

**An Examination of State Legislator Use of Communication Technologies:  
Differences Between the Frequency of Use and Importance of Mature and  
Internet Enabled Technologies**

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**Abstract:** This paper explores the relationships between state legislators and communication technology (CT). A United States wide survey sent to all 7,383<sup>1</sup> state legislators examines the frequency of use and importance of CTs commonly used by state legislators. Among other variables examined, this study compares the frequency of use and importance of evolutionarily mature CTs such as face-to-face meetings, handwritten letters, and phone conversations and Internet enabled CTs (IECTs) such as E-Mail, Facebook, Twitter, YouTube, web pages, Blogs, and text messaging. Additionally, this study examines the impact of minority political party status on CT frequency of use and importance. Among other findings, this study uncovers evidence that minority status increases both CT frequency of use and importance and that while Internet enabled CTs are frequently used, state legislators place significantly more importance on traditional (mature CTs) than IECTs.

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<sup>1</sup> **Important Note: Important Note: This paper is being written during the final stages of a mixed-mode study of state legislators. Thus far, 1,887 state legislators have responded to this study: 1006 via an Internet survey and 881 via USPS survey. The overall response rate of this study, including only legislators who were successfully contacted via E-mail (Internet mode) or by mail (mail mode) is currently =  $1887/6977 = 27\%$  . This number will increase as we follow up with legislators who did not respond to this study. Preliminary results of this study presented at the APSA Pre-conference in San Francisco California in September of 2015, prior to the mail mode phase of this study.**

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## **Introduction**

This paper focuses on understanding the frequency of use of, and the importance<sup>2</sup> assigned to, common communication technologies (CTs) in use by state legislators today. In addition, the relationships between frequency of use and importance of mature<sup>3</sup> CTs, Internet enabled<sup>4</sup> CTs (IECTs), and mass media<sup>5</sup> are examined. Media naturalness theory (Kock, 2005) and data from a 2014 mixed-methods study on legislator use of CT (West, 2014) are combined to offer evidence that the importance legislators place on CT is likely to be, at least in part, a byproduct of human evolution.

This paper focuses on four primary research questions:

Research Question **RQ1**: What, if any, quantifiable links exist between the importance of a CT suggested by media naturalness theory and the importance legislators assign to mature, Internet enabled, and mass media CTs?

Research Question **RQ2**: How frequently do state legislators use mature, Internet enabled, and mass media CTs?

Research Question **RQ3**: What importance do state legislators assign to mature, Internet enabled, and mass media CTs?

Research Question **RQ4**: What econometric relationships exist between the frequency of use and importance of mature CTs when compared to Internet enabled CTs?

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<sup>2</sup> Importance was defined in all survey questions as follows: “Importance is related to the likelihood that you will respond favorably to a request received from another legislator (or a constituent), all else equal, via one of the communication technologies shown below”.

<sup>3</sup> Face-to-face meetings, phone conversations, and written/printed communications.

<sup>4</sup> E-Mail, Twitter, Facebook, YouTube, web pages, blogs, and text messaging.

<sup>5</sup> Television, radio, press releases, and town hall meetings.

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The following sections examine legislator motivation to communicate, media richness and media naturalness theory, and culminate in hypotheses that will be tested in the results section of this paper.

### **What Motivates Legislators to Communicate?**

Because the topic of the importance of CT is critical to this paper, it is reasonable to question why legislators are motivated to communicate with their peers and their constituents in the first place. While it is simplistic to suggest that one can fully understand what motivates legislators to communicate with constituents and their peers, this study follows the lead of Mayhew (1974) and other prominent scholars (Arnold, 1992; Campbell, 2003; Krehbiel, 1992; Schneider & Ingram, 1997), and assumes that legislators are “single-minded seekers of reelection.” (Mayhew, p. 5). It is reasonable to expect that a fundamental reason why legislators communicate with constituents and peers is because they want to be reelected, regardless of whether their motivations for being reelected are altruistic or self-interested in nature. Confirming links between legislator motivation and constituent communication, significant research at the congressional level suggests that legislators who are not seeking reelection communicate with constituents less than those who are running for reelection (Carey, 1994; Herrick, Moore, & Hibbing, 1994; Lott, 1990; Zupan, 1990).

While the previous paragraph offers an explanation as to why legislators might find communication with constituents important, it does little to explain the *relative* importance of various CTs. For this explanation, a discussion of media richness and media naturalness theories will be useful. In effect, media richness and media

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naturalness theory can be used as a theoretical lens to derive the relative importance that legislators may assign to a range of CTs.

### **Media Richness and Media Naturalness Theory**

From a theoretical perspective, of all the research questions in this paper, research question *RQ1* is likely to be the most difficult to assimilate, so discussion begins with this question. The essence of the argument outlined in this section can be summarized succinctly as follows. Media naturalness theory suggests that the more face-to-face like a CT is, the more physiologically satisfying it is, the less ambiguous it is, and the more information it can transmit over a given period of time. Given the potential benefits of natural communications, time constrained legislators can be expected to rate more natural CTs as more important than less natural CTs.

Media richness and media naturalness theory provide a link that enables one to predict how a particular CT or range of technologies may impact human behavior. While there are many human behaviors related to CT that can be investigated, this section focuses on using media richness and naturalness theory to develop a hypothesis regarding the relative importance that legislators can be expected to assign to a range of CTs. A basic understanding of both media richness theory and media naturalness theory require a brief overview of the topic of social presence.

Social presence is an important concept in media richness theory. According to Short (1976), various CTs differ in their ability to communicate both quantity and type of information in a fixed timeframe. Short suggested that higher bandwidth CTs were

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associated with increased social presence while lower bandwidth media types were associated with lower social presence. According to Burke (Burke & Chidambaram, 1999) bandwidth is defined as the “range of [verbal and non-verbal] cues transmitted by the [communication] medium; a higher bandwidth medium transmits more types of cues than one with less bandwidth” (p. 559). Social presence is defined as “the ability of learners to project themselves socially and affectively into a community of inquiry” (Rourke, Anderson, Garrison, & Archer, 1999, p. 1) or, put another way, the extent a learner feels the presence of an individual with whom they are interacting. According to Rourke et al., social presence as a concept has its roots in Wiener & Mehrabian’s (1968) concept of *immediacy*, defined as “those communication behaviors that enhance closeness to and nonverbal interaction with another” (Wiener & Mehrabian, 1968, p. 203).

The essence of media richness theory is that different CTs vary in “richness”, which is defined by Daft & Lengel (1986) as “...the ability of information to change understanding within a time interval” (p. 560). Daft & Lengel go on to state that CTs that require a long time on the reader’s part to understand are less rich while CTs that convey information quickly are more rich. Time is an important factor both in media richness theory, and in determining why a particular CT may be more or less important to a legislator, but why might time be important to legislators?

In *Information Sources in State Legislative Decision Making*, Mooney (1991) references work by March & Simon (1958) and Huber (1989) to justify the importance of time in legislative decision making. Referencing legislative bounded rationality, Mooney suggests that because legislators have severe limitations on their time, they will search for

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the information they need to make a decision from the most readily available source. It is reasonable to expect that time constraints drive how legislators communicate with constituents and peers, not just how they search for information. Like Mooney, Arnold (1992) lists a legislator's time (and that of their staff) as: "two of their scarcest resources" (pp. 36-37). Mooney goes on to suggest that once legislators obtain the information they need, they will stop searching. In Simon's terminology, legislators who acted thusly would be "satisficing" (1957, p. 119).

Associated with the shortage of time as a motivating factor for legislative information selection, Bradley (1980) in his research *Motivations in Legislative Information Use* found that legislators are "strongly motivated" (p. 399) to use information sources that are both accessible and convenient. According to Bradley, in the legislators polled (n=36), the most important aspect of information is accessibility (72%) while convenience and understandability were tied as the second most important attributes of information. The link between legislators having limited time and the importance of accessibility and convenience of information is clear – logic would dictate that accessible, convenient information *should* be important for legislators who have limited time to address all of the tasks they face.

To summarize the hypothesis thus far: First, media richness theory suggests that the richer the media, the more information it can transmit over a fixed period of time. Second, legislators are time-constrained and value (read: find more important) information that is clear, concise, and can be gathered quickly. Third, and derived from the two previous relationships; legislators can be expected to find richer CT more important than leaner CT.

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Burke (1999) outlines media richness theory which suggests that CT with inherently limited cue-carrying capacity will be less effective on ambiguous tasks than on simpler, pre-defined tasks (p. 560). Media richness theory suggests that ambiguous information requires more bandwidth to be understood while simpler information requires less bandwidth. The richer the media, the more social presence that is communicated, and the higher the bandwidth of the CT needed to communicate the information. It is important to note that empirical attempts to test the media richness hypothesis have resulted in mixed results, with some studies finding support for the theory and others finding little or no support (Kock, 2005).




