential position in AIS and related disciplines through three major historical streams: AIS, Public Administration, and independent redevelopment. This paper then proposes future applications where design science's methodological utility would be strongest for advancing other areas of accounting research.

## **1. Introduction**

There is some concern that by being so heavily descriptive, modern accounting has reduced its ability to make prescriptive or normative judgments on disclosures (Boland & Gordon, 1992; Dyckman & Zeff, 2015; Whittington, 1987). Much of modern accounting research avoids prescriptive or normative judgments, and has ceded these considerations to other disciplines. As a result, several competing formats have filled the conceptual vacuum: alternative disclosures, open ledgers and smart contracts, data-mining (Amani & Fadlalla, 2017), and the business community itself changing what is considered decision-relevant information (Business Roundtable, 2019; Harrison et al., 2020; Taylor, 2019). In some ways this is the same cat-and-mouse game of businesses attempting to find ways to minimize the negative effects of disclosures, matched by accounting bodies determining new and more-accurate regulations that has occurred for centuries. At the same time, the criticism of accounting's descriptivist mindset has gained renewed validity (Williams & Ravenscroft, 2015) with trends such as the dominance of intangibles, mandatory disclosure of ESG, or governmental and nonprofit accounting. Descriptive

research is a powerful but perhaps incorrect tool to deal with these emerging forms of disclosure, and it is possible that normative research might be required to create new norms in modern society and for modern accounting.

However, accounting research has often shied away from normative lenses in the past half-century, to the detriment of areas such as ethics or applied (phronetic) research where pure description seem insufficient (Flyvbjerg, 2001). Other disciplines, such as public administration, medicine, or economics, do not have such a clean break between descriptive-theoretical and prescriptive-applied work. Further, this break found in accounting research seems detrimental to producing research that is relevant in applied situations, to practitioners in our discipline, or requires normative engagement to function at all (such as governmental accounting or ESG). Such challenges suggest accounting researchers should observe what methodologies better-integrated research paradigms use to produce relevant applied research, and apply those methodologies to accounting research.

Using such methodologies is easier than one might naively think, given that (governmental) accounting research was the original progenitor of such methods (Ridley & Simon, 1938; Simon, 1946, 1969), and accounting research has recaptured or reinvented such methodologies by necessity (Kasanen et al., 1993; McCarthy, 1979; Schnitkey & Sonka, 1986). However, each reclamation or reinvention has failed to penetrate in a cross-disciplinary manner, leaving some areas of accounting research (such as Accounting Information Systems (AIS) or governmental accounting) with a significantly-advanced understanding of “the sciences of the artificial” (Simon, 1969), while closely-related areas remain entirely unfamiliar with it. This paper contains three goals: (1) explaining the concept of “design science” which was invented for governmental accounting, but is now used in disciplines diverse as law, dentistry, and cybernetics, (2) showing how AIS and public administration use design science from the

same source of descent (Simon 1969) in a way that makes the two mutually intelligible to one another, and (3) describing how this mutual intelligibility may show a way that provides relevance and research opportunities for normative models in other accounting sub-disciplines.

This chapter precedes as follows: in section two, the general concept of design sciences is described from its initial development in decision theory around public finance, as well as its dispersion into a large and diverse selection of other disciplines. In section three, a focused literature review is provided on how design science has re-entered accounting research along three related paths: AIS, Public Administration, and independent development by singular researchers. In section four, current gaps in design science use and enumeration of future research opportunities relevant to accounting research are discussed.

## **2.0 Background Discussion**

Using scientific knowledge in an applied manner towards a goal is not a new phenomenon, and dates back at least to Aristotle as *phronesis*, “practical wisdom”. This is in contrast to *episteme*, “scientific knowledge”, and *techne*, “skill, craft”. Many scholars have observed and wrestled with the transition from value-rational phronetic knowledge-seeking to instrumentally-rational epistemic development (Argyris & Schön, 1978; Bourdieu, 2004; Flyvbjerg, 2001; Kinsella & Pitman, 2012; Schön, 2010; Scott, 1998), and how the pursuit of *episteme* in social sciences has sometimes backfired as decontextualized knowledge ceases to be useful for practical improvements. For practitioners who must take epistemic knowledge and actively apply it towards a goal, this produces a tension between what knowledge is useful for their work and what knowledge is provided to them by research. This decontextualization of usability from knowledge in some cases can lead to a net harm, as the intellectual aim of knowledge-generation is so decoupled from human welfare that the result is not just unhelpful but irrational

(Maxwell, 2013). In governmental accounting, this tension drove practitioner-scholars such as Clarence Ridley and Herbert Simon to try and synthesize epistemic and phronetic knowledge, and formalize the application of universal scientific knowledge to specific and human-tractable challenges (Ridley & Simon, 1938). Their suggested “iterated applied research” for the International City Managers’ Association (ICMA) was an attempt to satisfy the constraints of both forms of knowledge: using epistemic knowledge to produce better phronetic applications, then using these phronetic applications to ask better epistemic questions. This form of alternation was only possible with objects of study that have a human intent behind them, such as accounting. Simon would later (1969) categorize these as the “Sciences of the Artificial”, in contrast to the “Natural Sciences”. After several iterations by diverse researchers over the last half-decade, the sciences of the artificial are now often referred to as “design sciences”.

While the umbrella term for iterated applied research is now known as “design science”, this was an originally-unintended commingling of two related concepts. The phrase “design science” was coined by R. Buckminster Fuller (1957) to the Royal Architectural Institute of Canada to describe applying scientific rationality to the design of artifacts (such as built structures, laws, or consumer products). In contrast, Herbert Simon initially described “The Sciences of the Artificial” (1969) as the converse: applying rationally-designed artifacts towards a particular goal. However, while there have been some attempts to split the two (as discussed by Hatchuel (2001)) such attempts have generally been unsuccessful. This might be because both Fuller’s and Simon’s processes are interrelated to the other as part of a decision-action system. Solving a problem requires that an artifact (whether physical tool, data structure, or decision system) be developed to meet the problem’s constraints, and searching the possibility-space of artifacts requires a methodical, scientific process. As a result, applied research requires an iterative approach of both forms of “design science”, treating development, application, and judgment as parts of

an iterated cycle until the problem is solved. Given Simon's development of design science research as being directly relevant to accounting research (because of Simon's focus on public administration and information systems, in contrast to Fuller's original engineering focus, though the two converge by 1975) this literature review will follow Simon's genealogy of design science as the most salient for future accounting research. However, it is important to note that the earliest uses of the phrase "design science" were drawn either from Fuller's work, or a synthesis of Fuller and Simon, and at the time of the coining of the phrase, were considered distinct processes. It is only decades later with additional refinement that the methodical-construction-from-principles of Simon and the empirical-iterations-within-the-search-space model of Fuller are considered related arcs of the same process.

## **2.1 Initial Development of Design Science**

The earliest development of design science methodology can be tracked to two different dates depending on how development is defined. The collection of information into an iterated decision system was codified in *Sciences of the Artificial* (Simon, 1969), but Simon had been using accounting as an information-systems tool for over 30 years at that point, starting back with analysis of performance measurement and decision-relevance of financial and managerial accounting information in city governments (Ridley & Simon, 1938). This early on, accounting, information theory, public administration, and general expertise (phronesis) at good governance were often undifferentiated at the practitioner level, and Simon struggled to find variables that were simultaneously good measures of success, easily measurable, and not vulnerable to cooptation or artificial pressure.

At the same time, these were not merely mathematical challenges. As Ridley and Simon argued:

“It cannot be emphasized too strongly that these standards are not theoretical concepts devised by academicians. Nor are they intended as playthings for statisticians. They are practical tools by means of which practical legislators and administrators can meet the practical need of choosing between alternative courses of action.” (p.13)

Salience in application was the initial goal decades before being formalized in *Sciences of the Artificial*. Design science’s broad applicability to any discipline that was similarly concerned with empirical results in applied research emerged from this shared challenge.

However, this interest in applied solutions for decision theory was initially not well-shared outside the narrow confines of governmental accounting. As a result, Simon was able to wend his way through organizational studies (Barnard & Simon, 1947), decisionmaking and cognition (Simon, 1957), and microeconomic models of behavior (Simon, 1955). This finally reached full flower when Simon attempted to synthesize these diverse disciplines into a single coherent model of decision and choice in The Sciences of the Artificial (1969), the second and clearer introduction of design science methodology. A collection and refinement of his MIT lecture series, The Sciences of the Artificial was broad-ranging and interdisciplinary. Simon had spent 30 years carefully connecting concepts as diverse as optimization problems for limited human computation (better known as Bounded Rationality, a concept for which Simon won the Nobel Prize in Economics<sup>3</sup> in 1978) to the earliest conceptions of cybernetics and artificial intelligence.

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3 Note that the Nobel Prize in Economics is a distinct and separate prize to the other Nobel Foundation prizes, and should be more accurately called the “Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel”. Multiple members of the Nobel family have spoken out against the award’s inclusion alongside the original Nobel Prizes.

In The Sciences of the Artificial, Simon argues there are “natural sciences” and “design sciences,” with the design sciences also known as “sciences of the artificial.” “[T]he former [natural sciences] study how the world is and exclude the normative,” while by contrast the latter, sciences of the artificial, study “how things ought to be in order to attain goals”. This is a more elegant, more generalized restatement of the problems that Ridley and Simon had discussed in governmental accounting 30 years previous. While generalizable and applicable to numerous disciplines, the originating question in The Sciences of the Artificial remained from a governmental accounting lens: when an entity is faced with a problem, what is the process to solve it? Simon suggested that the process involves the creation of a solution (an artifact), but requires additional steps on both sides: designing the tool using decision-theoretic principles, and applying the tool in an experimental manner to determine if it achieves its stated goal.

The generalized Design Science Research Methodology thus becomes a recursive chain of tool design (as seen in the accounting-specific formulation suggested by Geerts (2011) below):

1. Problem Identification and Motivation
  - Determine the nature of the problem and why a solution would be desirable.
2. Define a solution
  - Rationally determine what sort of artifact would solve the problem as defined.
3. Artifact Creation
  - Create the artifact, which may be a concrete object, a method, or model.
4. Artifact Demonstration
  - Apply the artifact to the problem.
5. Artifact Evaluation
  - Determine whether the artifact achieved the intended goal.

## 6. Communication

- Disseminate the artifact and its results to interested parties.

On its own, Simon's model is relatively similar to how humans (and other animals (Manrique et al., 2013; Sanz et al., 2013)) configure and apply tools to novel challenges. Simon's major contributions were the first formalization and systematization of this process, and the first attempt to intersect trial-and-error artifact development to the rational rigor of decision theory in initial creation of the tool.

### 2.2 Dispersion of Design Science into Related Disciplines

Design science's interdisciplinarity means it is in turn valuable to numerous disciplines. Simon synthesized work from government accounting, computer science, psychology, and engineering in his work, and as a result produced an artifact that was useful to those very same disciplines. As a result, it is possible to track Simon's work diffusing through multiple different academic disciplines in tandem. However, at the same time, network effects render this diffusion enormous when it is observed in totality, with over 150,000 citations for "design science" available on Google Scholar as of 2022. Given these two facts (a single instantiating article and an end-stage diffusion into hundreds of thousands of articles), it makes sense to not just filter for salience to accounting research, but to follow the diffusion chronologically. These methods allow this chapter to capture the transmission of concepts that remain relevant to accounting research while also observing the growth and drift of the concepts. Further, this gives a possible opportunity to observe the genealogy of ideas similar to Tinker's (1988) "Panglossian Accounting Theories", showing that design science was independently re-invented several times within accounting research, but failed to achieve traction and widespread use outside of AIS.

### 2.3 Previous Design Science Literature Reviews

Given the vast and diverse scope of research informed by design science, there have not been many literature reviews, and of those produced, all have been focused in particular on information systems (Carter et al., 2022; Engel et al., 2019), and only tangentially related to accounting. This limitation of scope and focus to accounting-centric design science only allows a more systematic literature review, at the cost of cutting out large swathes of design science research. For example, Engel et al. do not consider any research before Nunamaker, Chen, and Purdin's 1991 article to be of interest, even as Nunamaker et al.'s article is in fact a reply to the argumentation of design and implementation versus design theory ongoing in *Journal of Management Information Systems* at that time. Similarly, Carter, Yoon, and Li constrain their systematic literature review to 2000-2020, a reasonable limitation given their subject-matter interest in e-government design, but as a result characterize public administration use of design science as “niche” with “opportunity for growth”, missing significant development and implementation of design science in top public administration journals from the 1970s through 1990s.

### **3.0 Genealogy**

Design science has itself gone through several iterative steps to better fit disciplinary needs. Originally, it was a formal logic attempt to universalize laws on how to approach problems. In some disciplines, such as programming and decision theory, design science's formalization of needs has been most successful and maintains wide use. By contrast, in areas like engineering or public administration, design science has become more incremental and experimentalist because that is the most effective process for designing effective tools. Accounting is interesting because it straddles the line between methods, with some design science accounting coming out of AI and information systems design (McCarthy, 1979) and some design science coming from the iterative heuristic style more common in policy design (McCarthy, 2012). This suggests that accounting, which is at the crossroads of large systematic data sets requiring

efficient decisions and normative complex organic human systems requiring experimental progress towards a goal, is uniquely suited to benefit from design science's full heritage.

### **3.1 Design Science Before 1969**

Before the publication of Sciences of the Artificial, Simon wrote on the subject (Ridley & Simon, 1938; Simon, 1946) but did not yet refer to it as “design science”. Simultaneous to Simon's works, Buckminster Fuller (1957) was working on the same problem but from the opposite side, using bottom-up empirical iterative testing to develop decision theory principles. Fuller used the term “design science” first (Fuller, 1957), but later scholars and practitioners would collapse the work of both Simon and Fuller into the concept of design science.

While the top-down work of Simon culminates in 1969 with Sciences of the Artificial, the first universal design science argument, the arguments therein were not unheard-of. Not only was Sciences the collected work of Simon's previous lectures, but “design science” in its bottom-up, empiric form was being deployed in several disciplines in response to earlier work by Fuller, who had termed 1965-1975 the “World Design Science Decade” in his proposal to the International Union of Architects (Fuller et al., 1963). The earliest traces of the eventual synergy between Fuller's and Simon's work exists even here, with Fuller et al suggesting that design will require “*a rational 'all energy behavior accounting' system*” to track the actual impacts of design choices and preferences, envisioning a prototypical version of Environmental, Social, and Governance (ESG) accounting decades before the technologies to track it could be designed.

### **3.2 1970-1979**

Sciences of the Artificial takes time to wend its way through other fields, and is cited only 616 times in this decade. The majority of such citations come from Simon's interrelated disciplines of psychology, computer science, and public administration. Accounting research cites Simon's work (Argyris, 1977; Hopwood, 1978; McCarthy, 1979), though almost entirely within *Accounting, Organizations, and Society*. There is also a single book, Measurement and Accounting Information Criteria, written by Theodore Mock (1976), who seeks to apply the relevant decision theory aspects to the concept of the value of information. There are also papers on early transaction automation and how to have computers perform accounting efficiently (Gattorna, 1977; Lee, 1972), but these are not connected to Accounting Information Systems as a distinct sub-discipline. Perhaps most salient, however, is McCarthy's *An Entity-Relationship View of Accounting Models*. McCarthy would eventually go on to be a major design science proponent in accounting research, and this is his earliest non-dissertation design science paper. It is so early in the diffusion of Simon's work that the phrase "design science" does not appear at all, perhaps due to Simon's and Fuller's work not yet being synthesized this early on. Instead, it notes a problem (effectively structuring accounting data for both humans and computers) and proposes an artifact of solving such a problem (relationship-entity data structuring), offering "practical advice to accountants". This can be argued to be some of the earliest design science ever done in accounting, in contrast to earlier papers that discuss the theory but do not engage in significant implementable artifact-creation.

By contrast to the limited adoption by accounting research, Simon's work is more widely-cited in public administration, with multiple major papers in *Public Administration Review* referencing Simon's work by name and at length (Clark & Shrode, 1979; Levine et al., 1975; Springer, 1976). Some of this difference in responses seems due to path-dependence: public administration had been seeking ways to systematize decision theory for decades (unsurprising as Simon himself was part of this community) and had a robust identity as an applied discipline, while accounting was at this time struggling with casting-off

normative accounting. As a result, while public administration researchers were excited at a formalization and systemization of their artifactual systems already in-use, only a limited amount of early AIS work was concerned with direct artifact-creation.

### 3.3 1980-1989

This era saw “design science” as a concept sufficiently matured that researchers and journals were directly discussing design science, and the decade was bookended by two critical design science articles. Michael Batty’s *Limits to Prediction in Science and Design Science* (1980) was forward-looking and asking for the adoption of better design science, but couched almost wholly in terms of his own discipline’s theory. Batty, who at the time worked for the Town Planning Department of Cardiff in the UK, explained the gap of natural and design sciences: “To invent the future we must understand the present, and thus the design process must provide a bridge between our knowledge of the present loosely referred to as science, and our knowledge of the future, which is subject to control and design.” (p. 153). Batty’s argument is that design science explicates the cyclical process of science and design. As our comprehension of the world increases, we then convert that comprehension into tools to assist us in manipulating it. Then, given our greater manipulation of the world, we use this to advance our comprehension further in a virtuous cycle. However, in the “sciences of the artificial”, this loop becomes snarled. The phenomenon being comprehended is the tool, and the tool being applied is the process of comprehending. Batty is thus well aware of the utility of design science towards problems with intractable normativity. He gives examples in a format public administration would find comprehensible: while the design requirements for buildings in a city *in aggregate* are well-known to natural sciences, any individual building’s design, for an urban planner, is a mix of “fugitive and speculative” knowledge (p. 157) which “Rarely is [...] usable or testable in an empirical sense and thus it largely acts as background information”. Similarly, in accounting, while we *in aggregate* know what best practices of

internal controls are, any individual local government's needs will be an idiosyncratic mix of internal control principles designed for its own particular context. A mere five years after Fuller's World Design Science Decade, practitioners were already conflating Fuller's bottom-up and Simon's top-down conceptions of design science into a singular unified concept. Batty's experience as both a practitioner and an academic meant that it was comparatively simple to treat both conceptions as complementary flows within the same process.

