PERCEPTIONS OF STEM AND LIBERAL ARTS POLICY IN FLORIDA

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The promotion of STEM (Science, Technology, Engineering, and Mathematics) education is similar to the rhetoric of the Space Race. Only 19% of U.S. degrees are in STEM fields, compared to over 50% in China (National Science and Technology Council, 2013). Policy makers like President Obama, New Jersey Governor Chris Christie, and Maryland Governor Martin O'Malley tie STEM investment directly to economic impact, using language similar to the rhetoric President Eisenhower utilized to promote the National Defense Education Act (NDEA) of 1958. Florida Governor Rick Scott places STEM in zero-sum competition against liberal arts subjects with the rationale of stimulating economic growth.

I surveyed and interviewed Florida policy makers to explore their perceptions of STEM and liberal arts fields. I wanted to know how these perceptions influenced policy formation. I examined press releases to identify trends and patterns in messaging from Governor Scott's office. The majority of policy actors supported balanced positions on the 7-point Likert scale survey items, recognizing the economic importance of STEM education while also noting the value of liberal arts disciplines. However, when given the freedom to respond in open-ended survey items and semi-structured interviews, many policy makers revealed positions closer to the zero-sum strategies of Governor Scott. They were dismissive of the utility of liberal arts subjects,

and saw them as frivolous and unnecessary. Other participants defended the value of the liberal arts and saw them as a necessary component of a tertiary education.

My research demonstrates that the relationship between higher education and economic impact is unpredictable. To maximize economic growth, universities should produce *opportunistic communicators* who recognize opportunities in the Information Age economy and communicate to consumers across state and national borders. Zero-sum competitions between STEM and the liberal arts are unnecessary and detrimental in a non-zero-sum global economy.

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PREFACE

I began my investigation of this research topic during my first semester of doctoral study in Fall, 2011. The Governor of my home state of Florida, Rick Scott, introduced a controversial idea to take money from liberal arts programs like anthropology at state universities and divert it to STEM (Science, Technology, Engineering & Mathematics) fields (Anderson, 2011, October 10). He pursued this policy with the intention of using higher education to create jobs and spur economic innovation. Governor Scott charted this course despite the fact that it is difficult to correlate a link between state STEM investment and economic growth in the state itself (Gittel & Sedgley, 2000), and the few studies that explore this subject area illustrate multiple, overlapping variables that demonstrate a more complicated relationship than the linear narrative often portrayed by policy makers (Gasiewski, Eagan, Garcia, Hurtado, & Chang, 2012; Gittel & Sedgley, 2000; Hira, 2010). Upset by Governor Scott's attacks on the liberal arts, I brought my concerns about the matter to my class discussion board. By that time, the news had been picked up by the AP and was being republished nationwide. I was infuriated as a liberal arts graduate of a public university in Florida. I believed that my degree had given me the skills to be adaptable in a rapidly changing global economy. Now Governor Scott was devaluing my degree? I concurred with former University of Florida and UCLA president Charles E. Young, who stated, in response to Scott's proposal, "It's sheer and utter nonsense…they [Gov. Scott and his allies]

have a total lack of understanding about what a university is and what universities do" (Anderson, 2011, October 10, p. 1).

I championed the cause of the liberal arts on the course discussion board, and noted that curriculum mandates could be a potential solution that would please STEM advocates like Governor Scott without gutting liberal arts programs. Why not have liberal arts majors choose a STEM minor, and have STEM majors choose a liberal arts minor? A balanced approach to the curriculum sounded to me like a good plan that did not, as the *Sarasota Herald-Tribune* article stated, "…rob Peter to pay Paul" (Anderson, 2011, p. 2). My colleagues were quick to caution my enthusiasm for my idea. They noted that incentivizing STEM had its benefits and putting mandates on university curricula could have unintended consequences. Other comments noted that I was potentially crafting a solution to a nonexistent problem. Governor Scott did not have the authority to rearrange items in a university budget. If the Florida Legislature wanted to provide more money for STEM, what was the problem?