Taking a different theoretical approach that suggests a relationship between CT and human behavior, Kock (2005), hypothesizes that the “naturalness” of CT may directly impact human behavior. Kock defines naturalness as “degree of similarity to the face-to-face medium” (p. 117) and suggests that the less natural a communication media is, the more effort humans must expend to understand the information that is being communicated. Specifically, Kock suggests that less natural communications increase cognitive effort, increase communication ambiguity, and decrease physiological arousal, “each of which may or may not lead to certain types of behavior or task outcomes” (p. 125). To test his theory, Kock (2007) performed an experiment on 230 university students that compared the cognitive effort of face-to-face communications with a Web-based quasi-synchronous electronic medium similar to an interactive blog. Kock found that the web interface increased cognitive effort by 12%, communication ambiguity by 19%, and caused an increase in receiver effort by 19% over face-to-face communications.



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Putting Kock’s naturalness theory in terms of legislative behavior and CT: the less face-to-face like a CT is, the more cognitive effort a legislator must expend, the less physiologically aroused the legislator may be, and the more ambiguity there may be in the communication. If legislators are as time-constrained as many researchers suggest (Ellis, 2010; Harden, 2011; Kingdon, 1989; Oleszek, 2011), then CTs which requires more cognitive effort, are less physiologically arousing, and are more ambiguous, can be reasonably expected to *decrease* the importance of that CT. If this is the case, then the more face-to-face like a CT is, the greater the importance that technology should be to a legislator. The question then becomes, how might CTs be categorized by their “naturalness”? Recent literature drawing on media richness theory offers one possible answer to this question.

Mergel (2012), investigating social media adoption at the US federal level, builds on media richness theory to define a connection between the richness of interaction for various CT. Mergel notes some of the advantages and disadvantages associated with various CTs in use by public sector entities and uses the term “informal interactions” to describe how rich or face-to-face like certain CTs are. Mergel’s ranking of the richness of various CTs provides a convenient platform upon which the importance (from a legislator perspective) of these CTs may be derived. Mergel’s Figure 6.5 (p. 69) is synthesized into Table 1 below.

Communication Media	Richness	Advantages	Disadvantages
Formal Report	Low	Provides Records, Premeditated, Easily disseminated	Impersonal, One-way, Time lag in feedback
Memos, Letters			
E-mail, IM, Web			

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Phone, VOIP			
Social Media			
Face-to-Face	High	Personal, Two-way, Reflexive feedback cycles	No record, Spontaneous, dissemination difficult

**Table 1** Communication Media Richness of Interaction, adapted from Mergel (2012)

By ranking various CTs used by legislators by their naturalness, their relative importance can be hypothesized. Drawing on Kock’s (2005) naturalness theory which includes a discussion of the importance of synchronicity. Kock argues that humans are evolutionarily wired to communicate in a synchronous (full duplex) manner, and prefer to be co-located to receive visual and audio cues from each other. Table 2 lists the naturalness and the hypothesized importance of the CTs investigated in this study.

It is important to note that in order to generate the hypothetical relative importance shown in Table 2, each CT has been sorted three times: First by the age of the technology, second by duplex (is the communication real-time bidirectional or a time based serial communication) and then by media bandwidth. The final sort by media bandwidth is a recognition of the value of media richness theory which proposes that richer media consume a larger electronic bandwidth (Burke & Chidambaram, 1999). For example, the size of a digital video is significantly larger than the size of a digital photograph, and it consumes much larger bandwidth and conveys more information. It is important to note that E-Mail is assumed to be used primarily without attachments that contain visual or audio cues, and that blogs, webpages, and Twitter™ while they can be half duplex, are primarily unidirectional in nature.

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<b>Hypothesized Importance</b>	<b>CT</b>	<b>Naturalness</b>
1	Face-to-Face Communications	Oldest form of communication. Full duplex <sup>6</sup> , verbal and visual cues available. Very mature communication technology.
2	Phone Conversations	Speaking is the oldest form of communication but the phone is a newer (relatively) technology, Full Duplex, Moderate Bandwidth
3	Non-electronic Written Communications	Second oldest form of communication. Half Duplex, low bandwidth
4	E-mail	1971. Half duplex, low bandwidth.
5	Webpages	1989. Half duplex, higher bandwidth
6	Text Messages	1992. Half duplex, emoticons available to cue meaning
7	Blogs	1994. Half Duplex, moderate bandwidth
8	Facebook™	Founded in 2004. Half Duplex, High Bandwidth
9	YouTube™	2005, Half Duplex,

<sup>6</sup> Full duplex communications allow for communication from multiple participants at the same time. Full duplex communication can be thought of as parallel communication. Multiple participants can be communicating at the same time.

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		High Bandwidth
10	Twitter™	Founded in 2006. Half Duplex, low Bandwidth

**Table 2** Importance of CTs Used By Legislators

The results of Table 2 lead to our first set of hypotheses:

***H<sub>1a</sub>: The overall importance of a CT to a legislator is positively correlated with the naturalness of that CT such that more natural CTs will be ranked with higher importance.***

***H<sub>1b</sub>: Legislators will rank mature CTs more important than Internet enabled CTs.***

***H<sub>1c</sub>: Legislators will use mature CTs more frequently than Internet enabled CTs.***

In the previous section, the expected *relative* importance of CT to legislators was derived from media richness and media naturalness theory. While no research could be found which directly measures the relative importance legislators assign to various CTs, indicators of the overall importance of various CTs can be found. For example, Ferber et al. (2005) surveyed Arizona legislators and found that members “overwhelmingly prefer face-to-face communication” (p. 149) to computer-mediated CTs when performing their duties as legislators. Although Ferber et al. measured overall popularity of CTs and not overall importance, the two concepts are likely to be linked. Ferber’s findings, when compared with the hypothesized importance of CT in Table 2.2, suggest a link between the importance of a CT as predicted by media naturalness theory and the popularity of communication media to legislators. Ferber et al. noted that legislators viewed face-to-face interactions as most popular (31.7%). Telephones were second most popular (23.1%), followed by E-mail (19.2%) and regular mail (18.4%).

Interestingly, research by Burke & Chidambaram (1999) uncovered evidence that groups *initially* found the face-to-face medium to be more effective compared to Web-

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based synchronous and asynchronous communications, this effectiveness differential disappeared the longer the teams communicated. This suggests that, over time, and with the experience gained from group interactions, other CTs may be seen to be as effective at transmitting information as face-to-face communications. Interestingly, this may explain the differing importance of CTs when legislators communicate with constituents as compared to when they are communicating with their peers. During interviews with Arizona state legislators in 2013, West (2014) discovered that legislators indicate certain CTs such as E-Mail are more important for the day-to-day business of being a legislator while CTs such as face-to-face meetings are better for more important tasks such as communicating with constituents. This leads to the second and third hypotheses:

***H<sub>2a</sub>: Legislators will rate the importance of CTs differently when they are used to communicate with constituents than when they are used to communicate with other legislators in their state.***

***H<sub>2b</sub>: The frequency of use of a CT is a function of whether the legislator is communicating with their peers or with their constituents.***

Like Ferber et al. (2005), other researchers who note a human preference for face-to-face communications over other forms of communication, indicate that a preference for one CT over another depends on many factors. These factors include time constraints (Caballer, Gracia, & Peiró, 2005; Daft & Lengel, 1986), symbolic needs<sup>7</sup> (Denhardt, Denhardt, & Aristigueta, 2008; Trevino, Lengel, & Daft, 1987), and of course, the availability of the media itself for use.

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<sup>7</sup> For instance, the symbolic value of a face-to-face meeting to convey bad news might make it a preferred communication channel over a channel with less symbolic value such as e-mail.

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## **Data Collection and Methodology**

### **Research Population**

This study focuses on legislators in the upper (Senate) and lower (House of Representatives)<sup>8</sup> legislative chambers in all 50 states in the United States. At the time of the drafting of this document, there were 7,383 state legislators in the United States.

### **Survey Modes**

The survey data collection for this study consisted of Internet and mail survey delivery modes, modeled after the Tailored Design Method approach developed by Dillman and colleagues (Dillman, Smyth, & Christian, 2009). A survey pre-notice email was sent to legislators on July 6<sup>th</sup> and the Internet mode survey data collection began on July 13<sup>th</sup> 2015, when the official invitation to participate in the online survey was emailed to legislators. The email invitation contained a link to the Qualtrics online survey. Email addresses were obtained from state government websites for all states except Kentucky, New Jersey, and South Carolina. Because these three states do not publish their legislator email addresses, researchers had to contact state officials to determine email addresses. Survey links were emailed to all 7,383 legislators. Of the 7,383 emails sent, 1,421 emails were returned as undelivered due to email address errors<sup>9</sup> and 988 were blocked as spam

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<sup>8</sup> Lower chambers in certain states are known under different names. For example, in California, the lower chamber is referred to as the California State Assembly. For simplicity, in this study I will refer to all lower chambers as the House of Representatives.