By contrast, Helen Gill's *Adoption of design science by industry—why so slow?* (1990) was backwards-looking and wondered why the promises of design science hadn't borne fruit yet. Gill ponders aloud about how academic saturation has failed to translate into practitioner use due to the siloing between academia and industry. Design science, she argues, is well-understood at the academic level. Why has it had such poor penetration into actual industry? Because Design Science is both a methodology and a practice, and it is broadly applicable to numerous fields. This means that development of design science is fundamentally interdisciplinary (as noted and encouraged by both Simon and Fuller), and it is exceptionally easy for academics or practitioners in any single field to miss out on advancements that are highly applicable to their discipline, but couched in a foreign academic language. Thus, while the recursive self-improvement of design science might lead to computer programming solving a particular challenge that would help commercial industry with the same problem, this improvement will take a long time to percolate out to industry. And further, if discovered within industry, it may take decades for researchers to realize its importance academically. Gill calls for a reduction in siloing both between disciplines, and between academics and practitioners. If this reduction does not happen, she predicts that academia and industry will slow development of artifacts due to duplication of effort. This prediction seems to have been borne out in several subfields of accounting, which 'rediscovered' design science due to insufficient interdisciplinarity in their analysis.

It is in this era that design science percolates into accounting through numerous small connections to other fields: agricultural economics (Schnitkey & Sonka, 1986), the sociology of government science funding and goals (Holzner et al., 1987), and even from NASA internal design documents (Mistree et al., 1989). There are also several researchers who draw a direct line from Simon to accounting, whether in cognitive science (Stephens et al., 1981), decision theory (March, 1987), and even a meta-awareness of design-science theoretical genealogy (Tinker, 1988). Accounting Information Systems has a significant head start in integrating design science by dint of Simon's work connecting cybernetics and algorithmic decisionmaking, but in many cases is siloed as Gill (1990) lamented.

Schnitkey & Sonka deserve special consideration on the path between design science and accounting. The researchers independently created the design science methodology, creating a diverse set of formats for presenting accounting information for farmers, went out to a population of farmers, and did case study analysis of what accounting information their subjects actually found useful. Schnitkey and Sonka were stymied (or perhaps vindicated) in the fact that each farmer had different preferences for information, with one of the few commonalities being each farmer's interest was far more about increasing managerial accounting information rather than tax/financial reporting, when literature and accounting researchers had previously argued the exact opposite (without consulting farmers). Schnitkey and Sonka considered this a test case to overturn significant descriptive research in accounting that had made explanatory models of observations that were not borne out by live field tests. While this activity was common amongst AIS research for business automation, examples of public-administration style case tests in the field were comparatively rare.

Public administration research advanced the idea of Simon-and-Fuller synthesized design science by Trudi Miller (1984), with the book Public sector performance: a conceptual turning point. This anthology returned to Simon's earliest governmental accounting questions from the 1930s: how does one accurately measure governmental economic performance, and if given an accurate measuring system, create systems that improve its economic performance? Miller, like Simon, suggests that "design science" is a useful encapsulation of the concepts that make up the answer given real-world constraints:

"[Design science] assumes that cases are diverse and subject to manipulation. Design science diverges from the natural sciences just as technology and computer science diverge from physics, or as microgenetic engineering diverges from cell taxonomy. Design science is concerned with using the methods of hard science and a synthesis of the literature on public administration to identify and implement methods, procedures, and institutional arrangements that improve public-sector performance."

Unfortunately, the book itself received little fanfare and modest denigration in its initial release. Its main response was criticism by C.A. Wilson (1987), who dismissed design science as mere Taylorism. It was only in 1989, after the Second Minnowbrook Conference, that Shangraw, Crow, & Overman, (1989) advanced the namesake article *Public Administration as a Design Science* which makes the case that design science is already deeply entwined in public administration, but rarely discussed under that name.

### **3.4 1990-1999**

On the broader design science front, Ernst Eder (1998) and R.B. Frost (1999) both independently ask what is starting to become a perennial question. Why does a discipline (in their preferred case,

engineering) not use the phrase “design science” while engaging in design science? Eder and Frost agree with Gill, in that the barrier is between industry and academy. In design science disciplines, practical industry is as or even more likely to discover advancements than theoretical academe, but there is insufficient conversation to transmit these findings between industry and academia. Eder argues that this can lead to a death spiral, as academics do not observe what practitioners are actually doing and thus provide no assistance to them, practitioners in turn see no value in engaging with academics, and as a result the discipline cleaves into an academy with no interest in industry, and an industry with no interest in developments produced by the academy. As both Eder and Frost are academics, their papers agree that academics must go out and talk with the industry, not the other way around.

On the Public Administration front, the discussion was being relitigated. Where Miller was broadly dismissed in the previous decade, Shangraw et al’s 1989 defense of Miller (and by extension, design science in public administration) was argued with by public finance and budgeting scholars, both reservedly for (Overman, 1998) and decidedly against (Spicer, 1994, 1997, 1998). Similarly, Gregory Daneke’s *A Science of Public Administration?* (Daneke, 1990) argued that Miller’s support for design science was correct at the time, but given the lack of integration between academic design scientists and public administration practitioners, was insufficient on its own and requires a new generation of interdisciplinary scientists that can at once be critical and yet positivist. This cumulative support for Miller’s work had a lasting effect on public administration research. In response, several public administration researchers who had been convinced by Miller, Shangraw, or Daneke disseminated novel artifacts based on design science precepts. These artifacts included public policy prescriptions, such as some of the earliest performance measurement algorithms (Kravchuk & Schack, 1996), and novel statistical models to deal with emulating performance outliers in local governments (Meier & Keiser, 1996). Public Administration and Information Systems even intersected with a few of the proposed

artifacts, such as a government-subsystem-friendly resource flow mapping model (Chung et al., 1991) and managerial accounting systems (Levinthal & Warglien, 1999). This culminated with what might be considered a victory for design science in public administration: a republication of Shangraw et al.'s paper in *International Journal of Public Administration* (1998) a decade after its initial print.

On the accounting side, some design science research was being created natively within the accounting discipline, while a larger proportion trickled in from information technology (IT), information systems (IS) and automation research. S. T. March & Smith in *Decision Support Systems* (1995) made the argument that a grasp of both natural science and design science is needed when designing IT systems, as sometimes researchers are concerned with how and why things are (natural science) and sometimes they are concerned with designing artifacts to achieve goals (design science). This argument resonated with researchers outside of IT on the accounting side of automation, and Mauldin & Ruchala (1999) are the first researchers to explicitly discuss design science under that name in a major accounting journal, proposing in *Accounting, Organizations and Society* a meta-theory about how accounting researchers should deal with the way automation is changing workflows and best practices. Given their fluency with the concepts of design science, they are concerned that multiple accounting sub-disciplines will duplicate their efforts without discussing amongst each other. At almost precisely the same time, Julie Smith David, Cheryl L. Dunn, Bill McCarthy, and Robin Postin are bringing the design science literature in information systems and automation to accounting information systems, excited to find a branch of accounting research that has been using design science for the last 20 years (David et al., 1999). David et al. list several exemplars within this branch including Eero Kasanen, Kari Lukka, and Arto Siitonen's "Constructive Approach" to accounting research (Kasanen et al., 1993), and Salvatore March and Gerald Smith's focus on "design tasks faced by practitioners" (March & Smith, 1995), the latter of which also inspired Mauldin and Ruchala. There are a few other intersections of accounting and design science,

given this as the early era of machine cognition in accounting, such as the proposed artifact of AI 'demons' (O'Leary, 1991), more generally known as 'daemons', to structure accounting databases for better human use.

Besides (A)IS leading inroads to accounting more generally, the cognitive-behavioral linkage that Simon noted in design science is the other source of penetration into accounting, with several critical theorists in journals such as *Accounting, Organizations and Society* and *Critical Perspectives on Accounting* connecting cognition, organizational structure, and control systems to accounting (Busch, 1997; Dillard & Nehmer, 1990; Gibbins & Jamal, 1993; Peters, 1993; Vessey & Galletta, 1991). Most but not all of the design science penetration in accounting is through accounting information systems or the aforementioned theorists. Kasanen et al is an outlier discussing design science from a management accounting standpoint, deriving it from first principles of iterated design, similar to Schnitkey and Sonka. There is little bridging between public administration and accounting through design science research at this time, except where both are related to IS design science research.

### **3.5 2000-2009**

By the new millennium, design science within IS and IT research has become a dominant paradigm. As computational technology becomes a tool in many branches of research, design science methodology rides along as a passenger and is introduced or reintroduced to numerous disciplines.

In terms of AIS, this decade sees some of the most dominant advancements of design science methodology in AIS, but also a siloing that cleaves AIS design science research off from related accounting sub-disciplines compared to previous eras. AIS and Management Information Systems (MIS) are more interrelated than many AIS and other accounting disciplines, sharing journal space and

conversing among one another. Unfortunately, AIS's and MIS's interoperability means that much of AIS is treated as Information Systems research rather than accounting research. As a result, several of the best AIS papers are specialty-specific, such as Hevner et al.'s *Design Science in Information Systems Research* (2004), which obliquely references accounting-specific design science several times (Geerts & McCarthy, 2002; McCarthy, 1982) but is focused on the information systems design in a broad sense. Similarly, Peffers et al (2007) synthesize a Design Science Research Methodology (DSRM) for general Information Systems use, but have an accounting software firm as a prototype. Even one of the key artifact-design papers of the era, testing a system of semantic analysis for accounting transactions (Becker et al., 2009), was presented for IS audiences and not accounting audiences.

MIS being the native home of AIS during this decade means there are relatively limited examples of AIS as *Accounting Information Systems*, seeking to center their research as accounting. The few journal articles that seek to remain accounting-centric are thus very distinctive. For example, Julie Smith David, Gregory J. Gerard, and Bill E. McCarthy make an impassioned argument for accounting researchers to learn from their engineering and computer science colleagues in creating applied tools, and note that while their own expertise is in the Resources-Events-Agents (REA) paradigm, design science is usable for artifact-creation at a larger and more diverse scale (David et al., 2002). Similarly, Ingrid Fisher's (2007) work on producing a quick-searchable method of checking when particular Financial Accounting Standards amendments were relevant at a particular date is an artifact that is the direct ancestor to the way modern Financial, Governmental, or Sustainability Accounting Standards Boards' database checks are used by both accountants and accounting researchers to this day.

Public administration design science received significant support in this decade from management and organizational studies, which were experiencing an initial surge of research interest in design science

given its novelty and utility. However, in the major public administration journals, design science had become one of the major philosophical (but not *methodological*) lenses used by public administration researchers (Jones, 2003; Meier, 2005; Raadschelders, 2008). When design science was discussed in top journals, it tended to be used as a descriptive theoretical model rather than as an applied method for solving problems (Frederickson, 2000; Jackson, 2001; M. Jones, 2008). It is possible that this canonization of Simon (who passed away in 2001) was symptomatic of design science turning into another mere theory for scholars to debate in journals, given the relative paucity of public administration artifacts from this era. The few extant design science artifacts were similar in structure to AIS artifacts, being IS constructs that were being applied to governance issues, such as citizen-feedback on marriage laws via posting to forums and social media (Orita, 2005). Other attempts at artifact-creation include measuring causal outcome relationships to quantitatively determine “best practices” for public managers (Bretschneider et al., 2004) and methods of generating confidence intervals on public budgets for unsophisticated users such as elected officials and citizens (Cornia et al., 2004).

When viewed holistically, it is easy to see the turn of the millennium as not particularly valuable in terms of design science research for either accounting or public administration; there were numerous critical developments and artifacts created that are used to this very day, but all such activity was relegated to Information Systems journals and conferences, and what little returned to the home discipline was scant (accounting) or degraded into just another organizational lens (public administration). Both disciplines were the victims of the siloing that numerous design scientists had warned of for decades.

### **3.6 2010-2019**

In this decade, AIS returned to Accounting as a home discipline, rather than as a subset of MIS. While the major AIS papers of the 2000s were often found inside Information Systems journals, the major AIS

research literature was now much more likely to be found either in *International Journal of Accounting Information Systems* (which had been founded in 2000 for this precise challenge) (Geerts, 2011) or in accounting journals interested in discussing the possible future paths of AIS (Geerts et al., 2013; McCarthy, 2012). As a result, DSRM subjects became significantly more comprehensible to fellow accounting researchers, such as data analytics for auditing (Kogan et al., 2019), GAAP Standards harmonization (Vanhoof, 2016), and better financial statement reporting with blockchain technology (McCallig et al., 2019). Several papers also worked to refine design science research specifically for accounting use, including Geerts's (2011) formalization of Design Science Research Methodology for Accounting Information Systems, and the concept of "projectability" of artifacts (Baskerville & Pries-Heje, 2019). Further, a paper (Geerts et al., 2013) attempted to bridge the gap, providing theory on design science while also Geerts et al.'s attempt to show artifactual presence of multiple accounting areas of interest (including internal controls in IT, continuous audit, and XBRL usage) in current usage.

By contrast, Public Administration, forgetting Ridley and Simon's demand that design science not become "theoretical concepts devised by academicians", had by this time broadly added design science to its theoretical rather than phronetic canon. Many of the citations for Simon's works are either a theoretical contribution (Frederickson et al., 2018; Heidelberg, 2018; Meier, 2015; Raadschelders, 2011), or a "how to design a design" system of guidance (Bryson et al., 2013; Menzel & White, 2015; Walker et al., 2019). There are still some artifactual designs, such as an attempt to reduce discrimination against minority groups by workflow resource reallocation (Andersen & Guul, 2019), and an attempt to simply use regression models as reversible inputs to suggest policy results (Meier et al., 2018), but the general trend has been away from academic contributions to practice, suggesting siloing has taken hold. This is illustrated by an impassioned plea by Barzelay & Thompson (2010) to make Public Administration a

design science that can not only craft artifacts, but apply those artifacts in settings to produce actual results.

#### **4.0 Trends and themes in design science research: AIS, Public Administration, and Practitioners**

Simon's work percolated through diverse disciplines for two reasons: (1) Simon and Fuller were interdisciplinary in their interests and recommended other design scientists be similarly ecumenical, and (2) design science was useful to multiple disciplines which struggled with the same iterative processes. This meant that even quite divergent areas of research, such as education, cybernetics, and environmental engineering, could use design science concepts and methodology to be mutually-intelligible. Further, mutual intelligibility meant that related disciplines could draw innovations from one another, with the most obvious examples being where information systems intersects with another discipline. However, as multiple researchers (Barzelay & Thompson, 2010; McCarthy, 2012; Overman, 1988) have argued, limiting design science solely to information systems' effects on some arbitrary discipline ignores a larger and more generalizable tool for creating artifacts to improve human flourishing. Design science creates the object of its study, towards some other outwards goal. Accounting, which has explicit goals (Trueblood Committee, 1972), thus seems optimal for design science, as befits the original discipline of its inventor Herbert Simon. The genealogy of accounting design science thus comes most clearly from two streams, AIS and Public Administration, but several independent researchers have built artifacts within the same framework over the last 80 years of design science development.

#### **4.1 AIS**

Accounting Information Systems is the undisputed leader of accounting-focused design science research. It has some of the earliest research literature (McCarthy, 1979), some of the most-cited

accounting-centered design science literature (Geerts, 2011), and the most consistent conversation among researchers regarding design science of all accounting sub-disciplines. Further, the number of artifacts successfully designed and implemented is highest among AIS. At the same time, AIS's dominance of design science research means that most accounting design science research is information systems-focused on computer and software design. These are critical components for future systems in business, government, and society, but there is a risk in making these critical components the sole expression of the original design science methodology advanced by Simon. Simon's original *Sciences of the Artificial* was focused on cognition in humans as much as machines, and sought systems that could leverage cognition from both to improve conditions for humanity. AIS is large, diverse within its own framework, and critical to future work, but is in some ways too advanced to be useful to other accounting disciplines, having siloed itself off within its own technical paradigm (Granlund, 2011), as numerous design science researchers note is a recurring risk (Eder, 1998; Frost, 1999; Gill, 1990; Mauldin & Ruchala, 1999).

However, there are several lessons non-AIS accounting scholars can learn by observing AIS's early, consistent, and creative adoption of design science methodology. First is that any discipline experiences an initial "bloom" of research upon first attempting a design science research paradigm. This pattern can be seen in AIS, public administration, urban design, education, organizational studies, and even game design. This suggests that there are instrumental reasons to encourage a design science paradigm in a discipline simply for the value it brings in encouraging new questions and new modes of finding answers. While this initial bloom often fades, it generally does so having left seeds of future research ready for another generation of researchers to study a decade later. In some ways this very paper exists as an example of this process, having been inspired by accounting-centric design science questions asked by researchers a decade ago (Geerts, 2011; McCarthy, 2012). A second lesson that can be learned from AIS

is how important applied research is to advancing design science, such that much of AIS's comparative success can be explained by accounting researchers successfully avoiding being siloed away from accounting and IS practitioners in industry. The third lesson AIS can provide is an example of the sheer value well-designed artifacts can have for human flourishing. Design science in AIS is responsible for more efficient decision controls in business (Poels et al., 2004), improved automation of transactions (Becker et al., 2009), and better forensic accounting tools for blockchain systems (Appelbaum & Nehmer, 2020). Even where AIS artifactual design is not salient to a stream of research, its existence as an exemplar of what artifact design might do for the public good if appropriately applied is valuable.

There is also the further question of missing content: much of the earliest design science research in accounting (excepting, of course, Simon's own governmental accounting research in the 1930s-1960s) was first published in *Accounting, Organizations, and Society*, whether information systems or Simon's behavioral-science strains. AIS research did not yet have a home in the broader accounting research community, and would need to wait through a generation of researchers to create its own sub-discipline. This raises the question of whether AOS's greater willingness to tolerate interdisciplinarity was sufficient reason for AIS to settle there, or whether, as Simon and Fuller both noted, interdisciplinarity is a requirement to perform effective design science.

## **4.2 Public Administration**

Public administration adopted design science methodology earlier than accounting information systems research, arguably due to the advantage of Simon's original public administration and governmental accounting focus of his own research. Having a focus similar to public administration allowed for transmission of the design science paradigm more easily than the same transmission to accounting research. At the same time, public administration did not capitalize on design science research to the

same degree that AIS did, such that design science in public administration had been codified and then dismissed by the mid-1980s, while it was still being explored by AIS. This difference in outcome provides interesting theoretical fodder for understanding the value and limitations of design science. Given that AIS and Public Administration both eventually settled on design science as a major paradigm, it cannot be that design science fits one discipline but not the other. Further, both AIS and Public Administration draw from the same original literature of Herbert Simon, whose interests overlapped both computational cognition and governmental decisionmaking. While the difference in preferences may suggest network effects, there have been several researchers who have crossed the aisle between AIS and public administration not just from the very beginning with Simon, but continuing on until today (Barzelay & Thompson, 2010; Snow & Reck, 2016). It is possible that artifact design requires information systems to function less for its utility and more for the respectability technological design science has over social and behavioral design science artifacts. This is a question that merits future research.