I took the critiques of my colleagues, reflected on my thoughts, and refined my own position on the matter. I began to look at general education requirements as a potential avenue for the reforms I had in mind. I wrote two Op-Eds in 2012 for the *Sarasota Herald-Tribune*, the newspaper that originally broke the story of Governor Scott's plans for incentivizing STEM from liberal arts budgets. The first, titled, "Balance Gen Ed", illustrated the problem of general education requirements at universities, which often encompassed 50% or more of total university credits a student earned, while offering a "cafeteria style" selection of courses that allowed students to pick the path of least resistance (Lurz, 2012, March 7). I suggested that universities could instead cut general education requirements in half if students chose a minor significantly different than their major course of study. I used the suggestion I first brought up in class-

STEM students could select a liberal arts minor, and liberal arts majors could select a STEM minor. "An engineering major would be strengthened by a minor in German or Chinese. Likewise, an anthropology degree would be strengthened by a minor in chemistry. These are just two possibilities out of thousands of combinations" (Lurz, 2012, March 7, p. 8A). My article was used as a reference in Penn State's report on its General Education policies five months later (Pennsylvania State University, 2012). After introducing the problem space and framing my proposal within general education, I wrote a second Op-Ed for the *Herald-Tribune* titled "Creating Renaissance Scholars". I outlined specific ideas for my STEM/liberal arts major minor suggestion in this editorial. I took to heart the critiques of my colleagues, and cautioned against state or institutional mandates on the curriculum. I suggested instead that a pilot program, in which students *selected* the course of study I proposed, was an attractive and "shovel-ready" measure universities could put in place themselves (Lurz, 2012, November 26).

My published articles were a means of empowerment for me. I reflected critically on the thoughts of my colleagues and advocated my position on an important issue in the public sphere. The use of the university curriculum as the avenue for implementing my ideas was logical, and based on my research interests at the beginning of my doctoral program. When I first arrived at the University of Pittsburgh, I was interested in studying the mission and purpose of higher education institutions, specifically the increasing prominence of entrepreneurship and regional economic impact on university management. Traditionally, universities have focused on missions of academics, research, and service (Altbach, 2011; Thelin, 2011). Entrepreneurship and creating economic stimulus, on the other hand, are relatively recent goals of higher education institutions. Geiger (2011) notes that economic stimulus as a university mission had its roots in American colleges west of the Appalachians in the early 1800s, as local leaders believed that

establishing a college would enhance the cultural and economic standing of their towns (p. 48), and Altbach (2011) notes that the Germans who established research as a pillar of higher education recognized the advances in industrial production that such research generated.

The mission of entrepreneurship in American universities, a mission with the *deliberate* aim of creating economic growth in partnership with regional private interests, has only become universally recognized in the course of the last 30 years, and remains a subject of debate in the global higher education community (Curri, 2008). On highly visible signs all over campus, as well as on its official website, the University of Pittsburgh proclaimed, "Leader in Academics, pioneer in research, partner in regional development" (University of Pittsburgh, 2012). These prominent signs, which greeted me upon my arrival in Pittsburgh, demonstrated the university's recognition of its mission to create economic impact for its community. Ross (1994) argues that universities, within their strategic planning, engage in a process that is implicitly entrepreneurial, and should be viewed as an enterprise which results in comparative advantage and measurable net gains in the value of the institution. When public universities advocate for funding from state legislatures, they often deem such funding to be an investment that will produce the returns of economic growth in the region. This vision of bettering society through investment in higher education "requires a shift from past practices to embrace a more entrepreneurial vision of the university, one that is better suited to today's economy and society (Potter, 2008, p. 3). Entrepreneurial visions of university management inevitably lead to focusing on departments and degrees that offer the highest return on investment. Such views of higher education administration have natural allies in state policy makers who wish to incentivize STEM.