<sup>9</sup> Including closed email accounts, errors in email address coding, and errors in legislator contact information webpages.

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by state legislature information technology departments. To the best of our knowledge, a total of 4,974 emails were delivered to state legislator email inboxes<sup>10</sup>.

As part of the Internet survey, legislators were invited to use an identifying alphanumeric code that enabled researchers to identify legislators who responded to the Internet survey so that mail surveys would not be mailed to legislators who had already responded to the survey. 642 out of 984 (65.2%) of legislators responding to the Internet survey included their unique alphanumeric code. Follow-up (reminder) emails were sent to all 4,974 legislators every 7 days from the initial email. Follow-up emails ceased on August 17<sup>th</sup> when legislator responses dwindled to fewer than 10 per week, although the Internet survey was left open so that legislators could respond if they wished.

The second mode, the mail survey, began on September 10<sup>th</sup> 2015 and mail mode surveys are still being received as of April 2016<sup>11</sup>. Mail surveys were identical in format to the online survey, with the following exceptions: 1) they were printed instead of being displayed on a monitor and 2) they were not displayed one question at a time.

### **Instrument**

The survey instrument<sup>12</sup> consisted of an introductory cover letter briefly outlining the study and obtaining participant consent followed by sixteen questions. These questions consisted of nine demographic questions focused on the following variables: legislator age, gender, race (two questions), education, state, chamber, political party, and

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<sup>10</sup> State information technology departments can block emails “silently” with no errors sent back to the sender. It would be difficult to detect when this occurs.

<sup>11</sup> Previous research by West (2014) suggests that legislators will sometimes defer “public service” tasks such as responding to surveys until after their legislative session ends. It was important to leave the Internet survey open to allow legislators this option.

<sup>12</sup> See Appendix A for the actual instrument.

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years in office. In addition, there were seven questions that were used to develop the dependent variables for the study. Specifically, there were two questions focused on the frequency of use and importance of CTs used to communicate with other legislators, two questions focused on the frequency of use and importance of CTs used to communicate with constituents. These questions about CT frequency of use and importance were asked multiple times across specific CT or hardware technologies. In particular, respondents were asked these questions about ten forms of CTs: 1) face-to-face meetings, 2) telephone calls, 3) letters (hardcopy), 4) E-mail, 5) Twitter™, 6) Facebook™, 7) webpages, 8) blogs, 9) YouTube, and 10) text messaging. For constituent communications only, three additional forms of mass-media communications were surveyed: 1) press releases, 2) television, and 3) radio. Legislator use of town hall style meetings were also examined.

In addition to the four questions related to communication frequency of use and importance, there were three other dependent variable questions: One question examined the legislator's behavior as a delegate (or trustee or politico), one question examined how frequently a legislator's policy preferences conflicted with the preferences of the majority of their constituents, and the final question examined how much time a legislator spent meeting with various individuals during a typical day. The list of choices included constituents, legislative staff, lobbyists and special interest groups, legislators from their own political party, legislators from other political parties, constituents from their own party, constituents from other political parties, legal counsel, government agency representatives, and constitutional officers (governor, attorney general, secretary of state, etc.)



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In the questionnaire, the communication frequency of use variables were ordinal in nature, with the following response categories: do not use (coded as 0), use annually (coded as 1), use monthly (coded as 2), use weekly (coded as 3), use daily (coded as 4), and use hourly (coded as 5). The CT importance of use variables were also ordinal in nature with the following response categories: do not use (coded as 0), not important (coded as 1), slightly important (coded as 2), moderately important (coded as 3), important (coded as 4), and very important (coded as 5).

While the previous paragraphs discuss all of the variables in the instrument, this paper focuses primarily on the frequency of use and importance variables and the relationships between mature CTs and Internet enabled CTs. Demographic variables will be discussed in the context of their relationships to and impact on frequency of use and importance variables.

### **Results**

#### **Legislator Survey Response Demographics**

Table 3 provides the descriptive statistics for the legislators who responded to the online survey. Figure 1 highlights the number of legislators responding to the survey for each state.

<b>Demographic Variable</b>	<b>Number of Responses</b>	<b>Summary Statistics</b>
<b>House of Representatives</b>	1213	72.77%
<b>Senate</b>	454	27.23%
<b>Strongly Progressive Democrat</b>	183	11.28%
<b>Moderately Progressive Democrat</b>	339	20.89%
<b>Slightly Progressive Democrat</b>	75	4.62%
<b>Independent Leaning Democrat</b>	98	6.04%
<b>Independent</b>	14	0.86%
<b>Independent Leaning Republican</b>	62	3.82%

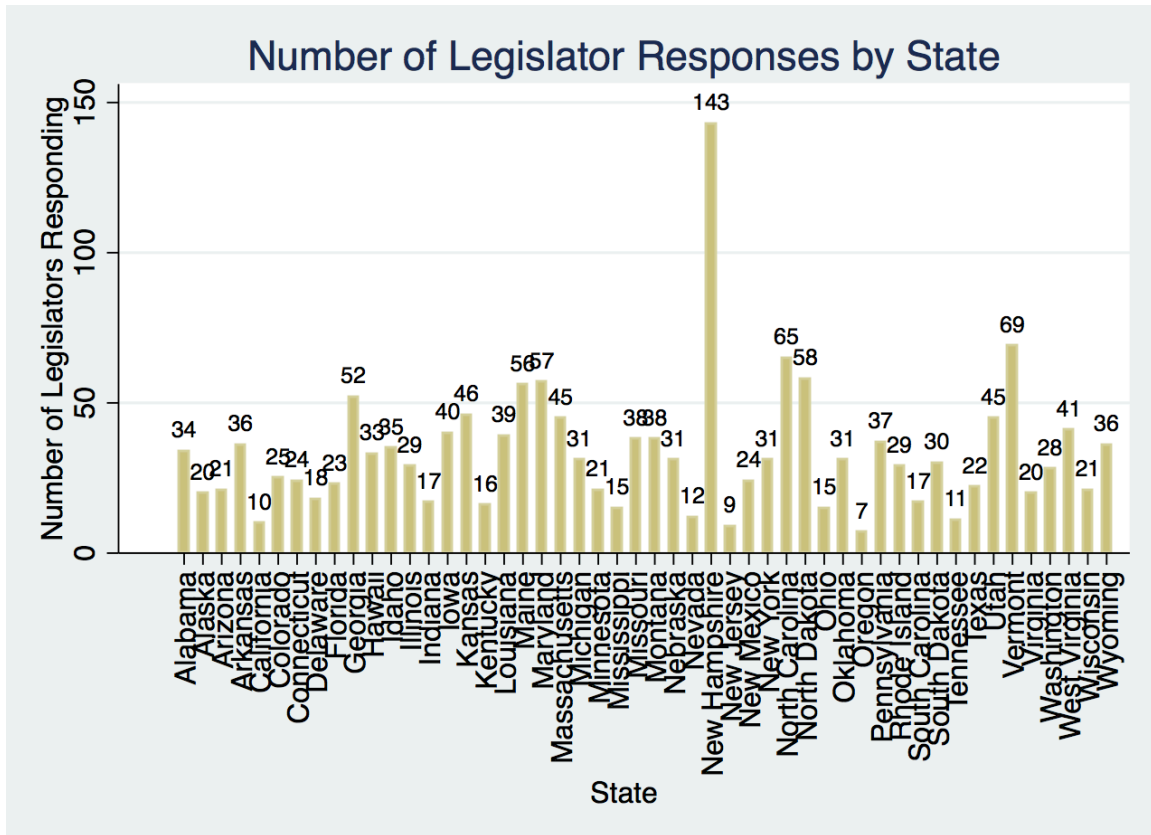
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<b>Slightly Conservative Republican</b>	44	2.71%
<b>Moderately Conservative Republican</b>	426	26.25%
<b>Strongly Conservative Republican</b>	382	23.54%
<b>Other</b>	0	0%
<b>Male</b>	1113	73.64%
<b>Female</b>	389	25.90% <sup>13</sup>
<b>Years In Office</b>	1559	Min = 1 Max = 66 Mean = 7.91 Std. Dev. 8.04
<b>Age</b>	1435	Min = 21 Max = 88 Mean = 58.04 Std. Dev. 12.01
<b>Education</b>	1483	Min = 10 Max = 23 Mean = 17.30 Std. Dev. 2.87
<b>White</b>	1256	76.45%
<b>Hispanic</b>	25	1.74%
<b>Puerto Rican</b>	7	0.47%
<b>Cuban</b>	3	0.23%
<b>Spanish or Latino</b>	10	0.68%
<b>Negro, African American, Black</b>	64	3.90%
<b>American Indian</b>	13	0.88%
<b>Asian Indian</b>	3	0.23%
<b>Filipino</b>	7	0.45%
<b>Japanese</b>	9	0.53%
<b>Korean</b>	3	0.23%
<b>Vietnamese</b>	2	0.15%
<b>Native Hawaiian</b>	4	0.30%
<b>Samoan</b>	2	0.15%
<b>Other Asian</b>	3	0.23%

**Table 3** Legislator Demographics

<sup>13</sup> Nationwide in 2015, women made up 24.4% of state legislators.