#### **4.3 Independent Redevelopment**

Perhaps the most interesting source of design science research are the studies unconnected to the rest of the literature. Components of design science research methodology were independently re-created among accounting scholars numerous times, due to the problems they had been facing resembling the classic DSRM requirements. However, research such as Schnitkey & Sonka's (1986) applied accounting systems field test, or Kasanen et al.'s (1993) quest for "innovation and relevance" by creating a method of applied artifact design, are not necessarily considered part of the design science stream of research. This is heartening in the sense that design science is sufficiently useful to accounting researchers that it will be re-invented if unavailable, but also a demoralizing demonstration of how siloed researchers will end up duplicating effort in design science research given a lack of interdisciplinary connections. Given the increasing specialization required in academic research, this suggests that future reinventions of

design science will happen in accounting research if there are not practitioners or researchers capable of bridging gaps between accounting's sub-disciplines.

## **5.0 Gaps and Opportunities in Design Science Research in Accounting**

Given the diffusion of design science as a method and a movement across both accounting and public administration, what trends should be expected over the next decade? What stones are left unturned such that DSRM would provide value as a fulcrum or lever? There seem to be five broad answers given the review of the literature. (1) Non-IS accounting research needs to look to AIS, emulate it, and exceed it. (2) Public Administration has canonized Simon as a theoretical lens which is in turn unused by actual practitioners. (3) Synthesis between accounting and public administration design science research is needed. (4) The siloing of researchers and practitioners in accounting research is more easily torn down by researchers than practitioners. (5) Simon's original work married practical wisdom to technological advancement and accounting can renew this marriage.

### *(1) Non-IS Accounting Research can emulate AIS and then exceed it within their own sub-disciplines*

Accounting Information Systems has advanced design science research methodologies to a significant degree; so much so that other accounting research attempting to draw on much of AIS will, ironically, find little utility outside AIS. Most of the current design science around accounting is information-systems-centric. However, this is a philosophical rather than epistemological challenge; as noted by Geerts et al. (2013), design science is applicable to multiple other areas of accounting research, and this position would likely be supported by the many earlier accounting researchers who used design science as part of their research paradigms in *Accounting, Organizations, and Society* in previous decades (Argyris, 1977; Hopwood, 1978; Tinker, 1988). As accounting better delineates between descriptive

research and prescriptive research, design science provides an opportunity to produce prescriptive research with explicated goals that provide rigor, relevance, and intentional design (Hevner, 2007). There are some tentative steps in this direction already being made, such as developing methods for auditing blockchains (Appelbaum & Nehmer, 2020), training citizens to partner with forensic accountants for local government accountability (Kurpierz & Smith, 2020), and developing new pedagogical tools for accounting students (Voshaar et al., 2022).

Many of the methods with which AIS uses design science could be emulated in other branches of accounting research. As noted, Simon (1957) was interested in cognition, regardless of whether it was human or machine. Machine cognition is the core of AIS, but behavioral research of human cognition is equally relevant and far less studied from a design science lens. Perhaps because most behavioral accounting research comes from a deeply experimental paradigm, the addition of a normative or goal-oriented component risks internal validity. However, even simple experiments that simply provide awareness of cognitive gaps provide actionable knowledge. For example, Brunner et al's (2020) experiment that showed tax policy choices could gain or lose nearly 10% of the voting population's support depending on how the financial information was presented suggests that tax policy is amenable (or vulnerable) to information structure rather than the public's preferences. Similarly, Saiewitz and Piercey's (2020) experiments show how the public is cost-sensitive to budgetary changes only under certain number formats, which suggests that control of disclosure formats to the public might materially affect referendum outcomes. The earliest design science machine-cognition research in accounting was about the existence of data structures that materially affected machine computations. 40 years later, that simple recognition had expanded into a complete accounting sub-discipline of Accounting Information Systems. It is possible that behavioral accounting research might expand in similar ways from these earliest public-interest behavioral design science studies. Further emulation of AIS suggests

that valuable contributions in this area would follow the same path as AIS, where finding more efficient artifacts for humans to interpret accounting information could allow more efficient decisionmaking tools for humans more generally.

Similarly, public interest accounting often has a strong normative component either explicated or implied within its research. This normativity allows accounting in the public interest to describe goals, and with design science, propose artifacts that advance those goals. The synergy between public interest accounting's willingness to be normative and design science's use of normativity is illustrated by the overlap in scholars that do both. Several public interest accounting scholars are also design scientists, who first studied artifacts towards other normative goals (Dillard & Nehmer, 1990; Mauldin & Ruchala, 1999; Stephens et al., 1981) and have turned to the study of artifacts that damage or pervert the public's goals (Dillard & Ruchala, 2005). However, there is a risk of public interest accounting falling into the same trap as public administration research, where design science is a beloved analytical lens, but has become divorced from creation of artifacts that advance normative goals. Public interest accounting is in a better position than public administration with design science due to a closer relationship with practitioners. Where public administration has limited its artifact design outside of an information systems framework, public interest accounting still has connections with activists and policymakers (Dallyn, 2017; Sikka, 2013). Public interest accounting can similarly look to AIS to see that artifact creation can be a virtuous cycle. As Batty (1980) discussed, an implemented artifact can allow for new research questions to be asked thanks to improved scope, and improved scope can allow for better artifacts. One such example might be how better whistleblowing and data journalism artifacts allowed for the Panama Papers to be disseminated, which in turn provided new insight into how accountability can lead to positive social change (Neu et al., 2019), which in turn has allowed better artifacts to mobilize tax enforcement (Arlen, 2022). Just as McCarthy's REA model was the founding design and

artifact for a significant proportion of AIS thanks to such a virtuous cycle, tax disclosures and democratic participation might be moved forward by public interest research in the same manner.

*(2) Public Administration should use design science as a tool to improve wellbeing, not as a paradigmatic lens*

Public Administration continues to hold Simon in esteem as a theoretical lens, but the amount of non-IS design science artifact creation done by Public Administration has trended heavily downwards over the last 20 years, with the effect seemingly driven by a loss of practitioner participation in research.

Practitioners in governments, nonprofits, and other public organizations have not ceased innovating. Instead, the dreaded siloing of research expertise from practitioner participation has come to pass yet again, as predicted, lamented, and warned against by generations of design science scholars (Barzelay & Thompson, 2010; Eder, 1998; Frost, 1999; Gill, 1990). This comports with Flyvbjerg's (2001) concern of *phronesis* being replaced with *episteme*, an event Simon or Fuller would have found acceptable, save that the loss of phronetic knowledge is not being replaced by further engagement with practical ends. As Simon warned, if knowledge is reduced to purely "statistical exercises", not only is the desired goal of a better society no longer being sought, but the validity of those statistical exercises will become unmoored from the reality they were derived.

This unmooring is also a possible risk in several branches of accounting research. As noted earlier in this dissertation, there have been several situations where practitioners have superseded scientists and standard-setters to create their own disclosure formats (EBITDA, ESG, and PFRs). This is in contrast to XBRL, which was also a practitioner-driven development, but thanks to XBRL's integration into a design science paradigm, is a synthesis of practitioner and researcher development (Geerts 2011). While standard-setting bodies are able to catch up to novel developments, XBRL's smoother integration and

broader use is an indication of the value of using design science as an artifact-development process rather than merely as a conceptual lens. In a similar but non-IS vein, Kurpierz and Smith (2020) propose a review and accountability artifact that is usable by non-accountants to “forensically acculturate” them and allow greater public participation in decisionmaking. However, these artifact designs are often treated as normative incursions into what is idealized as purely descriptive accounting research (Williams & Ravenscroft, 2015). While it is true that artifact-creation cannot be value-neutral, design science seeks to make values explicated and explicable, so that artifacts can be judged on how well they achieve those goals as much as the goals themselves. Dismissing artifact-creation in its entirety because artifacts have goals leads to accounting research that enshrines the status quo as the most advanced accounting can ever be. Practitioners and standards-setting bodies clearly do not believe this, and researchers should not either, unless the discipline seeks to become like Public Administration. Accounting research has both the risk of becoming fully descriptivist like public administration in the 2000s, as well as the opportunity of behaving as problem-solvers like public administration research in the 1980s.

### *(3) Accounting and Public Administration benefit from each other in their shared overlap*

If accounting design science research outside of AIS struggles with applied work, and public administration design science research lacks connections to practitioners, this suggests that the two disciplines could compensate for one another in areas of overlapping interests, such as accountability improvements, ESG, or governmental accounting. This would not be a novelty, but simply a return to the original applied research questions that started Herbert Simon down the path of design science and into a history. As both Simon and Buckminster-Fuller recommended, wide interdisciplinarity is required to prevent siloing and solve practical problems. The most obvious synthesis of these concepts comes from Fuller’s “rational ‘all energy behavior accounting’ system”, which was Fuller’s attempt to successfully

measure the cost of environmental and social externalities when designing artifacts. Such actions are an early precursor to sustainability accounting and modern ESG. However, Fuller was unable to generate a satisfying model independently, perhaps due to his lack of integration with accounting research. Modern accounting research has fared better in tabulating the environmental and social costs than Fuller's all-energy behavior accounting system, but has done so by integration with public administration and government, such as the United Nation's Sustainable Development Goals (UN SDGs) or triple-bottom-line accounting (Spreckley, 1997). On its own, accounting research is better at analyzing and tabulating costs, but it is only with synthesis on the public administration and policy side that this cost analysis has been successfully applied to environmental and social areas. At the same time, without the rigor of accounting research, ESG is often at risk of falling away into something more akin to marketing than accurate measurements of activity (Hopwood, 2009; Kurpierz & Smith, 2020; Matsumura et al., 2014).

Another example of accounting and public administration working together in design science is in the area of transparency. Many of the most successful artifacts of design science have been attempts by public administration practitioners or researchers seeking to disclose materially-relevant information to the public. Such artifacts include Fisher's (2007) searchable standards methodology, or Cornia's (2004) error-bar models for unsophisticated elected officials. Because both accounting and public administration are concerned with disclosures, but are driven by different norms and goals in disclosing, there is rich mutually-intelligible practitioner knowledge and artifact creation that can be shared with either side. Further, while "practitioner usability" is a norm in public administration (Miller, 1984), its strongest design principles come from accounting (Kasanen et al., 1993; Schnitkey & Sonka, 1986).

*(4) Researchers can reach out to practitioners more easily than the converse*

Practitioners have phronesis and researchers have rigor, while both share goals of improving society. However, in modern technocratic society, practitioners and researchers have different constraints and incentives on discovery and artifact creation. While the duty of researchers is to research, the duty of practitioners is to practice, and only one of these duties can be risky, experimental, and unconventional. While both researchers and practitioners have value and skill in designing artifacts, researchers are at an advantage in taking risks that suggests researchers need to be the first-movers in artifact design. For example, Eder (1998) noted that practitioners tend to have less freedom to experiment than academics, and argued the value of design science researchers was their ability to test designs and fail without risk to others. Further, as shown in Chapter 4, it is significantly easier for a researcher to seek out practitioners using an artifact than it is for practitioners to provide academics an artifact unbidden. These facts together suggest that academics have a special duty in public service to perform certain parts of design science research that cannot be done by practitioners alone. As noted previously, Public Administration's failure by severing the practitioner-researcher connection harmed Public Administration research quickly and obviously, but reduced the productivity of practitioners in a more subtle but more damaging matter (Barzelay & Thompson, 2010). It is possible one of the normative duties of accounting research is to renew itself by greater engagement with practitioner's artifact designs.

A question raised by this asymmetry is whether practitioners have a special duty to academics in a similar manner. While it is possible to characterize practitioners as being better at implementing artifacts for general use than academics, it seems more parsimonious and equally valid to argue that practitioners have a duty to the *public*. Such a duty would supersede any duty to researchers, especially in design science branches closer to Simon's original vision of merging technocratic expertise, phronesis,

and public service. Academics and practitioners both share a goal of improving society, but excel at different stages of artifact creation, and the public might be better served by asymmetrical public service.

*(5) Design Science balances practical wisdom with technological advancement, and accounting can benefit from this balance*

Design science was created from the desire to use the advances in formal quantitative research in a way that would be useful and meaningful to actual human lives. Simon was responsible for the first academic formalizations of machine cognition which would eventually lead to all of modern cybernetics (Newell & Simon, 1956, 1961), but also a member of the International City Manager's Association (ICMA) who collected a book of proverbial wisdom for use by new city managers (Simon, 1946). Simon was fascinated by the possibility of using such cognition systems to promote general welfare. These urges were not seen as contradictory at the time, but as research has become more specialized and formalized, the synthesis of practical wisdom with advanced positivist techniques has become much rarer. Just as numerous design-science scholars deplore this siloing in terms of practical results for the common good, there are numerous scholars that recognize this siloing on a philosophical level as equally undesirable. For example, Nicolas Maxwell, in his chapter of *The Scientific Study of Personal Wisdom* (Ferrari & Weststrate, 2013) discusses how "science dissociated from a more fundamental concern to help humanity resolve problems" (Maxwell, 2013) ends up being irrational in its rational attempt at knowledge creation. Similarly, critical realism would recognize design science's requirement for purpose as a fellow form of meta-theoretical inquiry (Fleetwood, 2014), though design science may be able to match or outstrip critical realism given its equal willingness to encapsulate relational and processual realism but being more applicable to pragmatic processes. Similarly, much of design science's goals can be characterized simply as *phronesis* (Flyvbjerg, 2001), making sure that knowledge is not

decontextualized such that it is arbitrarily more rigorous while losing its applicable value towards human-desirable goals. Sciences of the Artificial, unlike natural sciences, are created by and thus for humans, and thus must be accountable to humans for their existence.

Accounting as a discipline could be much more comfortably situated in this than it has generally chosen to be. Accounting is explicitly designed and promulgated by a limited number of authorities in a way that many other design sciences such as public administration or engineering cannot be, and thus accounting can much more directly improve human experiences. For example, as ESG becomes more and more central to understanding how entities use resources and create externalities, accounting has responded by creating and slowly harmonizing sustainability accounting standards to retain comparability while increasing transparency and accountability. By contrast, accounting has generally failed to harmonize transparency and accountability in either large organizations or governments. Design science would have us ask, what is accounting's purpose in not doing so?

Simon sought a tool that would allow government accountants to accurately measure resource allocations and make better decisions that would benefit the public good. The tool he crafted, design science, has not yet solved that problem, but has made great inroads into it. Respecting the design science process, the next step must be refinement of the tool towards the next field test of its intended purpose.

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### CHAPTER 3: GAAP COMPLIANCE AND SCHOOL DISTRICT OUTCOMES: EVIDENCE FROM WASHINGTON STATE

## **GAAP Compliance and School District Outcomes: Evidence from Washington State**

### **Abstract**

Past research has shown numerous benefits to GAAP compliance for school districts, but a significant proportion of school districts resist complying, to the point that some states have almost no GAAP-compliant school districts. Baber and Gore (2008) suggested several possibilities for why school districts seemed indifferent to GAAP compliance even though compliance produced cheaper cost of capital. Extending Baber and Gore's (2008) supposition, this chapter tests to see if GAAP compliance is associated with positive or negative educational outcomes, and find that schools that score lower on reporting quality have higher graduation rates. This suggests that school districts may be acting rationally to protect constrained resources when avoiding GAAP compliance.

### **1. Introduction**

Extant research consistently finds that local governments which engage in governmental Generally-Accepted Accounting Principles (GAAP) (as codified by the Government Accounting Standards Board) experience numerous benefits. Such benefits include lower cost of capital (Baber & Gore, 2008), fewer internal control dangers (Carslaw et al., 2007), better planning and more efficient use of resources (Saito & McIntosh, 2010; Saito & McIntosh, 2007), and decreased risk of catastrophic failure (Kurpierz & Panci, 2015). However, while most municipal local governments are GAAP-compliant, some sub-populations, such as school districts, have abnormally high rates of GAAP-noncompliance. Given the numerous and obvious benefits enumerated in the literature, why do so many school districts actively choose to not comply with GAAP? In their study on the significant benefits of GAAP compliance for municipal governments, Baber and Gore (2008) proposed, but did not explore, a possible mechanism for why so

many municipal governments might forgo those significant benefits. Baber and Gore offer a supposition that the benefits of GAAP-compliance are large and easily-measurable, but that there may be equally-large costs that are more difficult to measure. If these costs are sufficiently large, that could lead to governments to have reduced levels of GAAP compliance compared to what would be expected, and closer in line with what is observed. Using a design-science paradigm (Simon, 1969) of normative but positivist accounting (McCarthy, 2012), this paper presents evidence from school districts in support of the resource constraint hypothesis enumerated by Baber and Gore. The resource constraint hypothesis posited by Baber and Gore suggested that GAAP compliance provides easily-measured benefits, but harder-to-measure costs, and that as a result GAAP compliance might be a net-negative decision for local governments when observed from the local government's perspective. By using a design science paradigm that integrates practitioner decisionmaking (Barnard & Simon, 1947; McCarthy, 2012) this chapter finds evidence that supports Baber and Gore's supposition that there may be unmeasured costs to GAAP compliance in the novel population of school districts.

To address this research question, I collect and analyze Washington State school districts' audit reports along with corresponding fiscal data and Washington State Office of Superintendent of Public Instruction's (OSPI) performance data from 2013-2015. The variables of interest include quantifiable measures of educational outcomes (e.g., graduation rates), measures of GAAP compliance (e.g. the M-QRI of Kurpierz & Panci (2015)), financial data, and demographic data (e.g. school district size, school district munificence).

I find that school districts that have higher-quality reporting due to GAAP compliance also have reduced graduation rates among their students compared to other school districts. If decisionmakers in school districts consider graduation rates more important than GAAP compliance as a measure of managerial

performance, and both compliance and graduation rates are constrained by the same resource, this would suggest school districts are rationally choosing to trade off compliance for graduation. Internal documents and manuals for Washington State School Districts that discount GAAP-compliance as a concern while discussing the importance of graduation rates imply that this is the case. The negative correlation between graduation rates and degree of GAAP compliance becomes more robust when the set of school districts is limited only to districts which had more than 100 K-12 students. This is in keeping with the literature on school performance reporting that finds smaller schools tend to be statistically noisier in terms of cost/performance relationships (Fox, 2004).