Being an advocate for civic engagement and service in the academy, such corporatization of the university environment alarmed me. The statements by Governor Scott for incentivizing

STEM at the expense of the liberal arts in the name of economic impact seemed to affirm the viewpoints of entrepreneurial proponents. Other scholars, echoing my concerns, worried about the potential implications of market-driven management of universities. The traditional missions of universities, such as civic engagement, academic excellence, research, and student development, risk being overshadowed by pursuit of curricula and management philosophies that are dictated by market demands. Kirp (2003) makes a particularly strong rebuke of these entrepreneurial principles within higher education institutions (HEIs). He states, "Entrepreneurial ambition, which used to be regarded in academe as a hold-the-nose necessity, has become a virtue" (p. 2). Kirp (2003) is especially critical of Resource Center Management (RCM), which dictates that department costs cannot outpace revenues, and favors profit centers that produce more revenue than they spend in expenditures. Such management philosophy might be good for popular health science programs, but it can be devastating to smaller departments like classics, religion, Russian, or German, which provide value for academic pursuit but less robust profit margins. Departments that operate at a loss could be at risk for elimination.

This was the research background I had when I first began looking into STEM and liberal arts higher education policy. The more I looked into the issue, the more my research concentration moved away from curricula and university mission/vision and more into higher education policy approaches of the federal government and various state governments. In Dr. John Weidman's Policy Studies course in Fall, 2012, I studied other states' approaches to STEM and liberal arts higher education policy. I decided to focus on West Virginia and Georgia as comparative models. I selected West Virginia and Georgia on the basis of their status as states classified as having strong merit-based scholarship systems (Heller, 2000, 2004) and as states which received between 10-15% of their education budgets from gaming revenues like casinos

and lotteries (Russell, 2008). My study in that course led me to determine that there are many different approaches to STEM policy that governments can undertake. Florida has set up STEM disciplines in a competitive and confrontational relationship with liberal and fine arts disciplines, and has pushed through legislation and budgets that provide direct advantages to STEM projects. Georgia has taken a more balanced approach, incentivizing STEM projects, but also promoting liberal and fine arts in the name of critical thinking and innovation. Georgia's approach to the issue is more similar to the federal government's, whose commissions and reports from various administrations have concurred that more STEM funding is needed, but prose literacy and critical thinking cannot be ignored either. West Virginia advocated for a balanced STEM and liberal arts K-12 curriculum, while pushing for shovel-ready community college and certificate STEM programs in an alliance between government entities, private firms, and 2-year institutions. In short, Governor Scott has other options. While pushing STEM projects is a politically popular maneuver, there is no need to attack the liberal or fine arts in the process.

Delving into state and federal STEM policy was fascinating for me, and raised questions of how to *measure* a tangible regional economic impact from STEM education. I read various justifications for STEM funding used by policy makers and university leaders, and that term, *regional economic impact*, which I was familiar with from previous studies concerning entrepreneurship in the academy, kept coming up. How could such an item be measured? In my quantitative methods research methodology studies with Dr. Shafiq, I returned to the limited literature regarding this aspect, and learned the difficulty in correlating state STEM investment with economic impact. The short answer is this: the omitted variable bias is too great to overcome. STEM investment impacts the economy. However, there are many other variables that influence a broad topic like *economic growth* or *new job creation*, and a researcher would

have a very difficult time controlling for even 30% of the existing variables. Gittel & Sedgley (2000) conducted an exploratory study regarding higher education investment in New England, and came to similar conclusions as those put forward to me by Dr. Shafiq. While STEM investment has a possible impact on economic growth, it is incredibly difficult to demonstrate a strong correlation, and impossible to *prove*. State funding that Governor Scott takes away from liberal arts disciplines and pumps into STEM programs was just as likely to benefit Georgia or Virginia as it would Florida, since graduates could leave the state. Significantly altering the mission and vision of universities is not a prudent measure if the promised local economic impact is only a possibility, rather than a probability.