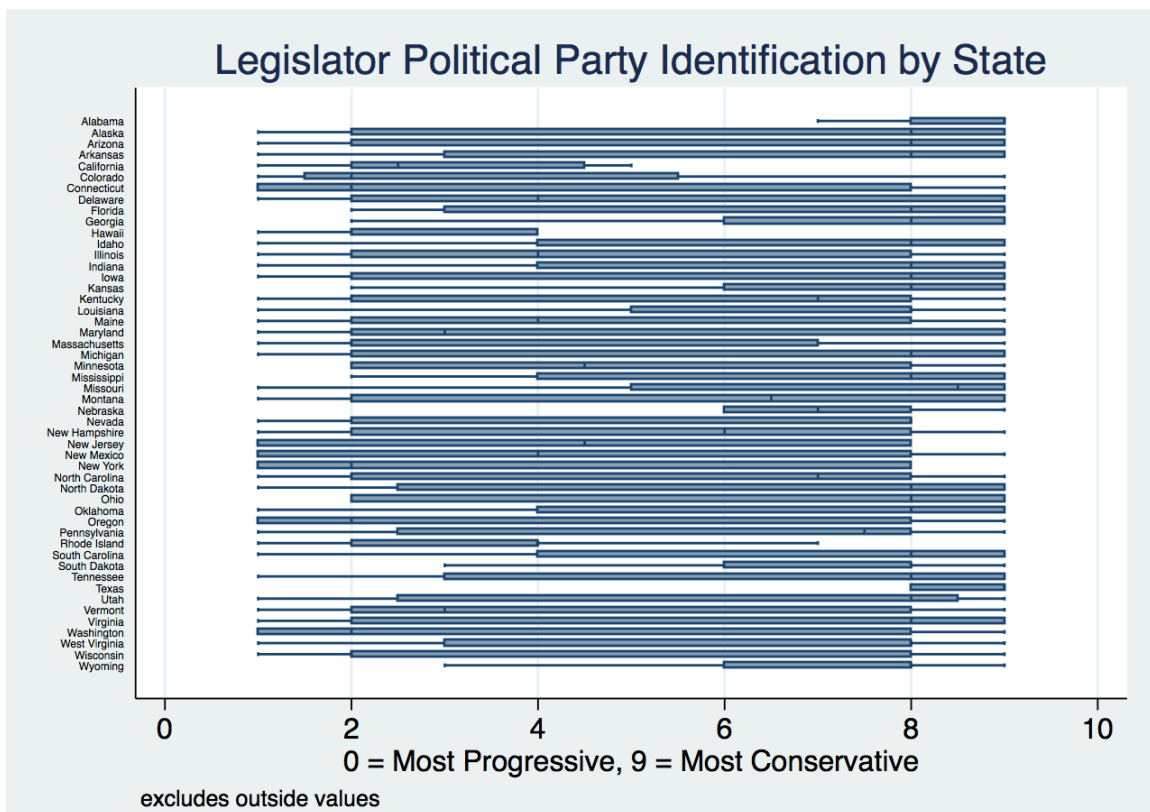
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**Figure 1** Number of Legislator Responses by State

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One interesting finding shown in Table 3 that bears further examination is legislator party identification. Examination of legislator political party identification in Table 3 suggests that legislators tend to report strong or moderate party identification, with relatively few legislators reporting as independents or with mild Democrat or Republican affiliations. A box plot of party identification by state is shown in Figure 2 and offers insights into the range of legislator political party affiliations by state.



**Figure 2** Legislator Political Party Identification by State

States shown in Figure 2 can be grouped into three primary categories: 1) Conservative states with a relatively small range of party identifications (e.g., Alabama and Texas), 2) Progressive states with a relatively small range of party identification (e.g., California and Hawaii), and 3) States with relatively wide ranges of party identification (e.g., New Jersey and Michigan). Although an analysis of party identification is not the main focus

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of this paper, researchers note that female legislators tend to be more liberal than their male counterparts (McCarty, Poole, Rosenthal, & Knoedler, 2006; Poole & Rosenthal, 2011; Thomas & Wilcox, 2014). The results of this study confirm this research, with female legislators being 1.8 categories more liberal than male legislators ( $p = 0.001$ ).

**Communication Technology Frequency of Use**

Table 4 outlines the frequency of use statistics for each CT, arranged from most used to least used. Table 4 addresses research question **RQ2**: *How frequently do state legislators use mature, Internet enabled, and mass media CTs?*

<b>Communication Technology</b>	<b>Rank</b>	<b>Mean</b>	<b>Median</b>	<b>Standard Deviation</b>	<b>Sample Size</b>
Telephone	1	3.35	3.5	0.76	1526
Face-to-Face Meetings	2	3.20	3	0.74	1521
Hardcopy Letters	3	2.86	3	0.87	1508
E-Mail	4	2.58	2.5	0.96	1509
Automated Telephone	5	2.23	2	1.11	1533
Blog	6	1.88	2	0.91	1494
Facebook	7	1.78	2	1.26	1486
Twitter	8	1.74	2	1.39	1478
Web Page	9	1.49	1.5	1.13	1460
Mass-Media, Press	12	1.29	3	0.89	1518
Text Message	10	1.17	1	0.79	1459
YouTube	11	0.96	1	1.06	1462
Mass-Media, Television	13	0.83	1	1.04	1503
Town Hall Meetings	14	0.47	0	0.81	1508
Mass-Media, Radio	15	0.40	0	0.77	1532

**Table 4** CT Frequency of Use, Average of Peer and Constituent Communications

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**Communication Technology Importance**

Table 5 outlines the importance statistics for each CT, arranged from most important to least important. Table 5 addresses research question **RQ3**: *What importance do state legislators assign to mature, Internet enabled, and mass media CTs?*

<b>Communication Technology</b>	<b>Rank</b>	<b>Mean</b>	<b>Median</b>	<b>Standard Deviation</b>	<b>Sample Size</b>
Face-to-Face Meetings	1	4.62	5.0	0.56	1487
Telephone	2	4.23	4.5	0.72	1480
Hardcopy Letters	3	3.51	4.0	0.85	1479
Automated Telephone	4	3.38	4.0	1.30	1492
Mass-Media, Press	12	2.90	3.0	1.65	1474
E-Mail	5	2.71	2.5	0.93	1464
Blog	6	2.11	2.0	1.03	1444
Web Page	7	1.72	2.0	1.14	1436
Facebook	9	1.61	1.5	1.26	1452
Twitter	8	1.59	1.5	1.31	1451
Text Message	10	1.55	1.5	0.96	1436
Mass-Media, Television	13	1.51	1.0	1.62	1469
Town Hall Meetings	14	1.01	0.0	1.45	1470
YouTube	11	0.89	0.5	1.06	1447
Mass-Media, Radio	15	0.71	0.0	1.13	1490

**Table 5** CT Importance, Average of Peer and Constituent Communications

Using a Pearson’s correlation with statistical significance reported, the hypothesized importance of the various CTs shown in Table 2 were compared with the importance rankings assigned by legislators. The Pearson’s correlation coefficient of 0.87 (p = 0.001) suggest that there is a strong, statistically significant correlation between

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the importance of a CT suggested by naturalness theory augmented by the age of the technology, duplex, and bandwidth and the actual importance legislators assign to the CT. This result leads us to reject the **null** hypothesis for hypothesis  $H_{1a}$ : *The overall importance of a CT to a legislator is positively correlated with the naturalness of that CT such that more natural CTs will be ranked with higher importance.* Naturalness theory accurately predicts the importance that legislators place on CTs.