This study contributes to the governmental and nonprofit accounting literature, public administration literature, and education studies literature by providing evidence for a proposed relationship in which GAAP-compliance consumes resources that school districts also use for service provision. This consumption constrains school districts in a way that could make GAAP compliance appear net-negative for school districts in the manner proposed by Baber and Gore. There are several reasons school districts might be a clearer example of the resource constraint hypothesis than municipal governments at large. The benefits of GAAP-compliance are less beneficial to school districts than other municipal local governments (cost of capital), hard to quantify for most educational administrators (internal controls, allocation efficiency), or concerned with long-term risks rather than immediate challenges (catastrophic collapse risk). At the same time, the costs of GAAP compliance are more direct to school districts (mission failure) and so administrators may have a stronger-than-usual bias towards avoiding GAAP if they are allowed to, compared to other forms of municipal government. These findings should be of interest to lawmakers, administrators, and taxpayers who must balance GAAP's broad-based benefits of transparency and reliability to multiple stakeholders against the costs borne by individual school districts

to provide such transparency and reliability, especially the students whose graduations are the price of this choice.

The remainder of this chapter proceeds as follows. In the next section, I provide a brief background and literature review of GAAP compliance in school districts, current theories as to why school districts resist GAAP compliance, and the institutional environment that makes school districts distinct. I then develop hypotheses in the third section. Following the hypotheses development, I present sections that describe the research method and the findings. In the final section, I conclude with a discussion of the results, limitations, and outlook for future research.

## **2. Background and Related Literature**

Government accounting differs in key ways from private-sector accounting. The basic accounting entity for governmental operations is the fund, which requires separate budget-based accounting and for the funds to be self-balanced (Ingram, 1984; Zimmerman, 1977). Government accounting standards are promulgated by the Government Accounting Standards Board (GASB) and governmental entities have a similar but distinct set of Generally Accepted Accounting Principles (GAAP) for governmental use. In Washington State, sub-sovereign governments (including cities, counties, school districts, fire districts, and utility districts) are by law allowed to choose between GAAP accounting and Other Comprehensive Bases of Accounting (OCBOA) allowed by the state (RCW 43.09.200 Local Government Accounting - Uniform System of Accounting., 1995). The vast majority of Washington State school districts generally do not comply with GAAP (Kurpierz & Panci, 2015), though the Office of the Superintendent of Public Instruction (OSPI) argues in its accounting manual that “Accounting requirements for school districts in the state of Washington are in significant compliance with generally accepted accounting principles (GAAP)” (OSPI, 2021). However, this is contradicted by the Washington State Auditor’s Office, which

notes that “Approximately 20 percent of local governments – the largest and most complex in the state – report financial information in accordance with generally accepted accounting principles (GAAP).” (Washington State Auditor’s Office, 2021). This disagreement is illustrative of the internal conflicts and political choices school districts face when choosing a reporting regime in Washington State.

Given such freedom, most school districts in Washington State choose to report on OCBOA rather than be GAAP-compliant. However, as noted previously, GAAP-compliance produces numerous benefits that would seem to encourage school districts to choose GAAP as their reporting basis. While there are several reasons suggested for noncompliance in the literature, there has been limited testing of these hypotheses, and none in a school district context. Further, a significant proportion of the limited extant literature is practitioner-agnostic, and does not include the perspective of school district public finance professionals, whether in favor of or against GAAP-compliance. This is a possible failure mode in accounting research, which tends to silo research separate from practitioner activities, to the detriment of phronetic knowledge that improves human flourishing (Flyvbjerg, 2001). This chapter takes a design-science perspective (Simon, 1969) that seeks interdisciplinarity in theory, and consideration of (though not necessarily agreement with) practitioner perspectives on the matter.

The original reason suggested for GAAP noncompliance in sub-sovereign municipal governments was due to auditors lacking independence. Dwyer and Wilson (1989), for example, extrapolated from research on municipal statement timeliness that because independent auditors were so critical in positive outcomes for cities, that other local governments such as counties and school districts would also require them, and that lack of independence in auditors might be responsible for the poor outcomes cities and school districts were experiencing. Similarly, Banker, Bunch, and Strauss (1989) in their seminal work “Factors influencing School District Financial Reporting Practices” (the first study to

ever look at school district financial reporting in the United States) found that “The results suggest that monitoring factors, specifically the existence of state statutes requiring GAAP conformance and the use of an independent CPA, are the most important determinants of variations in school district reporting practices”. However, Johnson and Soult (1984) had already noted years previous that independent auditors were “widely used” and “often mandatory” in states. This case can be illustrated in Washington State, where the State Auditor is independent and disagrees with the claim by Washington school districts that there is “significant compliance” with GAAP. This suggests that auditor independence is insufficient to predict GAAP noncompliance.

An alternative explanation, advanced by Robert Ingram (1984) (himself building off Zimmerman (1977), who developed the theory for municipal governments) was that statement quality and reporting compliance were merely outgrowths of internal political struggles happening between actors in the organization, and that compliance standards are often a function of political organizing more than direct interest in financial transparency. This was affirmed by Cheng (1992, 1994), who showed that government accounting disclosure choice is trapped in a “web” of various political actors, and that even well-intentioned decisionmakers are often given contradictory demands (e.g. timeliness and comprehensiveness are often anticorrelated in government financial statements (Allison & Johnson, 2014)). Saito and McIntosh published a 2007 paper showing that compliance and monitoring complexity both increase due to political concerns, but that increased complexity leads to lower benefits from compliance, and posited that some school districts might be avoiding increased compliance for political reasons. A refined version of this argument, that there is an equilibrium where the value of the next marginal unit of audit compliance is wholly eaten by the cost of the next marginal unit of audit complexity, was published in 2010.

This marginal increase in costs consuming the marginal increase in benefits for each unit of auditing does not seem to be limited to auditing. There are numerous and significant benefits to compliance, but there are also unmeasured, unstudied costs to compliance that could overwhelm the benefits, leading government managers to rationally choose to limit compliance. Some reasons are suggested by Carslaw, Mason, and Mills (2007), but the argument is more fully conceptualized by Baber and Gore (2008), who state

“...it is perhaps important to emphasize that the costs of GAAP regulation potentially outweigh benefits that accrue in municipal debt markets and, therefore, we cannot conclude that specific practices recommended by the GASB dominate other possible reporting procedures. Similarly, we cannot meaningfully compare the costs of GAAP compliance with other voluntary mechanisms that potentially yield greater reductions in municipal financing costs. Thus, the analysis does not definitively support conclusions regarding the costs of regulation or decisions by the states to mandate GAAP accounting for municipalities.” (p.25)

In other words, while there are benefits to GAAP compliance, the accounting research community has no causal model on whether *to prescribe* GAAP compliance as a policy, and the fact that such a large minority of states do not require it (or require Other Comprehensive Bases of Accounting) raises the question that there may be reasons known to or believed by practitioners why it is not universally required.

In the limited literature where practitioners are asked directly, most public servants indicate that reluctance to improve disclosures is due to its conflicts with terminal goals of transparency and public

service, rather than reluctance to disclose at all (Pilcher & Dean, 2009). Practitioners in local governments perceive improved external disclosures as costly while providing no benefit, either internally (Johnson & Kaplan, 1987) or externally as compliance (Burns et al., 1996). While it is important not to treat self-reports as above reproach, there is a long and robust literature of public servants being driven by certain normative goals to the detriment of personal incentives (the “public service mindset” (Molines et al., 2022; Ritz et al., 2016; Vandenabeele, 2007)), and it would be a mistake to dismiss practitioners’ reluctance as a mere example of principal-agent information asymmetry. Further, the combination of reduced personal incentives, normative focus on “transparency”, and significant effort and outlay on other disclosure formats (see Chapter 4) suggest costly signaling and a truly-held belief, rather than mere attempts to evade all disclosure compliance. This matches the findings of Khumawala et al. (2014) who noted that the driving force for municipal GAAP compliance was generally a sense of professionalism, rather than rational economic or political benefits.

### **3. Hypothesis Development**

There remains significant uncertainty as to why so many local governments remain GAAP-noncompliant. Further, of the three major suggested causal models, one has become obsolete (auditor independence is ubiquitous but GAAP compliance is not), one is not currently testable in a falsifiable manner (the “political incentives” would have to be explicated and modeled before researchers could test them, a daunting challenge, as noted by Cheng (1994)). By contrast, there is a proposed supposition that the costs of GAAP compliance are in some way being undermeasured, and that the expected value of switching to GAAP reporting is more negative for local governments than is commonly believed. One possible way of observing whether these undermeasured costs exist would be studying the outcomes of GAAP compliance, and determining if GAAP compliance is correlated with negative outcomes along some salient trait of organizational success. If institutions that are more GAAP-compliant are doing

worse in one or more well-established metrics of performance, this would be evidence of a correlation between GAAP-compliance and negative performance, though this evidence would be unable to show what the direction of causality might be. Given the interrelated aspects of public service performance, it is difficult to observe unitary metrics of “performance” in most municipal governments, but school districts by contrast would be relatively easier to observe in their GAAP-compliance and performance.

School districts are a population with traits that would make observing possible GAAP-compliance outcomes easier than other local governments for several reasons. While municipal and county governments have broad and diverse public duties, and vary widely in their revenue generation and expenses, school districts have consistent and comparable performance metrics (such as test scores and graduation rates) (Houck & Kurtz, 2010) especially within single states (Murnane, 2013), and less variability in funding sources than other local governments. Further, in Washington State, while school districts are overwhelmingly noncompliant, they vary in severity of noncompliance (Kurpierz & Panci 2015). These traits mean school districts will vary on traits that are important to observing GAAP-compliance and performance outcomes, while being more comparable on other traits than municipal governments at large.

Graduation rates are one such useful performance measure of school district performance. While there are methodological difficulties to aggregating datasets from multiple states, observations within a single state will be methodologically consistent and school districts will share a policy regime with their comparators (Houck & Kurtz, 2010; Murnane, 2013). Further, graduation rates are a well-understood and highly-desired performance metric not just among technical specialists, but are considered salient and desirable by parents (Chambers & Michelson, 2020), principals (Gaziel, 1996) and superintendents (Harvey, 2019). Such relationships in the literature suggest that school districts consider graduation rate

a key performance indicator, one likely to supersede GAAP compliance as a terminal goal of school districts. One can visualize the resource-constraint relationship between GAAP-compliance and graduation rates as compliance requiring resources (Pfeffer & Salancik, 1978, 2003), and these finite resources being redirected away from the school's terminal goal of educating and successfully graduating students.

There are several mechanisms by which GAAP compliance could be selected against by educational professionals. The most obvious, noted by Carslaw, Mason, and Mills (2007), as well as Saito and McIntosh (2010) is that of budgetary constraint; dollars for hiring staff trade off directly between accountants and educational professionals. If additional educational professionals increase graduation rate for a particular student cohort, executives would have to directly trade off hiring additional educational professionals against accounting professionals that would improve GAAP compliance. Another possibility is one of salience rather than direct cost. As humans are boundedly rational (Simon, 1957), they have finite attention to give to making decisions. If the benefits of higher graduation rates are clear and easily comprehensible, while the benefits of GAAP compliance are diffuse (Baber and Gore, 2008) or stochastic (Kurpierz and Panci, 2015), educational administrators may choose the "easier to understand" option. This could be extended further into the social sphere to suggest that improving graduation rates, by being comparatively easy to explain to others, is "less costly" in political capital to defend (Cheng 1994), even if the executives themselves are aware of the long-term benefits of GAAP (Flyvbjerg 2001).

School administrators, as rational actors, will only engage in compliance if the benefits of compliance to their terminal goal of educational outcomes is greater than the cost of compliance. The fact that such behavior is not consistently observed implies that practitioners in charge of school districts perceive that

they do not receive sufficient benefits from GAAP compliance to merit complying. This produces a testable hypothesis:

**H<sub>1</sub>:** The graduation rate in GAAP-compliant schools will be lower than the educational outcomes of noncompliant schools.

If H<sub>1</sub> is true, it suggests that GAAP compliance is not (or at least *perceived* as not) a net benefit, and schools who resist complying are acting rationally to preserve resources towards their organizations' terminal goals. This would be in keeping with the suppositions of Baber and Gore (2008) and Carslaw et al. (2007). However, as a correlational relationship, this hypothesis would not necessarily reveal which of the possible causal mechanisms are responsible, and such a determination would require future research.

## 4. Research Design

### 4.1 Data and Methodology

Kurpierz and Panci (2015) collected a population-wide sample of school districts in Washington State, and measured their level of GAAP-compliance using the Minimum Quality of Reporting Index (M-QRI) score, which broke down GAAP-compliance into several sub-sections and measured compliance in a granular form. Further, the M-QRI sample collected significant demographic data, such as student population and annual revenue. This data is then linked to the Washington State Office of Superintendent of Public Instruction's (OSPI) performance database to collect the high school graduation rates of the school districts.

| Table 1: Sample Attrition       |     |
|---------------------------------|-----|
| Initial Sample                  | 292 |
| Missing Student Population Data | 5   |
| Missing Revenue Data            | 46  |

|                         |     |
|-------------------------|-----|
| Missing Graduation Rate | 15  |
| <b>Final Sample</b>     | 226 |

This data is then cleaned, removing school districts that failed to report either financially or with graduation data, leaving a smaller sample of n= 226 with the following characteristics.

| <b>Table 2: Characteristics of Sampled Washington School Districts</b> |             |               |              |              |
|------------------------------------------------------------------------|-------------|---------------|--------------|--------------|
|                                                                        | Min         | Max           | Mean         | Median       |
| M-QRI                                                                  | 0           | 6             | 3.38         | 4            |
| Graduation Rate                                                        | 3.75%       | 100%          | 85.76%       | 87.27%       |
| Population                                                             | 5           | 52942         | 3613         | 963          |
| Total Revenues                                                         | \$1,266,789 | \$703,073,236 | \$46,915,395 | \$16,380,041 |

In addition to having the summary statistics as a whole, the summary statistics of compliant vs. noncompliant districts are provided below. Because the number of fully-compliant school districts in Washington State is so low (N=3), a second presentation is provided that separates milder noncompliance ( $MQR-I \geq 4$ ) from severe noncompliance with GAAP ( $MQR-I < 4$ ).

| <b>Table 3: Summary Statistics for GAAP-compliant vs. GAAP-noncompliant Districts (N=226)</b> |                             |         |         |         |         |                                  |         |        |        |         |
|-----------------------------------------------------------------------------------------------|-----------------------------|---------|---------|---------|---------|----------------------------------|---------|--------|--------|---------|
|                                                                                               | <b>GAAP-Compliant (N=3)</b> |         |         |         |         | <b>GAAP-Noncompliant (N=223)</b> |         |        |        |         |
|                                                                                               | Min                         | Max     | Mean    | Median  | Std Dev | Min                              | Max     | Mean   | Median | Std Dev |
| Graduation Rate                                                                               | 86.5%                       | 96%     | 92.4%   | 94.7%   | 5.2%    | 3.8%                             | 100%    | 85.7%  | 87.3%  | 11.1%   |
| Population                                                                                    | 15488                       | 29408   | 24008.7 | 27170   | 7497.8  | 5                                | 52942   | 3397.3 | 953    | 6013.2  |
| Total Revenues (Thousands)                                                                    | 166,549                     | 369,977 | 284,453 | 316,832 | 105,509 | 1,267                            | 703,073 | 43,921 | 16,055 | 73,327  |

| <b>Table 4: Summary Statistics for Weakly GAAP-Noncompliant vs. Severely GAAP-Noncompliant Districts (N=223)</b> |                                         |     |      |        |         |                                           |     |      |        |         |
|------------------------------------------------------------------------------------------------------------------|-----------------------------------------|-----|------|--------|---------|-------------------------------------------|-----|------|--------|---------|
|                                                                                                                  | <b>Weakly GAAP-Noncompliant (N=184)</b> |     |      |        |         | <b>Severely GAAP-Noncompliant (N=107)</b> |     |      |        |         |
|                                                                                                                  | Min                                     | Max | Mean | Median | Std Dev | Min                                       | Max | Mean | Median | Std Dev |

|                            |       |         |        |        |        |       |         |       |       |        |
|----------------------------|-------|---------|--------|--------|--------|-------|---------|-------|-------|--------|
| Graduation Rate            | 3.8%  | 100%    | 84.4%  | 86.1%  | 11.5%  | 68.0% | 100%    | 90.5% | 91.7% | 7.3%   |
| Population                 | 25    | 52942   | 4936.8 | 2330   | 6853.8 | 5     | 17105   | 650.2 | 172   | 2289.4 |
| Total Revenues (Thousands) | 1,267 | 703,073 | 54,678 | 24,963 | 79,950 | 1,560 | 166,122 | 8,961 | 4,015 | 22,509 |

## 4.2 Multivariate Specifications

I use the following specification to investigate associations between GAAP disclosure compliance and educational outcomes in Washington State school districts.

$$G\_RATE = \beta_0 + \beta_1 MQRI + \beta_2 POP + \beta_3 REV + \varepsilon$$

In the above model, G\_RATE is the 5-Year Cohort Graduation Rate, MQRI is the GAAP compliance index score, POP is student population and REV is the school district's annual revenue. POP and REV are used as control variables to account for differences in size and munificence, two traits that affect graduation rates at the district rather than individual level (Baker et al., 2008; Chakraborty et al., 2001; Hartman, 2003). All measures are taken from the 2015 school year.