My advisor and I, taking in all the research I have done on this topic, along with some of my earlier research on university missions and purpose, approached a colleague, Everett Herman, to present some of our initial findings at the Deutsche Gesellschaft für Erziehungswissenschaft (DGfE) [*trans: Society for Education Science*] Conference in Berlin. We combined our STEM policy research with Mr. Herman's research on Civic Engagement, in an attempt to see if a middle ground could be reached regarding university missions of service and producing the regional economic impact desired by policy makers on both sides of the Atlantic. Our project, "Constructing Narratives of STEM and Civic Education in the University: Complementarity or a Zero-Sum Game", concluded that promoting both STEM and Civic Engagement at higher education institutions produced benefits for universities and society at large, by producing graduates with the skills to foster innovation and the social conscience to build a more equitable democracy (Porter, Lurz & Herman, 2014). We received good feedback from European colleagues, and learned that STEM education also receives strong support in the EU, although in German-speaking countries it is called 'MINT' (Mathematik, Informatik,

Naturwissenschaften, Technik). Germany has been identified as an economic peer by national task forces exploring the issue of STEM, and it has been noted that while the number of students in the United States who major in STEM fields is under 20%, while in Germany, 30% major in Engineering alone (National Science and Technology Council, 2013). The number of students majoring in Engineering in the United States is a mere 4% (National Science and Technology Council, 2013). These figures, along with the political popularity of STEM education, were strong motivating factors for our team to present this research in Berlin. We were pleased at the response, and are exploring the possibility of writing a book chapter on the topic.

Following this long road of coursework, research, and study, I began an internship in 2014 in Harrisburg, working for Republican State Senator Mike Folmer of the 48th Senatorial District, which encompasses parts of the central Pennsylvania counties of Lebanon, York, and Dauphin. Senator Folmer is the chair of the Education Committee. Education constitutes the single largest expenditure of the Commonwealth's budget (Commonwealth of Pennsylvania, Office of the Governor, 2014). I was excited to put the ideas I had learned from my research into practical use. In going through the budget and preparing the Senator for committee hearings with questions and data, a surprising event occurred. I found myself recommending that the Senator go on public record supporting STEM education. Unlike the other states I've studied, STEM projects did not have a prominent position in Governor Corbett's proposed education budget. STEM certainly existed within that budget, but it was embedded into items such as "Hybrid Learning" and "Ready to Learn Block Grant" (Commonwealth of Pennsylvania, Office of the Governor, 2014). Those two items combined for over $350 million dollars in funding, and our staff's analysis of those items indicated that STEM was included within it. However, I knew from my own research how popular STEM was with constituents across demographic groups. I

knew that putting the title of STEM front and center and labeling it prominently on future legislation would be seen as a positive step for the Commonwealth, and would likely receive broad, bipartisan support. I included the caveat that a balanced approach which included the critical thinking skills of liberal arts disciplines and creativity of fine arts study *along with* STEM promotion would be the best option to pursue. Nonetheless, I quoted the same figures used by policy figures like former Education Secretary Margaret Spellings, President Barack Obama, and Florida Governor Rick Scott. Less than 20% of US Students major in STEM, and of those who begin STEM majors, 38% drop out or switch majors before they complete their degrees (National Science and Technology Council, 2013). Just 4% of American college students major in Engineering, and over 30% do so in Germany (National Science and Technology Council, 2013). What is the Commonwealth doing to promote STEM Education?

Senator Folmer asked those questions and quoted my figures at an education hearing in March, 2014. The Senator's Chief of Staff passed them on to the Senator, and the Senator asked them. As an intern, I was up on the fifth floor in my attic cubicle watching the hearing on closed-circuit TV, taking notes and summarizing positions. At first, I could not believe he actually used my suggestion. I was a lowly intern and had been on staff for less than two months. He had powerful education lawyers on his staff that provided him with most of the data and questions he used in hearings. They had printed bullet points. I had scrawled my question on a yellow piece of scrap paper on a legal pad and handed it to the Chief-of-Staff. The more I thought about it, however, the more it made sense to me. The Senator knows how important and hot STEM education is right now. It was wise for him to go on record asking that question and quoting those statistics. They are the questions the populace wants to hear. Additionally, there is a policy window open right now for Pennsylvania to promote STEM education. That said, a

disturbing question came to mind: had I become Governor Scott? Was I using my own research and taking politically expedient positions like the policy actors I opposed?