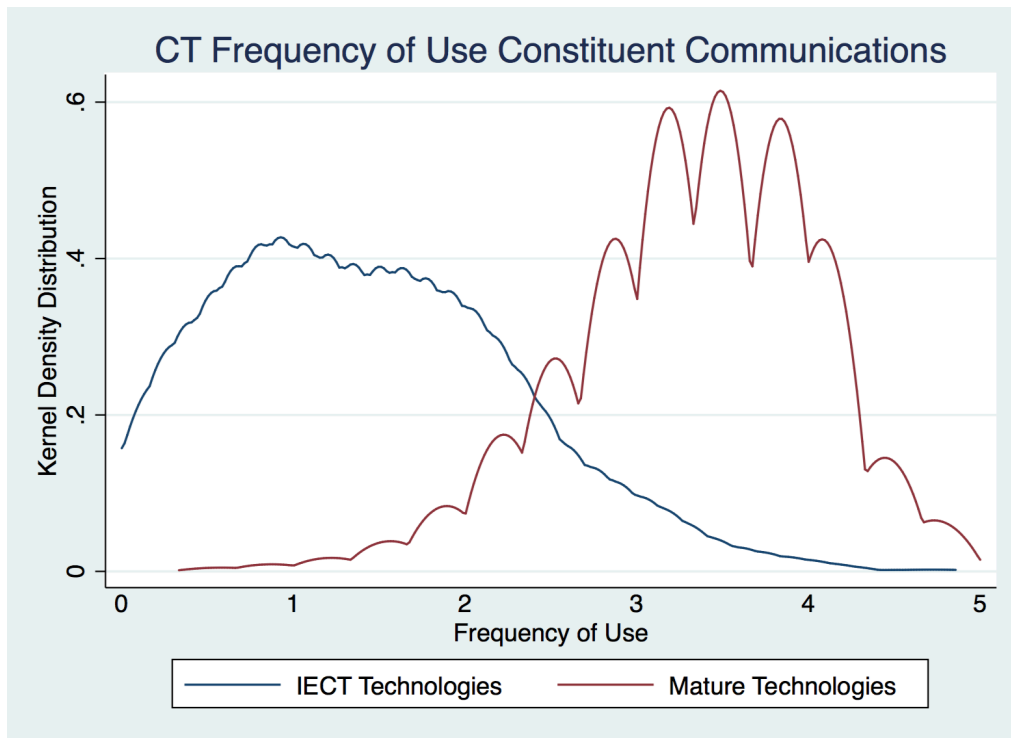
### **Mature vs. IECT Communication Technologies**

For the CTs examined, legislator CTs were combined into two categories: mature communications and Internet Enabled communications. Face-to-face meetings, telephone calls, and written correspondence were combined and averaged into a single variable for frequency of use (*freqmature*) and a second variable for importance (*importmature*). All Internet enabled communications were combined and averaged into a single variable for frequency of use (*freqiect*) and a second variable for importance (*importiect*). Difference of means testing was used to compare *freqmature* to *freqiect* and *importmature* to *importiect*. For importance, the mean value for mature communications is 4.12 and the mean value for IECT communications is 1.75 ( $p=0.00$ ). This result leads us to reject the null hypothesis for hypothesis  $H_{1b}$ : *Legislators will rank mature CTs more important than Internet enabled CTs.* Legislators clearly find mature CTs more important than Internet enabled CTs. For frequency of use, the mean value for mature communications is 3.11 and the mean value for IECT communications is 1.65 ( $p=0.00$ ). This result leads us to reject the null hypothesis for hypothesis  $H_{1c}$ : *Legislators will use*

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*mature CTs more frequently than Internet enabled CTs.* Legislators clearly use mature CTs more important than Internet enabled CTs.

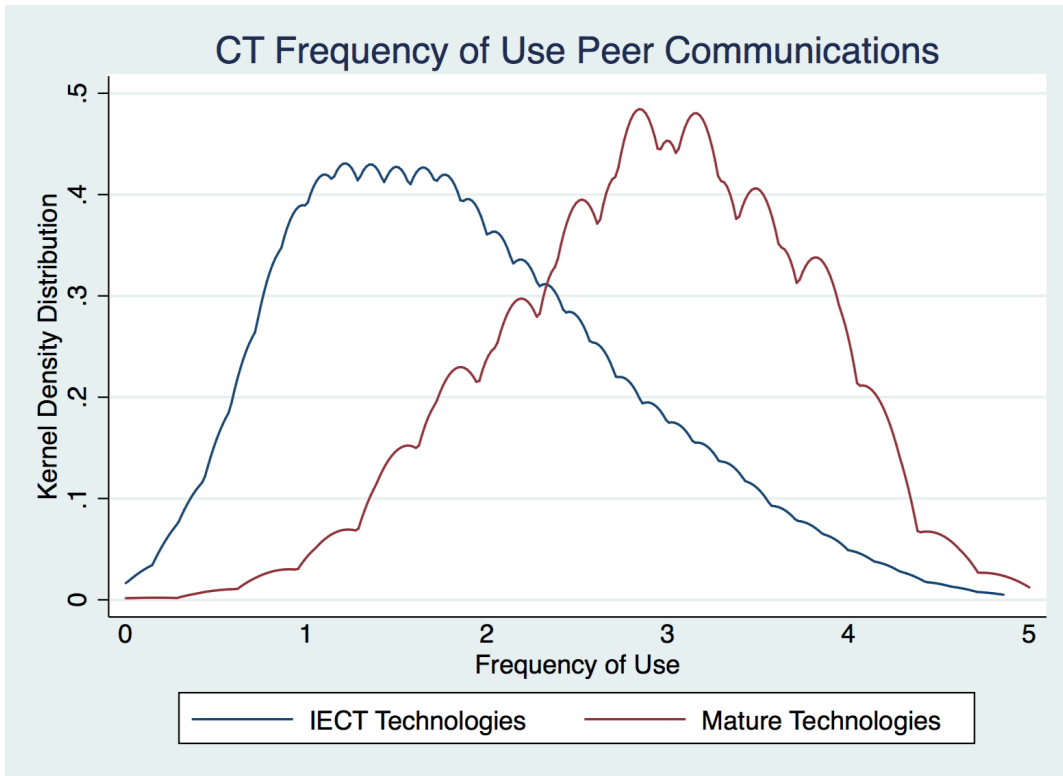
The differences between mature and IECT communications for both frequency of use and importance are made clearer by examining density plots for both peer and constituent communications. Figure 3 compares mature and IECT density plots for CT frequency of use for communicating with constituents. Figure 4 compares mature and IECT density plots for CT frequency of use for communicating with peers. Figure 4 compares mature and IECT density plots for CT importance when communicating with constituents, and Figure 5 compares mature and IECT density plots for CT importance when communicating with constituents.