## 5. Results

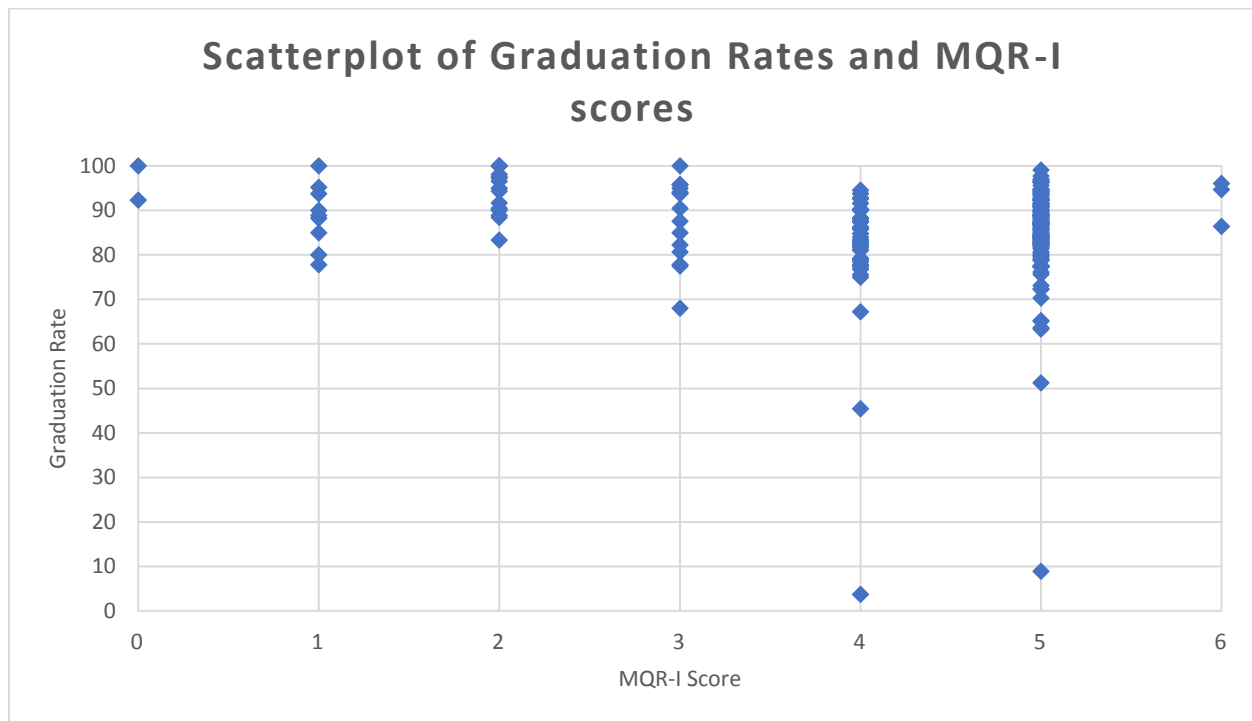
**Table 5: Regression Coefficients**

| Model |                    | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. | 95.0% Confidence Interval for B |             |
|-------|--------------------|-----------------------------|------------|---------------------------|--------|------|---------------------------------|-------------|
|       |                    | B                           | Std. Error | Beta                      |        |      | Lower Bound                     | Upper Bound |
| 1     | (Constant)         | 91.889                      | 2.662      |                           | 34.517 | .000 | 86.642                          | 97.135      |
|       | Index Score        | -1.620                      | .628       | -.180                     | -2.579 | .011 | -2.858                          | -.382       |
|       | Student Population | .000                        | .000       | .184                      | .996   | .320 | .000                            | .001        |

|                |            |      |       |       |      |      |      |
|----------------|------------|------|-------|-------|------|------|------|
| Total Revenues | -1.248E^-8 | .000 | -.091 | -.490 | .625 | .000 | .000 |
|----------------|------------|------|-------|-------|------|------|------|

The initial regression found the appropriate sign to match predictions (-1.62) and considerable significance ( $t=-2.58$ ,  $p<.05$ ) to consider it a noticeable finding. This suggests that GAAP compliance has a small but significant effect on educational outcomes, and that school districts who engage in GAAP compliance activities may lose out the use of those resources to their terminal goal of educating children.

**Figure 1: Scatterplot of Graduation and Compliance**



### Robustness Check

There is extant literature in government accounting research that has dealt with scale problems showing that school districts have very different outcomes based on size (Baber & Gore, 2008), and some of this variation has been measured by research around school consolidation (Berry & West, 2010; Duncombe & Yinger, 2010; Wang et al., 2011). This suggests that school districts of a very small size are significantly

more statistically noisy in their responses (Fox, 2004), less likely to report financial data (McLelland & Giroux, 2000), and less likely to report accurate performance data (Fox, 2004; McLaughlin, 1997). Given these constraints, a truncated data sample that removed all school districts with less than 100 K-12 students in total is used. This removes numerous schools that behave on a different scale and are perhaps outside the predictions of some literature (McLaughlin, 1997). This truncation removes 8 additional samples, leaving  $n=218$ . Because small size and poor reporting practices seem correlated in past literature, significant proportions of the missing data were already small-sized districts, reducing the number removed by truncation.

**Table 6: Regression Coefficients for a Size-Truncated Sample**

| Model |                    | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. | 95.0% Confidence Interval for B |             |
|-------|--------------------|-----------------------------|------------|---------------------------|--------|------|---------------------------------|-------------|
|       |                    | B                           | Std. Error | Beta                      |        |      | Lower Bound                     | Upper Bound |
| 1     | (Constant)         | 92.051                      | 2.735      |                           | 33.656 | .000 | 86.660                          | 97.441      |
|       | Index Score        | -1.671                      | .643       | -.182                     | -2.599 | .010 | -2.939                          | -.404       |
|       | Student Population | .000                        | .000       | .194                      | 1.043  | .298 | .000                            | .001        |
|       | Total Revenues     | -1.349E-8                   | .000       | -.098                     | -.525  | .600 | .000                            | .000        |

As can be observed, this moves the negative effect of GAAP compliance on graduation rates into stronger significance ( $t=-2.56$ ,  $p=.01$ ), providing evidence that GAAP compliance might cause harm to educational outcomes, and that schools in Washington State may resist GAAP compliance due to rational resource-constraint reasons.

### **Administrative Decisionmaking in Choices of Outcomes for GAAP-Compliance**

In addition to correlational data showing GAAP-compliance and graduation rates are negatively correlated with one another, there is also internal documentation and discussions among practitioners that give similar reasoning for these outcomes. Pilcher and Dean (2009) noted that local governments

considered the resources allocated to complying with external reporting requirements excessive as they detracted from actual service provision. This evidence is replicated in the case of Washington State, where the Washington State Office of the Superintendent of Instruction (OSPI) Accounting Manual states: “Where legal requirements are in conflict with GAAP, legal requirements prevail.” (OSPI, 2021), even though in all cases of financial disclosure, the state’s legal requirements are less than GAAP’s requirements. Further, the manual immediately contradicts itself, stating “Sufficient additional records should exist to satisfy GAAP reporting requirements.” while not enumerating nor explaining what these additional records might be. Taking a design-science perspective in keeping with governmental accounting being a tool put towards a purpose (Simon, 1969), and specifically referencing the purpose of formal disclosures in local government being about both internal decisionmaking and public accountability (Barnard & Simon, 1947; Simon, 1946), these OSPI documents suggest that Washington State School Districts’ formal disclosures are superficial in nature and actively choose to seek minimum compliance. Further, as there has been limited enforcement, and the costs of GAAP-compliance are uniquely visible in school districts, it makes sense that superintendents are more likely than most local governments to dismiss GAAP-compliance as a cost without benefit. This is corroborated in other state documents, such as the Washington Student Achievement Council’s guidelines for improving graduation rates, which discuss the importance of demographic data for students, but limits discussion of financial data to a simple “secure government funding” (Ritter, 2015). The guidelines further recommend emulating several school districts used for case studies, all but one of which are GAAP-noncompliant. At the same time, Washington State has been stringent about the accuracy and reliability of its student demographic data, recommending superintendents present graduation data under a disclosure regime similar to accounting’s own principle of conservatism (Hall, 2005). When administrators are allowed freedom to choose which disclosures to focus on, they are able to both show the capacity for GAAP-compliance, and the active choice not to do so.

## 6. Discussion

Past literature has been broadly supportive of GAAP compliance in correlating with numerous positive outcomes for local governments. However, when school districts in Washington State are given a choice to comply with GAAP or use some other form of OCBOA, school districts overwhelmingly prefer to avoid GAAP. This contradiction in behavior suggests that some aspect of school district financial decisionmaking has not been considered. This study shows that, in keeping with the suppositions of Baber and Gore (2008), and arguably with the experiences of the practitioners themselves (Pilcher & Dean, 2009) there seem to be uncounted costs to GAAP compliance in the form of reduced graduation rates that outweigh the positive aspects of GAAP compliance for school districts. Baber and Gore (2008) found that municipal governments with GAAP compliance receive significantly lower cost of capital, but this lower cost of capital only translates into educational attainment if access to capital is a limiting factor to school district success. Similarly, Kurpierz and Panci (2015) predict low-compliance schools are in danger of catastrophic events in some far-off and inchoate future, but schools might be faced with the *short-term* costs of compliance to ward off a possible *long-term* threat. At a fundamental level, in resource-constrained environments like school districts, every dollar spent on reporting compliance is one dollar less to spend on a teacher. Superintendents operating in a sufficiently resource-constrained environment may rationally choose to ignore GAAP because cheap cost of capital or transparent finances are not central to their stakeholder's demands in the same way graduation rates are.

These results have significant implications for policy. If the reason for GAAP noncompliance is because of direct negative educational outcomes, this changes the best policy recommendations for school districts. It is no longer the equivalent of trying to get a fussy toddler to eat their broccoli, but instead

trying to remodel a home's only bathroom: a likely-good long-term investment, but a legitimately painful act in the transition.

There are several limitations to this study. Foremost is that as a correlational study, the causal direction of the GAAP-Graduation relationship is uncertain. While there is conceptual support and documentary evidence to suggest that educational administrators in Washington are actively choosing to prioritize graduation rates at the expense of GAAP, this paper cannot dismiss the possibility that the causal arrow runs the other way, or that an unmeasured mediating variable is endogenously determining both GAAP-compliance and graduation rates. Another limitation is in its external validity beyond Washington State. While the incorporation of every school district in Washington State ensures that the results are relevant to the area, there is no guarantee that these findings translate to the experience of school districts in Texas, California, Florida, or New York. There could be specific state-level effects (such as the fact that Washington State has an Auditor's Office rather than contracting firms to audit school districts) that might limit the generalizability of this study. Similarly, while graduation rates are a measure of school success, they are not the only measure, and the relationship between school GAAP compliance and test scores or student satisfaction remains unstudied. Additionally, this exploratory study uses a relatively unsophisticated model. It is possible there is an omitted variable (such as the ratio of administrative funding to teacher funding) that affects both GAAP compliance and graduation rates.

These findings suggest several avenues of future study. First, the exploratory nature of the study invites using a larger, more diverse sample from multiple US States to see if the effect replicates in a more generalized manner. Additionally, alternate measures of educational outcomes could give greater depth and context to the relationship between compliance and educational outcomes. Similarly, because resistance to GAAP-compliance is common folk-wisdom for many educational administrators, this

research could be bolstered by qualitative research (similar to that of Pilcher and Dean (2009) but in a North American context) determining how school administrators perceive GAAP compliance's benefits and costs. The possible curvilinear relationship of GAAP-compliance and graduation rate around the "moderately noncompliant" population with MQR-I of 4 also suggests that in schools approaching GAAP compliance there may be unexplored second-order effects that become important, as the three fully-GAAP-compliant schools themselves have satisfactory graduation rates. Finally, this suggests that policymakers would benefit from research on how to reduce the negative effects of GAAP compliance to make it easier for school districts to change their practices.

As accountants, we often focus on ensuring the reliability of our records to the exclusion of other values, from the Trueblood Committee onwards. This is not an incorrect choice, but it requires that we as a discipline accept that other organizations may have differing goals, and only rely on accounting so far as it provides the organization with benefits beyond the costs incurred. This study shows evidence that when it comes to school districts, the costs incurred may already be beyond our benefit.

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## CHAPTER 4: CITIZEN COMPREHENSION OF ACCOUNTING DOCUMENTS: WHAT EVEN IS “CITIZEN-CENTRIC”?

## **Citizen Comprehension of Accounting Documents: What Even Is “Citizen-Centric”?**

### **Abstract**

Governmental financial reports use unique formats that are difficult for the average citizen to comprehend, and this lack of comprehension makes democratic accountability difficult or impossible to achieve. In response, several key institutions such as the Association of Government Accountants (AGA) and Government Financial Officers’ Association (GFOA) have designed Popular Financial Reports (PFRs), alternative financial reporting formats designed for non-expert consumption of accounting information. However, there has been little investigation on how effective these PFRs are at their intended purpose of being understood by non-accountants. This study uses the DAGS Framework from Design Science Research Methodology (DSRM) to interview the designers of the original Citizen-Centric Report (CCR) format to determine their original artifactual goals, and to formalize the design intent of the creators to judge whether the CCR achieves those artifactual goals. This study finds that the implicit constructs practitioners designed the CCR around are focused on avoiding four distinct forms of failure. Further, these ways of failing are in tension with one another: CCRs must be (1) short enough to be easy to read, but also (2) must be long enough to be thorough. CCRs must (3) avoid being purely technical and boring, but must also (4) avoid being biased, motivated, or political. Further, the CCR is supposed to be a socializing document as much as a disclosure, with an expectation that readers will think like a practitioner after sufficient exposure. These disclosure goals in some ways mirror similar disclosure challenges in financial accounting, and in other ways are unique to governmental accounting. These similarities and divergences are discussed.

### **1. Introduction**

Democratic governments are definitionally run by the citizens who comprise them. This means that a well-run democratic government is dependent upon citizens who can make informed decisions, in the

same manner that a market requires some degree of informed participants for effective price discovery. In both markets and governments, being informed additionally requires a certain degree of auditing and oversight. However, the concept of ‘oversight’ in governments is a fraught and difficult term, encompassing not just the contradictory demands of accountability (Butler, 2005; Everett et al., 2007; Koppell, 2005) but the requirement for comprehension, for the citizens or market participants to not merely make decisions, but to make *informed* decisions. As a result, assisting citizens in making informed decisions is a critical component of modern democracy, and assisting comprehension of government financial information is an under-recognized subset of the larger challenge.

Governments and accountants both have worked at creating social technologies to increase comprehension for the average human (Ridley & Simon, 1938; Simon, 1946, 1969). The Government Accounting Standards Board (GASB) and the Financial Accounting Standards Board (FASB) both use “Understandability” as a critical qualitative characteristic (Financial Accounting Standards Board, 2018; Government Accounting Standards Board, 1987). However, both FASB and GASB guidelines put a limit on how understandable a disclosure must be to meet this requirement. The FASB Concepts Statement 8 requires disclosures be understandable to “users who have a reasonable knowledge of business and economic activities and who review and analyze the information diligently”. GASB Concepts Statement 1, by contrast, argues “To be publicly accountable, a government should issue financial reports that can be understood by those who may not have a detailed knowledge of accounting principles. Those reports should include explanations and interpretations that help users understand the information provided.” but provides no further direct guidance on understandability. As a result, governmental accounting practitioners that wish to obey the principle of the GASB pronouncement must take implementation into their own hands and create disclosure formats that are understandable. In the US context, these implementation attempts have produced two disclosure formats: the Popular Annual Financial Report

(PAFR) and the Citizen-Centric Report (CCR). Both purport to be “Popular Financial Reports” (PFRs), reporting documents that are more understandable to citizens and requiring less training to interpret than normal financial reporting documents. The PAFR and CCR were developed in reaction to the current required format for government accounting, the Annual Comprehensive Financial Report (ACFR). The ACFR is a large technical document, with even modest-sized cities having several hundred pages of technical documentation subject to the Governmental Accounting Standards Board. The ACFR is equivalent to US GAAP or IFRS financial documents for large organizations. By contrast, PFRs such as the PAFR and CCR are explicitly designed for ease-of-use for average unsophisticated users. PFRs are smaller, simpler, and less exhaustive than ACFRs while attempting to retain the most salient financial information.

However, there has been no test of PFR designs to see how effective they are at their stated goals of making information more comprehensible to the average citizen, nor what characteristics facilitate the comprehension of unsophisticated consumers compared to default accounting documents. This lack of testing provides an opportunity to explore the efficacy of PFRs like the CCR on citizen comprehension compared to traditional documents. Further, in a design science paradigm where the goal is a normative ‘product’ (in this case one of better governance), experimental testing is a required step in ensuring the developed social technology works as desired (Kurpierz & Smith, 2020).

Moving directly to experimental testing of the CCR presents a difficulty, however. The CCR was initially designed and deployed by practitioners, individuals who do not have a formal design model. Instead, practitioners are domain experts with an overarching goal. This means that attempts to judge the CCR as an artifact in design science research methodology (DSRM) must look not only forward (“does the artifact work?”) but also backwards (“what is the proposed artifact to solve this problem?”) to

determine whether the CCR achieves its intended goal. Going backwards through the design science model requires using special methodologies, the most common of which is referred to as the DAGS (Design science, Action research, Grounded theory, Systems development) Framework. In this paper I review the literature for best methods for each of the six stages of Design Science Research Methodology, determine what stage the extant CCR used by practitioners matches, and determine the best method to judge CCR's effectiveness as a design science artifact. I determine that "eliciting the implicit" (Hillier, 1998) is best done for CCRs at this time via semi-structured interviews and grounded theory, in preparation for more robust experimental tests such as Repertory Grids, field experiments, and lab experiments once the design theory of CCRs has been better explicated. I then perform semi-structured interviews with the surviving CCR designers to determine their original design theories and produce testable propositions for CCR guidelines.

I find that the CCR was only weakly designed *towards* the positive goal of educating, but was designed very strongly to avoid four known "failure states" (situations where no additional iteration is helpful, and it is more efficient to start over, a concept sometimes used in design sciences, including accounting research (Jones & Hensher, 2005; Jones & Wang, 2019)). The four failure states of disclosures for unsophisticated users are: (a) importance of concision in documents for non-sophisticated users (Not Short Enough); (b) importance in the neutrality of CCR creators (Not Apolitical Enough); (c) the converse of extreme difficulty in neutrality in CCR creation (Not Trustworthy Enough); and (d) that the CCR was supposed to be an entrée into further citizen analysis of financial information (Not Enticing Enough). I further find that practitioners considered educational value for both citizens and accounting students to be a goal, but that practitioners often considered accounting students and average citizens to be the same class of individuals with identical needs and desires, and viewed education as a socialization or normative process rather than an information-sharing process. Additionally, I find that each of the

failure states is in direct tension with another failure state as a converse: being short enough to be readable was in direct tension with being complete enough to be trustworthy. Similarly, being neutral enough to be apolitical directly traded off against being enticing enough with qualitative and contextual data to be engaging. As a result, there is initial evidence that design of the CCR is under selection pressures similar to the “stabilizing selection” pressure found in organizational theory and organizational ecology, where deviations from the population median are rapidly eliminated (Chuang et al., 2000; Hansen, 1997; Hashemi, 1994; Schmalhausen, 1949). This suggests the CCR may be unable to succeed in its stated purpose, as stabilizing-selection environments can lead to untenable tensions that lead to the extinction of the species (Weinkauff et al., 2019) or elimination of an artifact (Jones, 2006).

The remainder of the paper is organized as follows. Section II discusses the previous literature and explores what stage of the Design Science Research Methodology (DSRM) is most constructive for studying the CCR. Section III describes the specific DSRM used for this study. Section IV presents the results. Section V summarizes the findings and comments on the study's implications.