Upon further reflection, I do not believe that is the case. In meetings that have occurred since that March hearing, I have advocated for an approach that adds the liberal arts into the STEAM (Science, Technology, Engineering, Arts, and Mathematics) model in the name of creativity and innovation. I have not suggested that the Senator seek to take funding out of the liberal or fine arts in order to promote STEM, as Governor Scott advocated. We are simply trying to find funding to encourage STEM education while maintaining funding for other disciplines, using a balanced approach as encouraged by President Obama's STEM Task Force (National Science and Security Council, 2013) as well as Georgia Governor Nathan Deal's administration (Georgia Department of Education, 2012).

In conclusion, my views on this topic have evolved through the course of my studies and experiences in Administrative and Policy Studies at the University of Pittsburgh. I began with passionate outrage at what I perceived to be an assault on university autonomy by an opportunistic Governor. I debated with colleagues. I collected data. I explored the available scholarly literature, along with relevant documents like government press releases. I shared critical newspaper editorials. I looked up the literature related to policy formation as a whole, exploring authors such as Mills (2007), Doyle (2007) and Ness (2010a, 2010b). I crafted a theoretical framework describing how I saw the formation of STEM Policy in the states I researched, and edited that framework with colleagues. I pursued alternatives to the confrontational positions of Governor Scott, and discovered viable options. I collaborated with a friend and fellow scholar in the department, and flew overseas to exchange ideas with higher education personnel on the other side of the Atlantic. Finally, I obtained a 6-month internship

position where I had the opportunity to take what I have learned at the University of Pittsburgh and put it into practice, speaking truth to power in Harrisburg, PA. I have learned that the broad conclusions I put forward in class and even in the first editorials I published did not have the nuance needed to properly approach STEM policy formation, or university administration, for that matter. There are multiple approaches to this issue, and there is merit even in the arguments I disagree with. There is no silver bullet-no perfect STEM solution that is interchangeable in all fifty states. My research and experiences from Posvar Hall, to Potsdamer Platz, to the Pennsylvania Senate have shown me that this issue is, as my dear friend, Dr. Noreen Garman, likes to say-"complicated". I believe that my coursework, experiences and internship have given me the background needed to undertake this dissertation research. I collected and analyzed the data for this dissertation through the lens of my experience. With this dissertation, I hope to generate research that guides education policy formation in this field.

1.0 INTRODUCTION

The purpose of this study is to investigate the perceptions policy makers have of STEM (Science, Technology, Engineering, and Mathematics) and liberal arts education policy in the state of Florida. The rationale for making investments in STEM education is often an urgent narrative of falling behind competitors, which is reminiscent of language used in Cold War education legislation such as the National Defense and Education Act (NDEA) of 1958. STEM is linked with jobs, and policy makers see a direct relationship between state investment in higher education and economic impact (Gittell & Sedgley, 2000). In today's contentious political environment, STEM-centered education is an area of strong consensus. Language used to justify such legislation has not changed a great deal from the NDEA of 1958 to President Obama's Committee on STEM Education in 2013.

This study aims to critique and complicate the dominant narrative which presents STEM investment as a direct gateway to economic growth, and often denigrates liberal arts instruction in the process. My research demonstrates that innovation and economic impact through education are more complex than the present and persistent narrative suggests. By exploring the perceptions policy actors had of STEM and liberal arts disciplines, I gained insights into the education policy making process, and discovered areas of convergence that demonstrated potential for complicated yet concurrent mutual benefit.I focused my research on two central questions:

1.) What are key elements of the policy narratives of STEM and the liberal arts?

2.) How are these narratives utilized within the education policy making process?

1.1 BACKGROUND

Governor Rick Scott took office in 2010 with the campaign motto of "Let's get to work". He aimed to be a "jobs governor"-cutting government waste, reducing government regulation of business, and attracting industry to create jobs for the state (Scott, 2012). Degrees which did not fulfill this purpose were seen by Scott as frivolous or expendable (Anderson, 2011, October 10). In addition, many state legislators feel a sense of duty to their constituents to help alleviate unemployment and economic malaise in their home districts. Florida was hit particularly hard when the housing market collapsed in the late 2000s. Not only is the housing industry one of the state's largest employers, but property tax revenues from valuable real estate are an important source of revenue for local governments. Average home prices in the state plummeted 52.7% between April 2006 and October 2011 (Holtz-Eakin & Winkler, 2012). The collapse of the housing market, combined with the reduction of tourism due to the recession, left Florida reeling. Promises to get Floridians back to work propelled Governor Scott and many of his allies in the legislature into office. Higher education provides a vehicle for these policy actors to fulfill their campaign promises.