**Figure 3,** CT Frequency of Use, Constituent Communications, Mature vs. IECT

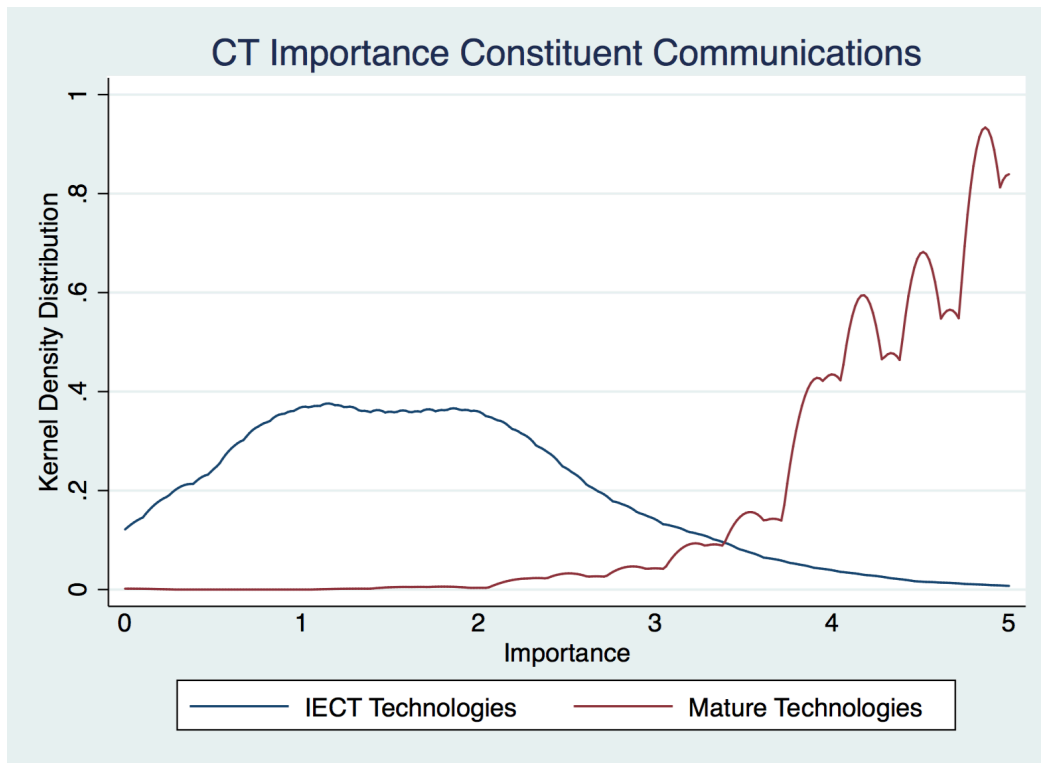


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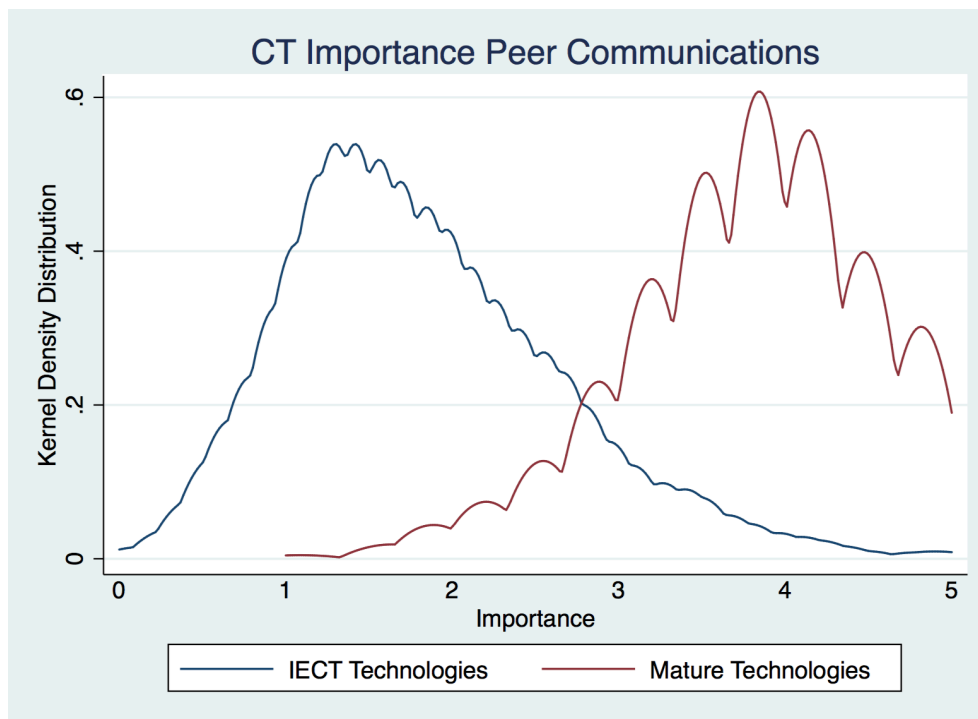


**Figure 4**, CT Frequency of Use, Peer Communications, Mature vs. IECT

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**Figure 5, CT Importance, Constituent Communications, Mature vs. IECT**



**Figure 5, CT Importance, Peer Communications, Mature vs. IECT**

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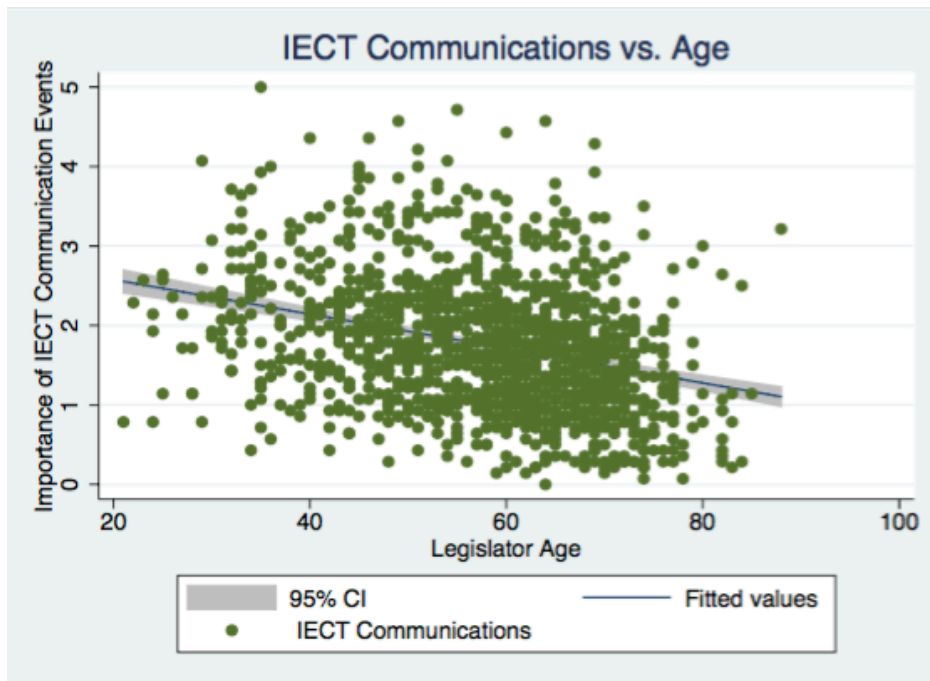
Figures 1 and 2 indicate that the frequency of use density distributions for constituent communications, mature vs. IECT (Figure 3) overlap significantly more than the frequency of use density distributions for peer communications (Figure 4). Similarly, when comparing Figures 3 and 4, the importance density distributions for constituent communications, mature vs. IECT (Figure 4) overlap significantly more than the importance density distributions for peer communications (Figure 5). These results suggest that overall; peer communications are less frequent and less important than constituent communications. Importantly, these results support the contention of this paper that legislators are motivated to communicate by a need for reelection, and that they recognize constituents rather than their peers, as the primary path to reelection. This increase in the frequency of use and importance of constituent communications over peer communications can be seen in Figures 1 through 4 and is manifested by increases in the frequency of use and importance of *mature* CTs for constituent communications while *IECT* communications remain relatively constant whether legislators are communicating with peers or constituents.

Examination of Figures 1 through 4 highlights clear differences between the frequency and importance of mature communications and IECT communications. One of the most common factors in the use of IECT communications are age and education (Carpenter & Buday, 2007; Juznic, Blazic, Mercun, Plestenjak, & Majcenovic, 2006; Schleife, 2006), so it is fair to wonder whether or not the differences are a function of legislator age and /or education. To address this question, ordinal logistic regressions were completed where the frequency and importance of mature and IECT CTs were regressed while controlling for both age and education.

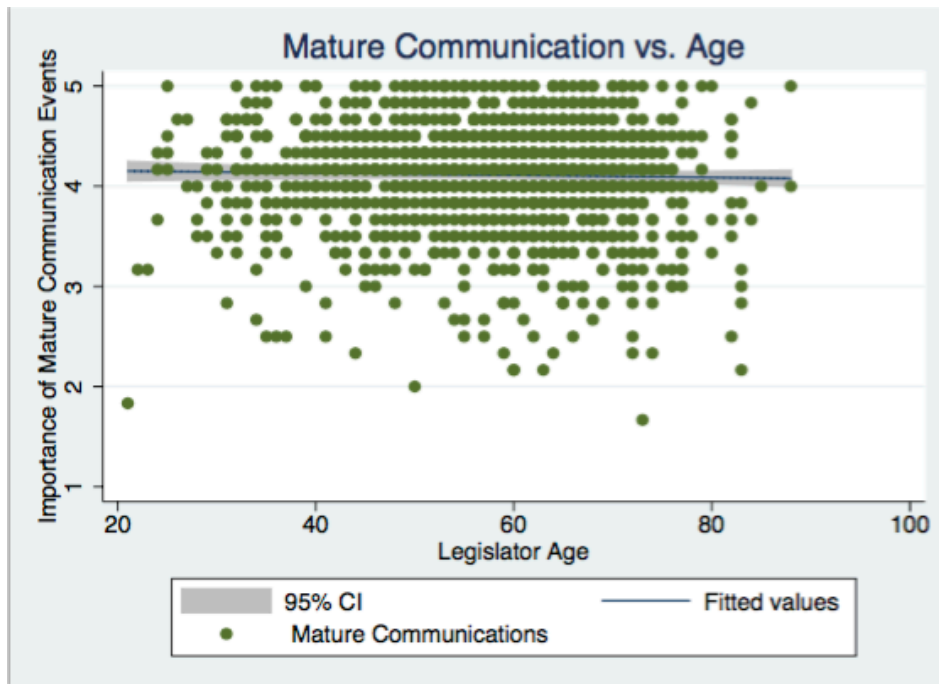
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The results ordinal logistic regressions show that even controlling for age and education, there is a statistically significant relationship between the frequency of IECT use and the frequency of mature CT use. The odds of a legislator indicating hourly use of mature CTs are 2.99 times higher than the odds of a legislator indicating hourly use of IECT ( $z = 15.21$ , Pseudo R-squared = .032). In this regression, a one-year increase in age is associated with a 2.9% increase in the likelihood of a legislator indicating hourly use of mature CT ( $z = 6.56$ ). The education variable was not statistically significant. The results for the relationship between the importance of IECT communications and the importance of mature CT communications are similar. After controlling for age and education, the odds of a legislator indicating that mature CTs are very important are 2.16 times higher than the odds of a legislator indicating that IECT communications are very important ( $z = 11.34$ , Pseudo R-squared = .019). In this regression, a one-year increase in age is associated with a 1.6% increase in the likelihood of a legislator indicating that mature CT is very important ( $z = 3.55$ ). Once again, the education variable was not statistically significant. Figures 5 and 6 highlight the relationship between legislator age and CT importance, mature vs. Internet enabled CTs. Figures 7 and 8 highlight the relationship between legislator age and CT frequency of use, mature vs. Internet enabled CTs.