## **2. Literature Review and Design Science Research Methodology**

One of the challenges in studying non-standard disclosure formats such as the CCR is that the initial creation of the format is often heavily practitioner-driven, and practitioners generally do not design their artifacts with researcher-legibility as a major goal (Frost, 1999; Gill, 1990; Kasanen et al., 1993; Peffers et al., 2007).

The difficulty of developing effective research methodologies for emerging technologies (what design science calls *artifacts*) is a known and recurring difficulty for design science researchers. This is due to design science disciplines, such as accounting information systems or public administration, being a mix

of natural science (“what is”) and design science (“what should be”), and thus needing distinct methodological phases (David et al., 1999).

In response to this challenge, Peffers et al. (2007) proposed a formalization of design science research methodology (DSRM) as a sequence of six activities: (1) problem identification and motivation, (2) definition of the objectives of a solution, (3) design and development, (4) demonstration, (5) evaluation, and (6) communication. This methodological sequence was further refined by Geerts, (2011).

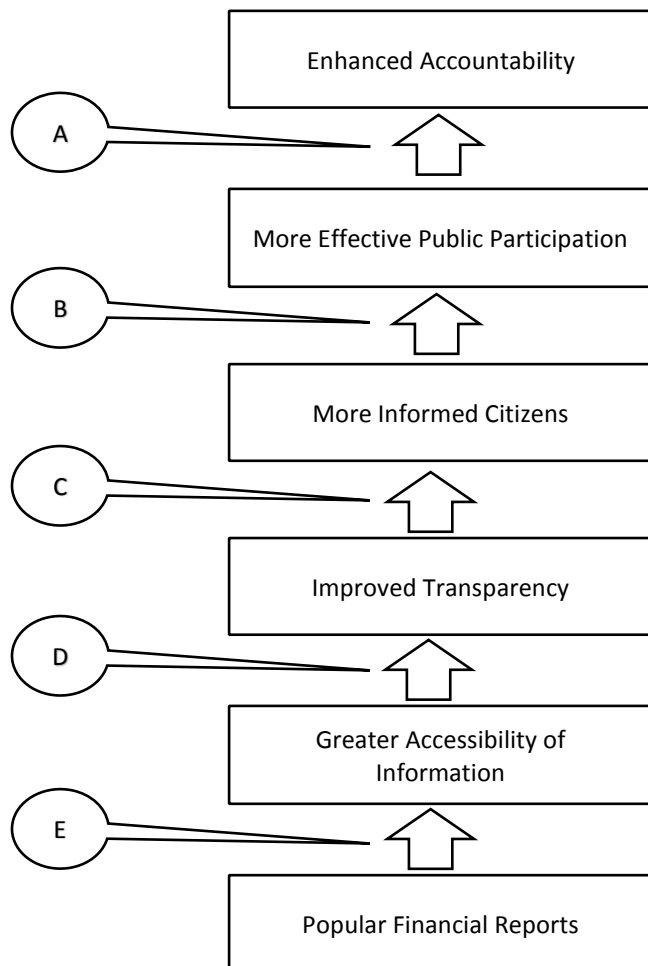
Government accounting practitioners have already completed steps one, two, and three with the CCR, a process recorded by researchers (Fritzlen, 2010; Jordan et al., 2017; Peterman, 2012; Sharp et al., 1998; Yusuf & Jordan, 2015; Yusuf et al., 2013). At the same time, practitioners have tried to move on to phase six and disseminate CCRs as a completed technology without any demonstration or evaluation attempts to determine the CCRs’ efficacy at the defined problem. Without completion of steps four and five, researchers cannot know whether the designed artifact (CCR) actually solves the problem it was designed to solve, that of citizen comprehension of government accounting disclosures.

There is a further complication to this problem of skipped developmental steps. Because the CCR was designed by practitioners for citizens, the design theory was never formally explicated. The causal reasoning exists, but is generally silently encoded as governing values (Argyris & Schön, 1978), *phronesis* (Flyvbjerg, 2001), or implicit constructs (Hillier, 1998). The strongest attempt to explicate the causal chain to date is Yusuf et al. (2013), who write:

“While we do not claim to know the definitive answer to this question, we offer a preliminary attempt at elucidating the linkages between popular reporting, financial information, transparency, accountability, citizen support, and public participation...”

And propose a causal chain, which this chapter marks with letters A through E for each causal linkage:

**Figure 1: Causal Chain of PFR Effectiveness**



Each linkage is treated by practitioners as an already-confirmed relationship. Several of the links in the above model have indeed been experimentally validated, but this is true only for some causal steps. For example, Linkage B (Brunner et al., 2020), Linkage C (Grimmelikhuijsen, 2012; Saiewitz & Piercey, 2020) and Linkage D (Dineen et al., 2017) have all been experimentally validated. There is additional tantalizing evidence in support for several of the linkages (Alt & Lowry, 2010; Benito & Bastida, 2009; Callahan, 2002; Justice & Dülger, 2009; Kurpierz & Smith, 2020; Yusuf & Jordan, 2012; Yusuf et al., 2013), whether

correlational or case studies. However, to date, there has not yet been experimental validation of linkages E or A. CCRs have been designed and deployed by practitioners under the presumption that all these linkages are true, and that these true linkages have been robustly validated by numerous investigations.

This step-skipping by practitioners produces a difficult situation for researchers interested in continuing this stream of research. Design Science Research Methodology requires artifacts like the CCR to have Demonstration and Evaluation stages as a rigorous test of the CCR's ability to solve the problem. However, the most appropriate rigorous test of the CCR's efficacy, experimental validation, requires constructs that can be operationalized. In turn, these constructs need to have a theoretical basis that would suggest content validity and construct validity. In the case of the CCR, there is no explicated theoretical basis, and one must instead somehow effectively impute theoretical models to practitioners, going "backwards" through the design science process.

A review of the literature suggests several prospective methodologies for filling these gaps, each with its own benefits and drawbacks. These include structured interviews, semi-structured interviews, Kelly's (1955) repertory grids, and the DAGS Framework for information systems. Further, it is possible to determine the most desirable methodology to use based on what phase of the design science research cycle the artifact is in. Earlier phases, such as (1) problem identification and motivation or (2) definition of the objectives of a solution, require methodologies that are more exploratory, theoretical, and groundwork-laying. By contrast, later steps such as (4) demonstration and (5) evaluation are better-served by tests of previously-developed theoretical knowledge to rigorously verify that artifacts solve problems as intended.

This trend suggests that the further back in the design process a researcher goes, the more qualitative and theory-building their research will be. Similarly, going further forwards in the design process will make methodologies that are more quantitative and theory-testing more attractive. However, it is important to note that the design science process is cyclical, and artifacts can be iteratively improved. Evaluation or even Communication can reveal opportunities for design alteration or fresh theoretical development. Given this cyclical nature, it is better to conceive of any methodological approach that doesn't seem to be working not as "not right" but instead as "not ripe". If experimental verification is a poor fit for the problem, it is reasonable to go back to developing the constructs for testing. If construct development doesn't yet have a reasonable theoretical validity, it is reasonable to go back further and use qualitative research methodologies to develop theory.

#### **DAGS Framework for Information System Data**

There is a broad recognition amongst design science researchers that design science work is multimethodological and multidisciplinary (David et al., 1999; March & Smith, 1995; Nunamaker Jr et al., 1990; Shangraw et al., 1989). However, diverse methodological approaches in the same research domain leads to the problem of choosing the most appropriate methodological tool when a researcher is not and cannot be fluent in all the possible, valid, and appropriate methodological approaches for this particular artifact. This problem has been particularly noticeable in the accounting information systems field, where accounting principles, software design, hardware engineering, and user experiences are all equally important, but not commensurable methodologically (Nunamaker Jr et al., 1990). As an attempt to solve this problem, Nunamaker, Chen, and Purdin (1990) proposed a "multimethodological approach to information systems research" that allowed movement between diverse methodological nodes. 15 years later, Adams & Courtney (2004) produced a refinement that was more explicit in which

methodological tools fell under which node, splitting the approach into four sub-sections: Design Science, Action Research, Grounded Theory, and Systems Development, calling it the DAGS framework.

The additional value of the DAGS Framework is in allowing researchers a guidepost for where to enter the cycle of design science research. As Adams and Courtney note:

“For example, a project might begin with Churchman’s Theory of Inquiring Systems as the basis for knowledge management systems in organizations, and use design science and systems development as ways of instantiating the theory, with tests of the resulting prototype as constituting proof of concept. On the other hand, in the absence of theory in the domain of interest, one might begin with a grounded theory approach, develop a theory of phenomena in the domain, then use action research, design science and systems development as ways of testing and refining the theory.”

Design science was originally created with the assumption that one would never need to move backwards in the artifact design process. It was assumed that one would simply iterate on an existing artifact. An already-implemented artifact, whether physical tool or social practice, requires going into the situation where practitioners are using the tool and seeing their reasons for using it. Accounting Information Systems design scientists were aware this required supplementary methodologies, and Adams and Courtney noted that the methodologies most effective for answering these design-science questions were Grounded Theory and Action Research.

An initial concern with the use of grounded theory is that its epistemology (complete theoretical naïveté) clashes with design science’s (purposive analysis). DAGS argues that these epistemologies can

be complementary in the case of artifacts (Gregory, 2011; Hmoud et al., 2020; Holmström et al., 2009; Müller & Olbrich, 2011). Design science imputes that an artifact is made with an intent, but recognizes it cannot effectively identify that intent post-hoc. Therefore, design science seeks grounded theory to try and “elicit the implicit”, with no preconceptions beyond that this artifact serves an (unknown) purpose. Grounded theory, in turn, can observe an artifact and see both how practitioners say it is used/useful, and how it is actually used. However, grounded theory cannot make a judgment call on how effectively an artifact actually achieves its stated, imputed, and real intent. Practitioners operate under the assumption that CCRs are helpful, and spend a significant amount of time and effort creating and promulgating them. From a grounded theory standpoint, practitioners seem to care for and value the CCR, and seem to have a theory of change regarding how CCRs improve society. But it takes the design science standpoint to determine whether that theory of change actually conforms to an external reality.

This ability to map what design science methodological work has been done and where the gaps remain allows future researchers to more easily choose which tool is appropriate to a particular stage of design science research methodology. This guidance can apply to practitioner-developed disclosure formats such as the CCR. Citizen-Centric Reports, when viewed under the DAGS Framework, show saturation of the “Systems Development” and “Design Science” nodes, as the CCR is a crafted artifact with practitioner-produced theory behind it, and either action research (to test whether the benefits of the CCR are actually being experienced by end-users) or grounded theory (to test whether the practitioner-produced theory is the actual causal system) are the most appropriate methodological next step.

Popular Financial Reporting in general and Citizen-Centric Reports in particular are practitioner-driven disclosure formats, and have been through the first three steps of a Design Science Research Methodology ((1)problem identification and motivation, (2) definition of the objectives of a solution, (3)

design and development) but have then been moved to step 6 (communication) without the required intervening steps of (4) Demonstration and (5) Evaluation that show CCRs actually solve the problem they were designed to solve. These middle steps are amenable to both theory-building and theory-testing methodologies, and future research can either press forward or iterate backwards with equal value. However, the lack of explicit theories-of-action for CCRs suggests that the first and best step is to use the DAGS Framework to extract constructs from practitioner's tacit knowledge before proceeding into demonstration or evaluation of the CCR.

**Table 1: DSRM Stage and Methodology**

| <b>DSRM Activities</b>                          | <b>Activity description</b>                                                                                                                                                                                            | <b>Knowledge base</b>                                                                                                                            | <b><i>Suggested Methodologies</i></b>                                                                             |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>1.</b> Problem identification and motivation | <i>What is the problem?</i><br><br>Define the research problem and justify the value of a solution.                                                                                                                    | Understand the problem's relevance and its current solutions and their weaknesses.                                                               | <i>Focus groups, Semi-structured interviews, Expert consultation</i>                                              |
| <b>2.</b> Define the objectives of a solution   | <i>How should the problem be solved?</i><br><br>In addition to general objectives such as feasibility and performance, what are the specific criteria that a solution for the problem defined in step one should meet? | Knowledge of what is possible and what is feasible. Knowledge of methods, technologies, and theories that can help with defining the objectives. | <i>Grounded Theory, Kelly's Repertory Grids, Semi-structured interviews, Expert consultation, Formal modeling</i> |
| <b>3.</b> Design and development                | <i>Create an artifact that solves the problem</i><br><br>Create constructs, models, methods, or instantiations in which a research contribution is embedded.                                                           | Application of methods, technologies, and theories to create an artifact that solves the problem.                                                | <i>Kelly's Repertory Grids, Prototyping, Technology Transfer, Computer simulations</i>                            |
| <b>4.</b> Demonstration                         | <i>Demonstrate the use of the artifact.</i><br><br>Prove that the artifact works by solving one or more instances of the problem.                                                                                      | Knowledge of how to use the artifact to solve the problem.                                                                                       | <i>Case studies, Action Research, Field studies</i>                                                               |
| <b>5.</b> Evaluation                            | <i>How well does the artifact work?</i>                                                                                                                                                                                | Knowledge of relevant metrics and evaluation                                                                                                     | <i>Lab experiments, Field experiments,</i>                                                                        |

|                  |                                                                                                                                                 |                                        |                                                        |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|--------------------------------------------------------|
|                  | Observe and measure how well the artifact supports a solution to the problem by comparing the objectives with observed results.                 | techniques.                            | <i>Surveys, Structured interviews, Action Research</i> |
| 6. Communication | Communicate the problem, its solution, and the utility, novelty, and effectiveness of the solution to researchers and other relevant audiences. | Knowledge of the disciplinary culture. |                                                        |

As noted previously, the causal reasoning of how CCRs improve citizen comprehension exists, but is not explicit and easily-reached. It is instead silently encoded as governing values (Argyris & Schön, 1978), *phronesis* (Flyvbjerg, 2001), or implicit constructs (Hillier, 1998). Such a challenge suggests that grounded theory working with current CCR practitioners to determine their design reasoning is necessary as a next step in determining the effectiveness of CCRs in achieving their goals.

### Research Questions

There has been a substantial lack of research into measures of citizen comprehension of financial information to date. This was known over a decade ago, with Kidwell and Lowensohn (2011) noting in a review of governmental behavioral accounting literature that *“We have found that citizens have never been the sole focus of GoBAR [Governmental Behavioral Accounting Research] research, although their behavior has been compared to that of elected officials, bureaucratic managers, external auditors, finance officers, and the credit market.”* (p. 61) and *“Citizens have been overlooked in both auditing and non-budget decision-making studies. There were no studies of citizens’ monitoring of candidate promises or government waste and inefficiency via the financial report or the budget.”* (p. 61) This dearth of research presents a challenge in developing variables for citizen-centric comprehension that have been experimentally validated by previous research.

As a result, this chapter must draw upon literature from other parts of accounting research, as well as related design-science disciplines that have a longer history of studying citizen comprehension, such as information systems and public administration.

There has been a diverse and growing body of research on the role that cognition and comprehension play in the translation of informational signals in financial documents. Some of the earliest landmark work in this area was done on the narrative content of accounting (Frazier et al., 1984) using the WORDS system to automate narrative comprehension, responding to the theoretical concerns about financial data comprehension proposed by Libby (1981). Accounting and finance researchers have studied the impact of qualitative information on equity valuations expansively (Antweiler & Frank, 2004; Das & Chen, 2007; Li, 2008; Tetlock, 2007). But it is important to note these studies are about a specific population: sophisticated (often-professional) producers and consumers of financial documents. The common population that is “users” in much of the extant accounting literature is treated as investors due to the equity-valuations focus of capital markets (Li, 2008; Loughran & McDonald, 2016; Tetlock, 2007), even when said user does not exist save as a ‘made-up’ construct for use by other entities (Stenka & Jaworska, 2019; Williams & Ravenscroft, 2015; Young, 2006). This focus is significantly different than the focus government disclosures tend to have, which focus on transparency and accountability to the public at large, though this “universal constituency” may be as artificial a construct as the idealized “user” from IASB or FASB’s documentation. At this time, there has been no research that emulates the textual analysis used in more mainstream accounting research, as noted by Kidwell and Lowensohn (2011).

There is significantly less literature on comprehension of governmental financial documents by citizens (though not none (Brunner et al., 2020; Dwyer & Wilson, 1989; Jones et al., 1985; Saiewitz & Piercey, 2020)), and of that literature, very little takes a behavioral view towards document comprehension. In a synthesis of the literature, Jordan et al. (2017) develop a five-trait index for government financial report quality: comprehension, access, financials, appearance, and community-focus. However, this index still remains normative and measures PFRs' adherence to presumed best practices rather than the measuring the effect on citizens. For example, "comprehension" as a category is tied to the difficulty of the Flesch-Kincaid Grade Level, even as this is not a metric designed to effectively measure accounting information, much of which is mathematical rather than based on length of words or sentences. Even so, the authors find that the trait PFRs most struggle with adherence to is comprehension, arguably the entire purpose of government financial reports to citizens. Similarly, the largest survey on PFR adoption found both that approximately 90% of Texan governments that created PFRs did so because they believed it was easier for citizens to understand, but that 82% of the survey respondents did not create a PFR, with a majority having no intention of ever doing so (Groff et al., 2017).

This lack of uptake reveals a tension that pits the normative goals and practical outcomes against the behavior of local governments, which don't see PFRs producing a positive cost-benefit outcome. This is in spite of a robust body of literature indicating that increased transparency has numerous positive outcomes for both governments and constituents, including lower cost of debt (Bastida et al., 2017), lower debt levels and improved fiscal discipline (Alesina et al., 1999), a decrease in fiscal illusion for citizens (Benito & Bastida, 2009; Simonsen & Robbins, 2000), increased approval ratings and voter confidence in the incumbent governor's decisionmaking (Alt et al., 2002), and decreased fund capture by corrupt elites (Reinikka & Svensson, 2011). Increased transparency even seems to blunt the dissatisfaction caused by raising taxes (Alt & Lowry, 2010).

However, this focus on positive effects and normative ideals is missing a key causal link: there is little research on the mechanism of action through which transparency improves citizen understanding. This gap has been recognized, with De Renzio & Wehner (2017) decrying the siloing of research around the subject, and Justice & Dülger (2009) suggesting that researchers will need to catch up to practitioners, who are already producing new disclosure technologies for their constituents without assistance from academia. This phenomenon is a known challenge in design science in accounting, where siloing amongst academics and between academics and practitioners leads to a significant slowdown in the development of accounting tools (Barzelay & Thompson, 2010; McCarthy, 2012). This study is an attempt to reverse this siloing, and bring together academic and practitioner knowledge from public administration, behavioral accounting, and political science to test if already-deployed interventions make progress towards the practitioner's stated goals for using them.