Governor Scott and his allies in the legislature have publicly stated their goal to shift funding from liberal arts programs to STEM disciplines. Zac Anderson (2011, October 10) originally broke the story concerning the Governor's proposals in the *Sarasota Herald-Tribune*. The Governor's statement to the *Herald-Tribune*, which has been reprinted in publications

nationwide, illustrated his position clearly. He states, “If I’m going to take money from a citizen to put into education then I’m going to take that money to create jobs. Is it a vital interest of the state to have more anthropologists? I don’t think so” (Anderson, 2011, October 10, p. 1). Anderson also quoted current and former university presidents who were critical of the Governor’s ideas. Former University of Florida president Charles Young said bluntly, “It’s sheer and utter nonsense. They have a total lack of understanding about what a university is and what universities do” (Anderson, 2011, October 10, p. 1). Young was not alone in his condemnation of the Governor’s statement. Shortly after the story broke, over 11,000 members of the American Anthropological Association signed an open letter to Governor Scott questioning his comprehension of their subject and defending the utility and worth of an anthropology degree.

Over the course of Governor Scott’s time in office, he has remained consistent in his perception of higher education policy. He frequently cites STEM education as a reason for strong jobs growth on monthly labor reports. Although he has not been as blunt as he was during that *Sarasota Herald-Tribune* interview, Governor Scott has continued to frame STEM in direct competition with liberal arts fields when discussing budget priorities and the purpose of higher education. Academic disciplines without perceived economic utility face Scott’s criticism in the public sphere.

1.2 STATE STEM VIGNETTES

This section evaluates state policy toward STEM and the liberal arts with vignettes of Florida, Georgia, and West Virginia. With these state snapshots, policy makers are presented with a few options regarding state government policy toward higher education. Each has its own set of benefits and risks, and its own base of support. Therefore, policy makers should carefully analyze the choices they make formulating higher education policy as well as the language and rhetoric they use to defend their choices.

These state vignettes were evaluated using a few guiding questions. Was Florida's attitude toward the liberal arts the norm? How did other states approach STEM promotion? Did they also see STEM as a zero-sum game in competition with the liberal arts? I looked at West Virginia and Georgia as comparative models. I selected these states based on their classification as having strong merit-based scholarship systems (Heller, 2000; 2004) and as states which received at least 10-15% of their education budgets from gaming revenues like casinos and state lotteries (Russell, 2008). While these states' governors certainly view STEM as an important piece of their education policies, I did not find animosity toward liberal arts fields as part of the rationale for the promotion of STEM projects

1.2.1 Florida

As the Florida 2012 legislative session began in January, it became clear to Governor Scott and his political allies that they could not actually undertake the measures he proposed in October, 2011. The Governor and state legislature do not have direct control over internal university budgets; that power is held by individual universities and the state Board of Governors.

Therefore, the Governor could not go into each university's budget, cut funding from programs he did not like, and shift it to STEM programs. What the Governor and his allies in the legislature *did* have the power to accomplish was favor STEM programs in the appropriation of state funds, and cut liberal arts programs which received state funding to make room for new STEM-centered projects in Florida's 2012 budget. The Governor's budget did exactly that. It cut items such as writing labs at the University of Central Florida, arts programs at Polk State College, and funding for the liberal arts-centered New College in Sarasota. New projects proposed in the Governor's budget included over 3 million dollars for a national high magnetic field lab and 4.5 million dollars for a medical school at Florida International University. In addition, HB 7135 was passed, which aimed to steer secondary students into STEM-related majors and required universities to report numerous statistics to the state, including percentage of STEM graduates, the percentage change of STEM graduates from year to year, and the number of patents and start-up businesses linked to the university (Florida House of Representatives, 2012).