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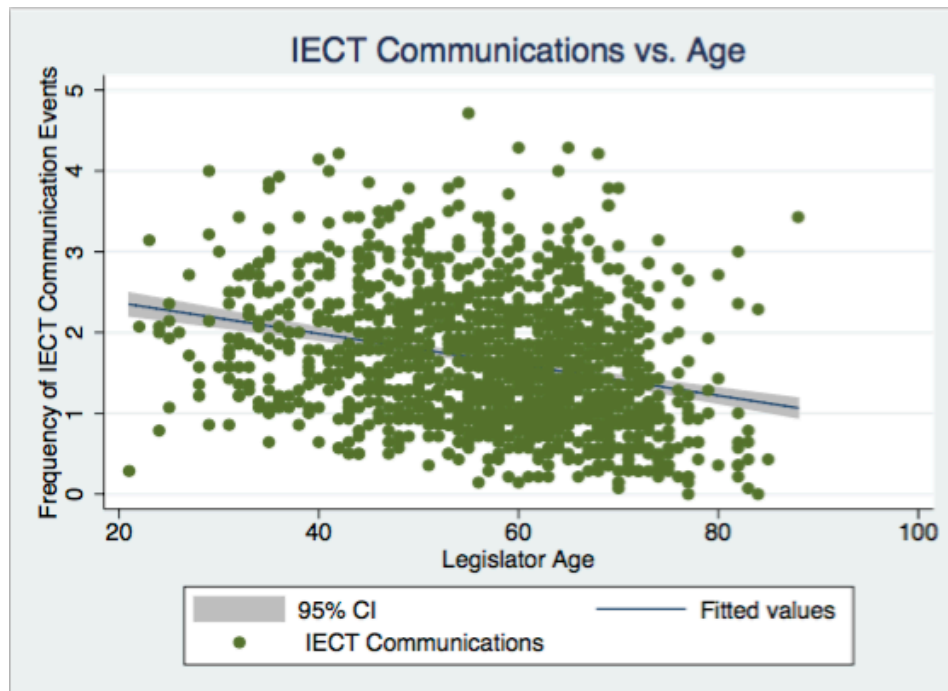


**Figure 7** Internet enabled CT Importance as a Function of Age

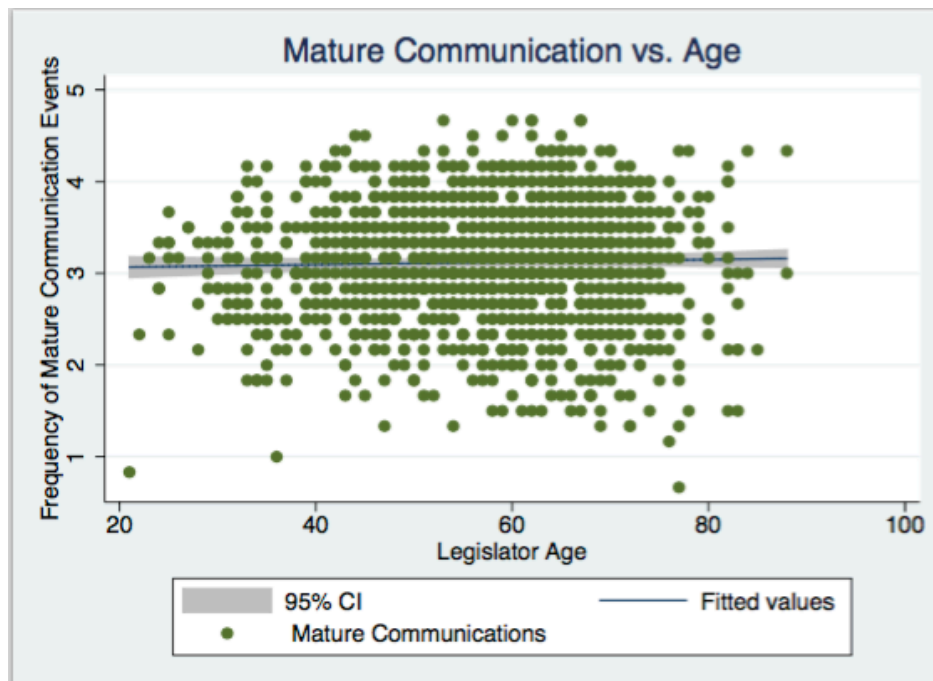


**Figure 8** Mature CT Importance as a Function of Age

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**Figure 9** Internet Enabled CT Frequency of Use as a Function of Age



**Figure 10** Mature CT Frequency of Use as a Function of Age

In addition to the ordinal logistic regressions that controlled for age and education, a t-test was performed which examined the overall importance of mature CT

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and IECT. This difference of means test highlighted a mean of 4.11 for the importance of mature CT and a mean of 1.75 for the importance of IECT ( $t = 100.2$ ). A second difference of means test was performed which examined the mean of mature CT frequency of use with the mean of IECT frequency of use. This difference of means test highlighted a mean of 3.11 for mature CT frequency of use and a mean of 1.65 for IECT frequency of use ( $t=65.1$ ). Based on these ordinal logistic regressions and difference of means tests, research **RQ4**: *What econometric relationships exist between the frequency of use and importance of mature CTs when compared to Internet enabled CTs?* is addressed.

Based on the results shown in figures 1 through 4, a closer examination of the overall frequency of use and importance of constituent vs. peer communications is in order. What are the relative frequencies of use and importance rankings for peer and constituent communications? Table 6 contains a comparison of constituent and peer frequency of use and Table 7 contains a comparison of constituent and peer importance.

CT	Constituent Frequency of Use Ranking	Constituent Mean Value	Peer Frequency of Use Ranking	Peer Mean Value	p-value
Letters (Hardcopy)	1	3.67	6	2.01	***
Telephone	2	3.28	2	3.37	***
Face-to-Face Meetings	3	3.05	4	3.33	***
Webpage	4	2.39	9	0.59	***
Twitter	5	2.27	8	1.21	***
Automated Phone Calls	6	2.15	N/A	N/A	N/A
Text Messages	7	1.83	10	0.51	***
Facebook	8	1.42	5	2.11	***
Mass-Media Press	9	1.35	N/A	N/A	N/A

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E-Mail	10	1.25	1	3.90	***
Mass-Media Television	11	0.89	N/A	N/A	N/A
YouTube	12	0.51	7	1.45	***
Town Hall Meetings	13	0.50	N/A	N/A	N/A
Mass-Media Radio	14	0.46	N/A	N/A	N/A
Blog	15	0.42	3	3.35	***

**Table 6** Constituent and Peer CT Frequency of Use Rankings, Difference of Means Testing, \*  $p \leq 0.05$ , \*\*  $p \leq 0.01$ , \*\*\*  $p \leq 0.001$

CT	Constituent Importance Ranking	Constituent Mean Value	Peer Importance Ranking	Peer Mean Value	p-value
Face-to-Face Meetings	1	4.61	1	4.58	*
Telephone	2	4.38	3	4.08	***
Letters (Hardcopy)	3	4.28	5	2.72	***
Automated Phone Calls	4	3.32	N/A	N/A	N/A
Mass-Media Press	5	2.91	N/A	N/A	N/A
Webpage	6	2.78	9	0.70	***
Text Messages	7	2.59	10	0.53	***
Twitter	8	2.23	8	0.97	***
Facebook	9	1.62	6	1.57	0.15
Mass-Media Television	10	1.52	N/A	N/A	N/A
E-Mail	11	1.19	2	4.22	***
Town Hall Meetings	12	0.95	N/A	N/A	N/A
Mass-Media Radio	13	0.78	N/A	N/A	N/A
YouTube	14	0.67	7	1.18	***
Blog	15	0.58	4	3.63	***