As a result, I have turned to practitioner models to determine the variables of interest. The GFOA and AGA developed their PFRs through a normative model, and have an implicit theory-of-change on how their PFRs are superior to default technical documents. All extant research on citizen comprehension of PFRs measures conformance of documents to this normative model. This leaves governmental behavioral accounting research in a similar state to accounting as an entire discipline before Ball and Brown (1968), with a significant focus on top-down, practitioner-driven normative models with significant empirical investigation yet to be performed.

As a result, the majority of the variables tested are taken from the normative models used by practitioners as "common-sense" measures of citizen comprehension, under the presumption that

practitioner goals developed by such bodies as the Association of Government Accountant's National Committee on Accountability will be salient as measures of their of their own projects' success.

To date this normative ideal has not seen any form of experimental validation. The CCR has been extant since 2006 (Peterman, 2012), with intended designs going back as far as the 1992 special report to the Government Accounting Standards Board (Carpenter & Sharp, 1992). The design of CCRs was rational and normative, in direct and logical response to problems of understandability for regular citizens in formal documents (Marsh & Montondon, 2005), but after development CCRs were deployed directly into use with no form of feedback on their actual efficacy. As a result, it is necessary to work backwards and find the formalized theory representing the intent of the practitioners who developed the CCR. Using the DAGS framework for DSRM, this need to work backwards and determine the intent of the CCR's creators suggests that a grounded-theory exploration of practitioners' design intent is the most effective tool for advancing the design of current and future CCRs.

### **3. Research Method**

Using the DAGS framework, I develop a semi-structured interview model to explore the decision processes of CCR creators and some of its current maintainers. I further supplement and add context by reviewing a selection of several hundred exemplary CCRs created by various local governments, as recommended to me by the interviewees.

A series of interviews were set up with the surviving members of the original CCR creation team, as well as several current members of the Association of Government Accountability's Accountability Committee, the professional body responsible for maintaining, promulgating, and updating the CCR. The Accountability Committee is part of the national body, which oversees all chapters of the AGA, including

state, local, tribal, and federal government chapters. All AGA chapters are required to produce an internal CCR of the chapter's own disclosures, and to encourage and assist other governmental bodies in creating CCRs. Entities that have produced annual CCRs with the assistance of the AGA include the states of Idaho and Texas; the cities of Albuquerque NM, Honolulu HI, Suffolk VA, and Montgomery AL; the federal departments of the Department of Human Services, the US Patent and Trademark Office, and the Architect of the Capitol; and the territory of Guam. The CCR is the second-most-used PFR after the GFOA's Popular Annual Financial Report (PAFR), though the PAFR's numerical dominance is due to the larger number of municipalities than states. More US States and federal bodies use the CCR than the PAFR.

Five creators and members of the Accountability Committee agreed to be interviewed. This sample size was smaller than desired, but is arguably sufficient due to 3 interrelated reasons. (1) Theoretical saturation was rapidly reached, with practitioners not only giving similar answers, but those answers matching the official literature and internal discursive norms of the AGA. Because many of those interviewed were not the original creators of the CCR, but instead the current implementers, there is an undesirable conflation between the unexplicated goals of the CCR creators, and the post-hoc justifications for the CCR creation that have been disseminated organizationally after the fact. (2) Attempts to reach the original CCR creators were often (but not entirely) unsuccessful due to COVID-19, both in making meetings more difficult, making interviewees more reluctant, and in several cases causing the death of the original CCR creators and preventing them from meeting. As a result, additional practitioners were recruited to interview, but (3) population exhaustion was rapidly reached. While every AGA chapter in the United States is required to create a CCR for its own chapter, and numerous local and state governments, as well as federal departments create CCRs each year, few individuals felt confident enough to give opinions on how the CCR is designed. Most practitioners take a compliance-

focused mindset in replicating the reporting format, and judge CCR success based on whether it meets a format checklist rather than whether it achieves its goals. These challenges significantly reduced the pool of prospective interviewees, but due to the theoretical saturation in replies, and relative seniority and design-centrality of the interviewees who did reply (See Appendix A for interviewee demographics), it was considered a sufficient sample. In-depth, semi-structured, open-ended interviews were conducted with these practitioners. Interviews were conducted via Zoom or phone due to COVID-19 health restrictions. All interviews were digitally recorded with permission. The interviews proceeded by the researcher asking pre-designed triggering questions (for example: “What motivated you to develop the CCR when other reporting formats already existed?”) and in-depth but on-the-fly eliciting questions (for example: “And did that help the citizen?”) in response to useful implicit constructs being evoked.

Each interview lasted approximately one to two hours and was designed to reveal the interviewees' mental model of the purpose and efficacy of the CCR as an artifact. These interviews were recorded and systematically analyzed to identify the underlying concepts and assumptions that these practitioners hold. The objective of this series of interviews was to identify how practitioners that used or developed the CCR as an artifact intended their artifact to function. By determining what practitioners' considered the purpose of CCRs, it would be possible to develop and operationalize variables that could then measure CCRs' success at achieving its intended purpose.

In order to prevent interviewees and interviewers from digressing into unrelated conversations, a semi-structured interview protocol based on a Design Science Research Methodology (DSRM) structure was used as a reference for the interviewer. However, the actual interview process was managed as an open-ended interview to surface and reveal unintended latent constructs. Triggering questions were allowed so that the interviewer could explore practitioners' implicit as well as explicit artifactual goals.

The protocol questions were ordered in the same format as the DSRM method, tracking artifact design from problem specification, to artifact development, to artifact demonstration. Further contextual questions were asked of the practitioners to encourage elicitation of norms, colleagues, and other avenues of artifact development. Questions were arranged in this order so as to emulate the same mode of artifact design used both consciously in design science (Simon, 1969) and naturally by humans trying to solve a problem (Simon, 1989), and thus start with fact gathering while moving towards open-ended triggers designed to reveal the deeper-residing constructs. The interviewer often asked subsequent questions in order to investigate further into practitioner's reasoning.

#### **4. Data Analysis and Results**

The interviews were recorded via Zoom, supplemented with significant note-taking and with publicly-available example CCRs, either referenced by the interviewee or shared directly with the researcher. Following the grounded theory methods described by Corbin & Strauss (2008), an initial open-coding procedure was used on the videos, notes, and supplementary documents to identify the range of artifactual concepts that could be drawn from the data. This procedure yielded 71 identifiable concepts that were subsequently reanalyzed using axial coding procedures. Axial coding provided a theoretical integration of the concepts derived from the data and identified the central concepts providing the greatest relevance and recurrence. The axial coding procedure found that in describing the artifactual values the CCR was designed for, the participants continually returned to four principal themes: (a) importance of concision in documents for non-sophisticated users; (b) importance in the neutrality of CCR creators (in opposition to politicians reporting results); (c) the converse of extreme difficulty in neutrality in CCR creation; and (d) that the CCR was supposed to be an entrée into further citizen analysis of financial information. An additional recurring theme that was not necessarily central to the

CCR's artifactual purpose but was a recurring statement from each interviewee was the pedagogical value of the CCR for accounting students as much as non-accountants, and several interviewees compared or even conflated these two populations during the interview. In sum, the interviewees seemed to suggest that the design merits of the artifact are for the CCR to be (a) Short, (b) Apolitical, (c) Trustworthy, and (d) Enticing.

#### **(a) The Importance of Concision in Documents for Non-Sophisticated Users (Avoiding 'Not Short Enough')**

The creators and curators of the CCR format continually referenced the primacy of keeping the CCR concise and "readable" for regular citizens. One interviewee spoke of how this was a known challenge even in the 1970s, but that as time went on, the number of individuals "overwhelmed" by data continued to grow both within and outside of governments. The advent of digitization and increasing transparency for regular citizens was summed up as "Free data aggravated this problem" because "Citizens are rational users, but only if given sufficient information." Another interviewee characterized the original challenge that necessitated the CCR as "Most citizens don't want to hug their government for that long", noting that so much important decisionmaking knowledge requires context only found through heavy analysis or methodical engagement with ACFRs, a task requiring far more time and attention than non-professionals can afford. Similarly, one of the current maintainers of the CCR described the importance of using "shorter documents" so as to "meet citizens where they are".

At the same time, the interviewees were aware and often pained that concision and completeness were mutually-exclusive traits, and that every reduction in length and complexity in turn reduced the detail and informational value of the financial document. As described by one interviewee: "Citizens need to understand how their government works, but we can't expect them to understand by reading hundreds

of pages technical documents”, while another spoke in information density terms, speaking of how financial reports made for professionals were “unwieldy” in the hands of citizens, and “The CCR’s iterations are always attempts to improve the transfer of information to citizens without increasing the size of the report.” The formalization of a four-page limit on the CCR was not arrived at by a design science methodology, however. Interviewees all discussed it as a “compromise”, a “*major* argument”, a “political choice”, “a back-of-the-napkin sketch we all found acceptable”, and other terms describing the CCR’s length as a function of practitioners trying to find a length that all the original creators felt straddled the concision/completeness dichotomy to their satisfaction.

However, even if the originating point of the CCR being four pages was a socially-determined choice rather than a technocratically-derived one, it has become ironclad as a design precept. No CCR observed was longer than four pages, with the format on each page held to a very rigid compliance checklist to account for the limited space. Quantification of page count seems easier and more objective than other CCR design goals of similar intent but less-clear implementation, such as “shows meaningful trends” or “provides supporting information”. As a result, CCRs treat page length not as a proxy variable for concision, but as the end goal to create concision. This leads to CCRs making diverse and sometimes-confusing design choices to stay within the four-page limit. Further, surveys suggest that citizens actually prefer longer documents than four pages: Yusuf and Jordan (2012) find that more than half of the participants rated a sample report of seven pages as being “just right”. This suggests an intriguing difference between a CCR that is short as citizens prefer it, versus a CCR that is short as government accountants think citizens would prefer it.

In financial accounting, document length tends to be a function of three traits: the firms' operating complexity, disclosure redundancy, and residual disclosure length due to management’s discretion

(Cazier & Pfeiffer, 2016). There has not been a similar decomposition of the determinants of length for governmental accounting, but if CCRs are locked to a specific, finite length, this suggests that CCR creators may need to alter component lengths as a function of organizational complexity and managerial discretion in a similar manner. Similarly, disclosure redundancy must be significantly reduced to meet the length needs of a CCR, which matches the interviewee's experiences with giving up completeness to maintain the short CCR length.

#### **(b) The Importance in the Neutrality of CCR Creators (Avoiding 'Not Apolitical Enough')**

Many of the interviewees made normative commitments or spoke proudly of the neutrality of the CCR. Interviewees discussed the tension in CCR design where more formal documents (such as the ACFR) have GAAP-compliant structures which greatly improve neutrality, information quality, and prevent misstatements, but that make it unreadable for regular citizens. Trying to maintain the same level of objectivity without resorting to the technical complexity of GAAP-compliance meant that the interviewees focused intensively on inculcating political neutrality as a norm. One of the creators spoke of the desire to create "T-accounts for policies", while another described there being "irreconcilable differences" between accounting disclosures and political needs. Many practitioners considered themselves as a form of third-party assurance for citizens, describing the CCR in terms of an independent interpretation of the government even as that government was the entity producing it. As one user described it: "There's so much information that's inaccurate out there, and team-based fact-checking just erodes the legitimacy even more."

At the same time, significant parts of the CCR are qualitative and normative while being characterized as apolitical. CCRs are directed to contain a government's mission statement, vision statement, and strategic goals for the next year. Non-financial accomplishments are also supposed to be listed, though

an interviewee noted “we do this because that’s what citizens care about”, and explained that leaving accomplishments out tended to do “more harm than good in helping people understand”.

There seemed to be some specific traits that were associated with “being political” that were a subset of how unsophisticated users might describe politics. Usage of data for personal or factional aggrandizement was considered political in a way that describing governmental accomplishments as a whole were not. For example, one interviewee discussed how a challenge for CCR creation was preventing its report from being [mis]used by “elected officials, who want to show off even when they shouldn’t.” This was contrasted with the government accountants who created CCRs, who were not motivated in a similar manner, but were motivated by the duty to disclose both positive and negative information about the organization. This behavior matches similar disclosure motivations found in financial accounting, where managers adjust disclosures based on performance to provide relevant information rather than to obfuscate performance (Merkley, 2014). In contrast, however, the CCR designers seemed to experience an adversarial relationship with management within their own governments, and saw disclosing information that was unflattering to elected officials as part of their duties since “performance is not just an activity [...] we need transparency to show results”.

This tension between wanting to be honest about disclosing the government’s strengths and weaknesses, and wanting to avoid aggrandizement of any entity smaller than “the whole of the government” puts CCRs in a difficult position. There is pressure to share fiscal and non-financial success stories, but not in a way that citizens would be able to point to key individuals who were responsible for those successes. At the same time, the CCR design checklist requires that the CCR provide “a listing of key leaders and contact information for further engagement” on page four of the CCR. One of the interviewees noted that the CCR was supposed to be apolitical, but that “it is impossible to make a truly

apolitical document”.

### **(c) The Challenge of Neutrality in CCR creation (Avoiding ‘Not Trustworthy Enough’)**

While desiring to remain independent and apolitical, practitioners were aware of the difficulties of maintaining neutrality, which was characterized by multiple interviewees as a distinct goal separate from being apolitical. There was significant variation in how various interviewees described the distinction. Some explained the difficulty in terms of the CCR as performance reporting, referencing “SEA (Service, Efforts, and Achievements) Reporting” and other forms of qualitative reporting, while describing the difficulty in giving unbiased qualitative reporting: “There’s nearly universal support for a citizen’s Right to Know. But *how* a citizen gets to know? That’s very contested”. Other interviewees characterized it as the impossibility of avoiding conflict-of-interest concerns: “[Our CCR is] Someone giving themselves their own haircut.” Several interviewees noted that the CCR’s tension meant it could be used both to rein in politicians and also encourage those same politicians by the same mechanisms. As one described: “Politicians are motivated by power, wealth, and prestige. A good CCR can give them prestige.”, while by contrast, a poorly-done CCR would instead “erode legitimacy”. Another creator characterized it as one of the few ways to contact citizens as a governmental entity rather than as a political campaign activity: “The only thing we send every year is a tax bill [...] voters are the ideal use-case for a CCR.”

The recurring theme around trustworthiness seemed to be a concept of “credibility” or “legitimacy”, phrases used by all but one of the interviewees. Where a CCR was supposed to be apolitical by avoiding an endorsement of individuals or factions within a government, trustworthiness was about being believed and believable by citizens. As a result, CCR designers wanted to avoid both appearances of conflict-of-interest, but also claims that were true but difficult for citizens to believe. For example, one

CCR designer discussed how the Federal Emergency Management Agency (FEMA) struggled every year, given that one of its stated duties was to ensure civilian control of the US government through any disaster or misfortune, but that stating as much on the CCR had become impossible over the last decade. Another described a struggle to be believed, noting “People think problems [with our government] are getting worse every year, and it is hard to make them understand that *those* problems get better and we have *new* problems.”

This struggle to be “credible” is distinct from financial accounting, since there is a lack of market mechanism for price discovery. In financial accounting, there are multiple ways by which market participants can price in reactions to low-quality information, including changing transaction types to maintain greater control (Beatty et al., 2010), or simply not engaging in a transaction (Skaife & Wangerin, 2013). This holds even in nonprofit accounting, which is more similar to governmental than financial accounting (Yetman & Yetman, 2013). By contrast, disclosure quality for governmental accounting disclosures is difficult to control or respond to (Giroux, 1989).

This challenge even holds through auditing. All of the interviewees were enthusiastic about more and more stringent auditing, and the CCR requires the disclosure of any audit, or an explanation if there has not been an audit. However, CCR designers struggled to find a way to impress upon citizens how meaningful an audit was for an organization. One interviewee explained that “auditing gives legitimacy, but it cuts into people’s positive feelings about the CCR.” Another interviewee argued that a CCR “can be reviewed, but not be audited, [...] even if the CCR’s government is audited.”

Because there is no market mechanism, and auditing does not provide the desired meaning for citizens, governments using the CCR instead seek alternative means to signal honesty. Several interviewees talked about the rarity of any disclosure documents having specific sections for performance failures or

admissions of fault, and how this was hopefully a convincing signal to citizens that the CCR was seeking to be transparent and accountable to them. At the same time, other interviewees considered that the small document size made it easy to omit truly unflattering information: “at the end of the day, the CCR is in the hands of the finance department, and they can say whatever they want about themselves.”

#### **(d) The CCR as an Entrée into Further Citizen Analysis (Avoiding ‘Not Enticing Enough’)**

A recurring way of describing the purpose of the CCR was as an initial, enticing document that would encourage unsophisticated users to delve deeper into other, more thorough and technical government accounting documents. The CCR was described as a “table of contents”, a “start”, an “index that piques your curiosity”, a “facilitating tool” that would help citizens better search other documents, a “research poster”, an “on-ramp for all government accounting information” and an artifact “to teach folks that for everything, there’s a beginning”. Because many practitioners were aware of the concision/completeness tension, and the creators of the artifact had deliberated to a compromise of four pages of specific formatting, every practitioner agreed that the CCR on its own was insufficient to educate citizens fully. However, the CCR was made to be readable, low on text-density, and visually appealing so as to encourage citizens to start with the CCR and advance into more complicated accounting documents in response. As one creator noted: “It lacks the details for opinion leaders and serious users, but the CCR is great for curious citizens, and turns them into opinion leaders and serious users.” Another interviewee described it thus: “The purpose of the CCR is to encourage a citizen to know more.”

As a result of these characterizations, the CCR is intended to be very attractive to regular citizens. One CCR designer explained that a CCR “needs to be pretty”. Significant sections of the CCR standards describe having “visual appeal”, use of a “good color scheme and use of photos throughout the four pages”, and needing to “hold reader interest”. One practitioner described the CCR as “a vacation spot”,

while another likened it to “comfort food”. The implied causal model of the designers suggests that if the CCR is enjoyable enough to peruse, it will successfully encourage citizens to read more technical material, such as the ACFR or audits. However, this construction of the CCR as an enticement towards more technical documentation cuts against the goal of being a complete report in and of itself. If some of the format requirements of the CCR include links to “[the government]’s website for more information, location of detailed reports and other supporting information”, then the CCR is less a reporting document itself, and more a pass-through URL for access to reporting documents.

Interviewees were aware of this challenge and expressed both frustration and hope about the attractiveness of CCRs. As one participant stated: “CCRs are still being designed to this day. It might be more useful for citizens not as a document but as a website.” Another concurred, describing how the CCR might emulate how several states have used data visualization and dashboards to be far more timely and readable for citizens than any form of report to date.

This sort of commingling of substantive data with explicit impression management is rarely found in financial accounting, though ESG’s comparatively lax rules means that until recently, similar behaviors could be found in environmental and sustainability accounting disclosures (Delmas & Burbano, 2011; Kurpierz & Smith, 2020; Lyon & Maxwell, 2011). In both ESG and governmental accounting, it is possible that similar pressures to share salient but non-financial information produces similar disclosure behaviors in both. As one interviewee said, “[The CCR] is about storytelling, and accountants and auditors are number-tellers, not storytellers. That’s the fundamental challenge.”

## **Pedagogical Value**

Parallel to but distinct from the CCR's educational value for citizens as a whole, multiple interviewees discussed the CCR in terms of pedagogical value for accounting students. However, "accounting students" as a population was conflated with the public at large. While one of the practitioners was also an accounting instructor, numerous other interviewees in government and industry also discussed the value of CCR as an educational tool for students. One practitioner spoke of the CCR's "success in training students", not just in government accounting but in accounting-at-large. Another discussed how students achieving experience with the CCR allowed more scholarships and internships to be filled by accounting students. One of the creators spoke about how developing a mock-CCR for students ended up encouraging the practitioner to disseminate it to the actual government where it was used as a template for the organization in future years. One interviewee noted the conflation, describing how "there are accounting books, but there is no accounting book/et", which both students and citizens equally needed. However, most practitioners did not seem aware of the conflation, and would sometimes treat citizens and accounting students as the same reference population.

Government accounting practitioners seemed to treat the CCRs as having two educational components: the actual financial information disclosed within, and also a form of initiation or socialization for citizens to change their priorities. One interviewee described citizens as "rational actors, but only if given sufficient information". Another described how the purpose of a CCR was to make citizens "curious", so that "they start asking the right questions". A third described the CCR as incomplete until "citizen watchdogs who are sufficiently sophisticated from reading [the CCR] are actually paying attention". The designers seemed to consider one of the core design challenges of the CCR not to be disclosures per se, but as a way of training both citizens and students to care about the "real" details of importance. As one practitioner stated "The CCR's greatest success has been for training students. 'For everything, there is a beginning', and the CCR is the beginning of positive relationships with government accounting."

The designer's desire to socialize citizens into asking the "right" questions is borne out by research. Fiscal illusion, the tendency for citizens to underestimate the cost of programs and overestimate the amount of revenue governments generate, is strongly affected by access to governmental financial disclosures (Benito & Bastida, 2009; Simonsen & Robbins, 2000). However, practitioners seem to believe that mere access is insufficient, given that most American and Canadian governments have publicly-available disclosures available at all times, but the overwhelming majority of citizens do not take advantage of these. If mere exposure to disclosures were sufficient, fiscal illusion would not be widespread, as described in detail by multiple interviewees. Instead, interviewees conflated the CCR's purpose as a disclosure document with its related purpose as a socialization document. Socialization happens in financial accounting, but tends to be specific to accountants and accountants-to-be (Anderson-Gough et al., 2018; Clikeman & Henning, 2000; Ponemon, 1992). By contrast, government accountants see part of their duty as a form of universal socialization based on democratic and egalitarian principles. However, this duty runs into a further difficulty that financial accountants don't face: accounting students are seeking to be socialized into their profession, while most citizens are uninterested in being socialized into better understanding of their local government's disclosures. To deal with this tension, CCR practitioners seem to respond with a practical response of trying to make the CCR enticing (as noted previously), and internally and amongst themselves, conflating students (who actively wish to be socialized) with citizens in general (whom the practitioners wish to socialize).

This conflation makes some sense, in that all students are citizens (in the sense of being deliberative members of a community if not explicit voting rights), and that citizens and students are equally new to governmental accounting, so similar pedagogy might work on both. However, while citizens are the consumers of CCRs, students were discussed as future CCR creators as much as consumers. The CCR was

described as “teaching accounting principles”, “for students to use”, and “what turns naïve students into new interns and experts.” Multiple interviewees spoke about the importance of having students create CCRs, both as a training exercise and as a form of activism. One practitioner described how students had made a mock-CCR of a local government that was well-done enough that the student was encouraged to send the CCR to the local government, which updated to match her disclosure the following year.

However, the CCR designers did not have significant contact with students directly (save for one who worked in academia) and there was limited information on how the students themselves experienced the socialization and education process.

Creators, practitioners, and documents all stress that a CCR must avoid four different failure states; two pairs that are in tension with themselves. A CCR can fail by being too long and comprehensive, becoming unusable to unsophisticated users like regular citizens. A CCR can also fail by the extreme opposite, being so incomplete that users lack enough decision-relevant information to judge their government. Similarly, a CCR can degrade into mere political posturing, a list of accomplishments that is prestigious, but does not give an unbiased picture of the state of the government. It can just as easily be too focused on giving purely technical information that unsophisticated users find incomprehensible or merely uninteresting. Designers, written guidelines, and the example CCRs provided by practitioners all discussed the importance of avoiding each of these conditions, while recognizing that avoiding one form of failure too aggressively would lead directly to failure via the opposite extreme. These two pairs in tension can be condensed as a “Concision/Completeness” axis and a “Prestige/Politicized” axis. Well-made CCRs, as described by interviewees, are designed to seek a happy medium between these four poles, though neither the practitioners nor example documents can confirm that such a happy medium necessarily exists. Instead, the most descriptive phenomena to CCR goals may be “stabilizing selection” (Chuang et al., 2000; Hansen, 1997; Hashemi, 1994; Schmalhausen, 1949), a selection pressure found in

organizational ecology where outliers on both sides of a variable trait's distribution are eliminated, leading to firm, systems, or organisms that converge ever more tightly around a particular median value. Further, the median value that is being converged-upon is not necessarily ideal in a positive sense, but instead in a "least-bad" sense; the convergent pressure may be extreme enough that the systems are squeezed from both sides at once into extinction (Weinkauff et al., 2019). The creators and maintainers of the CCR are not necessarily in such a dire situation, but it does reveal that CCR design, in the minds of its creators, is a series of attempts at avoiding four known failure states of information-transmission to citizens, rather than a positive design towards that same goal. Creators are aware of this tension, with one interview noting "The CCR can't be a cheerleading document. But it can't be apolitical either."

## **5. Conclusion**

Using the DAGS Framework, this study applied grounded theory as part of the Design Science Research Methodology (DSRM) to saturate the unexplored "theory creation" node of the Citizen-Centric Report (CCR), in preparation for future saturation of the "theory validation" and "artifact creation" nodes via qualitative (case studies, action research) and quantitative (experiments, technology transfers) methods suggested by DSRM. To do this, this study interviewed current users and surviving creators of the CCR to determine what their original artifactual goals had been in creating the CCR. This analysis was further enhanced by content analysis of extant CCRs, including the distinction between regular and award-winning CCRs.

This DAGS Framework analysis found that CCRs have been designed with the goal of avoiding four major failure states of the artifact: (1) too much information that overwhelms citizen-users, (2) too little information that prevents citizens from receiving decision-relevant levels of information, (3) too much qualitative, politically-motivated content that provides citizens a biased report, or (4) too little qualitative support that gives citizens context to make sense of the technical data. Further, these 4

failure states are in tension with one another: too much data overwhelms while too little data prevents decision-relevance, and CCRs must provide an enticing “so what” for unsophisticated users while remaining honest about the challenges and shortcomings the reports reveal. This means that CCR design is constrained along a “Concision/Completeness” axis related to length and information density, and a “Prestige/Politicized” axis related to qualitative reporting and bias. Further, CCR creators and users consider the CCR to have strong educational value for both citizens and accounting students, but treat these populations as interchangeable due to their shared lack of socialization as accountants. These traits reveal the difficulty in improving the CCR’s design as an artifact. Instead of being a tool made to solve a problem, the CCR is a tool made to avoid particular known failure states. This is a major design flaw for CCRs as an artifact, but also suggests there are future opportunities along the other DSRM nodes to better improve the CCR’s stated goal of informing unsophisticated users of government financial information.

CCR creators also struggle in balancing the understandability of CCRs versus the socialization required to make use of CCRs as well as more technical documents. “Understandability” is a formal goal in both GASB and FASB standards, but the two standards-setting bodies tend to focus more on the more easily-measurable traits such as reliability and timeliness. Further, when understandability is focused upon, the FASB tends to focus on understandability for sophisticated users (Financial Accounting Standards Board, 2018) or conflates it with “readability”, a distinct concept that does not necessarily correlate with understandability (Jones & Smith, 2014; Smith & Taffler, 1992). The GASB also focuses on understandability (Government Accounting Standards Board, 1987), but takes actions from a practitioner-centric viewpoint (Carpenter & Sharp, 1992). In both FASB and GASB discussions of understandability, most of the discussion is driven by practitioners, whether in government or in industry (Greenspan & Hartwell, 2009; Sharp et al., 1998), and generally within practitioner-focused

forums like *CPA Journal* (Ewer, 2007). As a result, interviewees and researchers of PFRs tend to use “comprehensibility” to distinguish the practical concept of citizens understanding from the formal standards concept of “understandability”. This is illustrated among the interviewees treating “comprehension” as a trait centered within the student or citizen, while “understandability” is a formal standard all financial disclosure documents are supposed to have. Interviewees were interested in “comprehensibility” not just to avoid conflation with the formal standards, but because a CCR is supposed to engender “comprehension” in the reader, socializing them into asking the questions the CCR designers considered important. FASB and GASB both consider understandability an important characteristic, but accept that only “users who have a reasonable knowledge of business and economic activities and who review and analyze the information diligently” (Financial Accounting Standards Board, 2018) are eligible to determine understandability. CCR designers actively choose to not include such a cutoff, and thus strive to provide understandable information universally.

Another finding is that government accounting has the same challenges as financial accounting in normative versus descriptive disclosures, even though both traveled different paths to reach this state. Financial and governmental accounting disclosures around the concept of understandability have ended up both being dependent upon practitioner determination and socialization even though financial and governmental accounting have diverged significantly over time due to different disclosure needs and constituents. This suggests the two came to the same situation by different paths: financial accounting depends on market mechanisms to sort for user sophistication, while governmental accounting has normative requirements to be broadly understandable to all members of society. This suggests an avenue for future research, in that diverse forms of accounting disclosures have all ended up taking a similar form even though their needs differ. If the different pressures on governmental versus capital market practitioners do not affect their disclosure preferences, what does? One possibility is

socialization itself. This chapter shows that CCR designers seek to mold citizens into asking the same questions practitioners would ask, and it is possible that practitioners ask the same questions whether they are financial or governmental CPAs. Alternatively, there may be a political economy component, and the standards-setters and CCR creators are able to unilaterally determine what makes a “good” disclosure without necessarily needing feedback from the constituents about what a good disclosure entails. The latter possibility is especially concerning, given governmental accounting’s strong normative desire to democratize accounting knowledge. If the very act of socializing citizens into sophistication prevents citizens from asking their original questions, the problem of using transparency as a democratic tool may be insoluble.

An additional theoretical development revealed by these interviews is the similarity of CCR design as instantiated by actual practitioners and the phenomena of stabilizing selection in organizational theory. When systems receive selection pressure against both extremes of a trait, those systems will cluster ever more tightly around a population median. This may be part of the reason for the limited variation in CCR design and rapid theoretical saturation from interviewees. Further, stabilizing selection can lead to wiping out all systems if the pressure from both directions is sufficiently high, a risk the CCR has struggled with considering its limited uptake amongst the broader population. It is possible that the CCR is practitioners’ best attempt at an impossible task: be thorough, precise, and complete about a government’s economic activity while never being biased, boring, or beyond four pages. In such a situation, there may be no way to provide the decision-relevant information that citizens deserve, but if there is any method to do so, current users and maintainers of the CCR will be attempting to provide it.

## Appendix A: Traits of Interviewees

| Professional Position                                                                                     | Position within AGA                                | Years with AGA | Years working with CCR | Interview Duration |
|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------|----------------|------------------------|--------------------|
| Retired                                                                                                   | CCR Creator, Accountability Committee Ex-President | 50 years       | 15 years               | 1 hour 45 minutes  |
| Small Business                                                                                            | Accountability Committee President, CCR Maintainer | 22 years       | 15 years               | 1 hour 2 minutes   |
| Big-4 Firm                                                                                                | CCR Creator, AGA President                         | 7 years        | 22 years*              | 1 hour 47 minutes  |
| State Government/Academia                                                                                 | Accountability Committee Member, CCR Maintainer    | 5 years        | 5 years                | 1 hour 37 minutes  |
| State Government                                                                                          | Idaho Chapter Member, CCR Maintainer               | 16 years       | 8 years                | 2 hours 1 minute   |
| *The earliest complete CCR was formally promulgated in 2006, but experimental designs were in use by 1999 |                                                    |                |                        |                    |

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## CHAPTER 5: CONCLUSION

## CONCLUSION

This dissertation is intended to explore the tensions between democratic societies' needs for an informed populace able to use decision-relevant information, and the difficulty of making government financial information actually useful and comprehensible to that same populace. It does so by using a methodology shared by both accounting and public administration, design science, to develop a framework usable in both disciplines and by both practitioners and researchers in government accounting, and then utilizing this framework in both a researcher- and a practitioner-driven context.

Chapter II begins this process with a literature review showing that Herbert Simon's "Sciences of the Artificial" (Simon, 1969) is a useful and mutually-understood framework in both accounting and in public policy, which makes sense given Simon's initial work as a government accounting researcher (Ridley & Simon, 1938). Simon's development of design science allowed for several disciplines (including accounting, information systems, public administration, and cybernetics) to be intelligible to one another, and as a result share developments between each other. These shared developments allow for the dissertation to apply accounting research frameworks to public administration problems as an extension and replication of current accounting knowledge, as in Chapter III, or use public administration knowledge to explore an unexplored aspect of governmental financial statements, as in Chapter IV.

Chapter III illustrates that a design science framework allows a novel perspective towards an intriguing discrepancy in government accounting research. Local governments with better GAAP-compliance in their reporting receive significantly cheaper cost of capital (Baber and Gore 2008), even as capital outlays are the major expense for local governments. However, local governments often have poor GAAP-compliance regardless. This chapter is an extension of Baber and Gore, showing that while GAAP

compliance correlates positively with cost of capital for school districts, GAAP compliance seems to correlate negatively with educational attainment for the district's students. This provides possible evidence that resolves the paradox discovered by Baber and Gore, and suggests some local governments may be trapped in an equilibrium where resources devoted to better-informing citizens also reduces the results citizens care most about.

Similarly, Chapter IV uses the design science research methodology (DAGS Framework) favored by accounting information systems (AIS) researchers (Geerts 2011, Adams & Courtney 2004) to determine how to judge a practitioner-produced artifact: the Citizen-Centric Report (CCR), a financial report designed for ease of understandability by citizens. After an analysis of stages of methodology, it is determined that because the CCR was created and disseminated by practitioners, but never theorized nor analyzed, the DSRM recommends a grounded theory perspective to determine the performance goals the CCR should be judged by. Grounded theory analysis of interviews with the surviving CCR creators shows that the CCR was designed to avoid four forms of failure, rather than towards some form that would succeed at a goal, and that while avoiding these failure states, the CCR may as a result be unable to achieve its "secondary" purpose of successfully providing decision-relevant information to non-accountants.

This dissertation as a whole assists in the application of design science towards one of the earliest design sciences, governmental accounting research. It does so from two directions simultaneously, using design science as both a methodology to study practitioner behaviors, and as a lens that allows for extension of other accounting research. It does this in service of the larger goal pursued by numerous researchers, accountants, and policymakers in democratic societies: finding better ways to inform and empower citizens with information that is both critically important to self-governance, but difficult to present in

an easily-understood manner. This dissertation both judges one tool that is currently used, and analyzes a “tool-shaped hole” where a new tool might be needed.

In summary, this dissertation contributes to the literature by synthesizing design science between related disciplines, applying this synthesis to novel contexts, and extending current research by using the synthesis as a starting point for future research with this framework. By studying multiple aspects of design science as it applies to government accounting and accountants, this dissertation seeks to catalyze exploration of novel areas of accounting research.

#### *Limitations and Future Research*

This dissertation is only the beginning of a larger research program, and as a result has several limitations. In Chapter II, one limitation is simply scope, in that while the earliest work in design science is from 1938, and Simon only codified his work by 1969, in the intervening years literally hundreds of thousands of research papers have used design science methodology. These papers are in every branch of science that is a design science, which comprises a group of disciplines as diverse as accounting, education, and dentistry. As a result, a genealogical lens was used to maintain focus on the three forms of design science salient to governmental accounting: design science developed by Accounting Information Systems, design science created by Public Administration, and design science that arose organically within accounting research directly. Tools and methodologies outside the scope of these streams may be quite salient and useful, but still wait to be discovered. Future studies may go farther afield and bridge larger gaps, finding value in the design science of machine learning (ML) research, or extracting practitioner knowledge for informing citizens from behavioral accounting research. Similarly, in Chapter IV, the Citizen-Centric Report is but one of several commonly-used popular financial reports, and DSRM analysis to more rigorously define the goals of other popular financial report formats would

be the first step into experimentally validating such reports in head-to-head tests to see which PFR is best used by governments. Additionally, Chapter III's extension of Baber and Gore only shows the pattern in the state of Washington. While the majority of states require GAAP reporting, this requirement is far from universal, and several other states have similar optional GAAP reporting requirements. Building a larger, more diverse data set to see if the relationship holds for multiple states would be a helpful refinement of the existing evidence.

Another limitation is due to the early levels of integration between the design sciences. While AIS and Public Administration are still closely-related enough to be mutually-intelligible through design science frameworks, design science also encompasses aspects of cognitive research and applied sociology, which would need an allied framework, though given the shared intellectual descent from design science, this is a tractable challenge and a fruitful avenue for future research. Similarly, the discovery of the cost of GAAP compliance was visible because of the design science framework's delineation of the border between accountants and accounting-users in school districts. What further perspectives could be derived from other non-standard producers or consumers of accounting documents in local governments is an unexplored area.

In conclusion, in addition to the contributions to the accounting literature provided by each chapter, this dissertation also integrates with practitioner-focused challenges of providing decision-relevant information for the benefit of democratic governance. There is a tragic scarcity of this research in much of the accounting literature, and most public administration literature lacks accounting's capabilities and perspectives. As a result, if we as a society wish to be better informed at the accounting systems that underlie public governance in the 21<sup>st</sup> century, we will have to design that information ourselves.

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