**Table 7** Constituent and Peer CT Importance Rankings, Difference of Means Testing, \*  $p \leq 0.05$ , \*\*  $p \leq 0.01$ , \*\*\*  $p \leq 0.001$

Table 6 illustrates that legislators use different CTs to communicate with their constituents than they use to communicate with their peers. For example, the top three



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most utilized CTs to communicate with constituents are letters, telephone, and face-to-face meetings. When legislators communicate with other legislators, their top three forms of communication are E-Mail, blogs, and the telephone. Importantly, while *overall* CT frequency of use and *overall* CT importance are highly correlated ( $r = 0.80$ ,  $p = 0.001$ ), they are not identical. As shown in Table 7, legislators find face-to-face meetings, telephone, and letters to be most important when communicating with their constituents, but find face-to-face meetings, E-Mail, and the telephone most important when communicating with each other. A Pearson's rho correlation with reported statistical significance was completed using the importance rank orders shown in Table 7 for peer and constituent communications. The result shows a weak positive correlation with  $\rho = 0.19$  ( $p = 0.58$ ). Based on these results, the **null** hypothesis for hypothesis  $H_{2a}$  is rejected: *Legislators will rate the importance of CTs differently when they are used to communicate with constituents than when they are used to communicate with other legislators in their state.* Legislators rank the importance of CTs differently when communicating with peers and constituents. A Pearson's rho correlation with reported statistical significance was completed using the frequency of use rank orders shown in Table 6 for peer and constituent communications. The result shows a weak negative correlation with  $\rho = -.173$  ( $p = 0.64$ ). This low correlation and lack of statistical significance leads to a rejection of the **null** hypothesis for hypothesis  $H_{2b}$ : *The frequency of use of a CT is a function of whether the legislator is communicating with their peers or with their constituents.*

Research question **RQ1**: *What, if any, quantifiable links exist between the importance of a CT suggested by media naturalness theory and the importance*

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*legislators assign to mature, Internet enabled, and mass media CTs* can be addressed by correlating the peer and constituent importance ranks with the importance rank predicted by naturalness theory<sup>14</sup> (shown in Table 2). The importance of constituent communications correlates with the importance predicted by naturalness theory with a correlation coefficient  $r = .76$ , a relatively high level of correlation. The importance of peer communications correlates with the importance predicted by naturalness theory with a correlation coefficient of  $r = .63$ , a moderate level of correlation. As discussed earlier, in the paper, based on research by research by Burke & Chidambaram (1999) and (West, 2014), these results were expected; differences in social presence between richer CTs and leaner CTs are reduced by group familiarity. Legislators who work together over time may find leaner CTs as important as richer CTs.

Table 8 provides a convenient summary of the hypotheses tested in this paper.

<b>Hypothesis Number</b>	<b>Summary of Alternative Hypothesis</b>	<b>Expected Sign for Correlation</b>	<b>Actual Sign for Correlation</b>	<b>Null Hypothesis Result</b>
<i>H<sub>1a</sub></i>	The importance of a CT is correlated with its naturalness	Positive	Positive ( $p = 0.001$ )	Rejected
<i>H<sub>1b</sub></i>	Legislators will rank mature CTs more important than Internet enabled CTs	Mean of mature CT importance > mean of IECT importance	Mean mature = 4.12 Mean IECT = 1.75 ( $p = 0.00$ )	Rejected
<i>H<sub>1c</sub></i>	Legislators will use mature CTs more frequently than Internet enabled CTs	Mean frequency of use mature CT > mean frequency of use IECT	Mean mature = 3.11 Mean IECT = 1.65 ( $p = 0.00$ )	Rejected

<sup>14</sup> Naturalness theory does not predict differences in importance based on who a person is communicating with.

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<b><i>H<sub>2a</sub></i></b>	The importance of a CT is a function of whether a legislator is communicating with a peer or a constituent	No correlation expected	Weak positive correlation found, not statistically significant (p = 0.58)	Rejected
<b><i>H<sub>2b</sub></i></b>	The frequency of use of a CT is a function of whether a legislator is communicating with a peer or a constituent	No correlation expected	Weak negative correlation found, not statistically significant (p = 0.64)	Rejected

**Table 8** Hypotheses Summary

**Examination of CT Use by Political Party**

Wilcoxon (Mann-Whitney) ranksum tests were performed on the frequency of use and importance of all CTs examined as a function of whether the legislator identified as a Democrat or Republican. The statistically significant differences are shown in Table 9 below.

<b>Peer Frequency</b>	<b>Democrat Mean</b>	<b>Republican Mean</b>	<b>Prob &gt;  z </b>
Twitter	<b>1.45</b>	1.04	***
YouTube	<b>1.53</b>	1.40	*
<b>Peer Importance</b>			
Twitter	<b>1.19</b>	0.81	***
Facebook	<b>1.65</b>	1.57	*
Webpages	<b>0.75</b>	0.61	**
Text Messages	<b>0.62</b>	0.46	**
<b>Constituent Frequency</b>			
Face-to-Face	3.00	<b>3.01</b>	*
Telephone	3.22	<b>3.29</b>	**
Hardcopy Letters	3.61	<b>3.71</b>	*
E-Mail	<b>1.49</b>	1.05	***
Twitter	<b>2.37</b>	2.14	**
Webpages	2.19	<b>2.53</b>	***
Blogs	<b>0.47</b>	0.39	*
YouTube	0.58	0.45	**
Press	<b>1.32</b>	1.23	*
Town Hall Meetings	<b>0.54</b>	0.44	**

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Television	0.74	0.89	**
Radio	0.50	0.37	***
<b>Constituent Importance</b>			
E-Mail	<b>1.46</b>	0.97	***
Twitter	<b>2.36</b>	2.07	***
Facebook	<b>1.70</b>	1.52	**
Blog	<b>0.64</b>	0.53	*
YouTube	0.74	0.60	**
Press	<b>3.00</b>	2.77	**
Town Hall Meetings	<b>1.12</b>	0.94	**
Television	<b>0.88</b>	0.66	***

**Table 7** Constituent and Peer CT Importance Rankings, Difference of Means Testing, \*  
p<=0.05, \*\* p<= 0.01, \*\*\* p<= 0.001

### Conclusions

The findings of this research have filled in significant gaps that exist in understanding the frequency that state legislators use, and the importance they assign to CTs. When comparing mature CTs with Internet enabled CTs, legislators find mature CTs more important and use them more frequently than Internet enabled CTs. CT naturalness theory offers a theoretically plausible explanation for the importance that legislators assign to a CT, but clearly, there are other factors that determine the importance legislators assign to a CT. As predicted, legislators value a CT differently when communicating with constituents than when communicating with peers. Age plays a role in how frequently legislators communicate with an Internet enabled CT, with older legislators using Internet enabled CTs less, but is not a significant indicator of the frequency of use of mature communications. Legislator education was not found to be a significant predictor of CT use or importance. With the exception of YouTube, E-Mail, and Blogs, legislators find all CTs examined more important when communicating with constituents than when communicating with peers.

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This research raises a number of questions that remain unanswered. For example, what factors, besides familiarity with each other, cause differences in the importance legislators assign to a CT? Why are CTs that are traditionally thought of as constituent communications such as YouTube and Blogs more important for communicating with legislators than with constituents? Finally, and perhaps most importantly, what are the ramifications of the differences in CT frequency of use and importance for the policymaking process? For example, Arizona legislators indicate that citizens use E-Mail more frequently than any other CT to communicate with legislators (West, 2014), yet legislators nationwide rank E-Mail from constituents as one of the least important<sup>15</sup> CTs. What are the implications of this disconnect?

The findings presented in this research paper touch on the complexity surrounding how state legislators communicate with peers and constituents and offer many avenues for future research. For example, understanding how legislators communicate is an important first step in determining how (or if) communications preferences impact the policymaking process. Does it matter how legislators communicate from a policymaking perspective? In a final example of possible future research, differences in legislator CT frequency of use and importance between peers and constituents may offer insights into legislator behaviors that could impact how the traditional legislator roles of delegate, trustee, and politico are being impacted by advances in communication technology.

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<sup>15</sup> Importance was defined in the survey instrument as “related to the likelihood that you will respond favorably to a request received from a constituent, all else equal, via one of the communication technologies” listed in the survey.

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