Initial reports seem to indicate that the Governor's measures are bearing fruit for STEM careers in the state. Over 64,000 job listings for STEM-related careers were listed in September, 2012, an increase of over 5,000 from the previous September. Responding to these statistics, Rick Scott states, "Jobs in STEM-related fields are high skill positions that are helping to further grow and diversify our economy…seing an increase in the demand for these jobs shows that we're making significant strides and ensuring that Florida is a leader in growing industries" (Florida Governor's Office, 2012, October 16). Since Florida will be the subject of this dissertation study, this section was kept purposefully brief.

1.2.2 Georgia

Georgia was one of the first states to promote an integrated P-16 education policy structure. These goals were designed to provide a seamless system of public education, increase high school students' preparedness for college-level work, and, with the aid of the merit-based HOPE scholarship system, keep the most talented students in the state for college (Valenzia et al., 2005). This idea helps foster the implementation of policy through all levels of the state education system. STEM initiatives are actively promoted through programs such as the Carl D. Perkins Perkins-plus Reserve Fund Grants, STEM Institutes for 5 day teacher training programs, and STEM Festivals for high school students across the state, designed to encourage students to consider STEM fields (Georgia Department of Education, 2012).

While Georgia emphasizes funding for STEM projects, it does not appear to do so in direct competition with liberal arts disciplines. Funding is not taken directly from liberal arts programs to promote STEM ones, and while public discourse is pro-STEM, the blunt attacks on the liberal arts seen in Florida are not repeated in Georgia.

Rhetoric concerning STEM is positive in nature, and not connected to corresponding cuts in the liberal arts. Georgia high schools can apply for official "STEM School" designations from the state. Designation as a STEM School is awarded to high schools that show a dedication to STEM instruction as well as cutting-edge methodology used in the classroom (Georgia Department of Education, 2012). The kind of zero-sum comparisons between STEM and the liberal arts cannot be found on any part of the application for STEM School designation or in the requirements for becoming such a school.

Georgia also illustrates coordination between multiple groups of stakeholders in promoting STEM education. In June, 2012, the state hosted the Georgia Aerospace STEM

festival, which featured coordination between the Georgia Center of Innovation Aerospace, the Museum of Aviation, Robins Air Force Base, the Aerospace Workforce Alliance, the Georgia Department of Education and the Georgia NASA Educator resource center. The purpose of this festival was to help teachers "develop classroom instruction that integrated fundamental knowledge of science and mathematics with real world STEM applications" (Georgia Department of Education, 2012).

In policy and public statements, Georgia's stance toward STEM is positive in nature. Like in Florida, STEM is connected with jobs and real-world applicability. But unlike Florida, STEM is not portrayed as locked in a bitter battle with liberal arts disciplines like anthropology. Instead, arts and humanities are portrayed in positive terms. In recent press releases from Governor Nathan Deal's office, the study of arts and humanities has been tied to bolstering and advancing the state's culture. Governor Deal then ties culture, surprisingly, to business and innovation, using similar rhetoric as that used to defend STEM. A press release from the Governor's office states, "'Georgia's artistic and cultural enterprise facilitates our competitiveness in the global market and attracts new commerce,' said Deal. 'These individuals and organizations are building a distinct state identity while also helping make Georgia the No. 1 place to do business nationwide.'" (Georgia Department of Education, 2012). Deal's statements could be seen as a nod to the role of the arts in advancing the state's economic performance. Over the past several years, Georgia has become a popular setting for many films and television shows.

The Governor's statements and the actions taken by legislators in Georgia to support STEM initiatives demonstrate a balanced approach to STEM and liberal arts state policy. Governor Deal's rhetoric concerning the arts and humanities, which ties excellence in these

fields to cultural identity, innovation, and global economic competitiveness has support in the research concerning state higher education policy and demonstrates considerable political acumen. By supporting both STEM and the humanities, Governor Deal builds a broad coalition of allies to help him advance his goals to completion. Returning to the theoretical framework used to guide this analysis, Governor Deal can utilize successes in the state of Georgia in both STEM and the liberal arts for "credit claiming" and "advertising" (Mayhew, 2004; Mills, 2007; Ness, 2010a). The rhetoric in the "stories" expressed by Deal, to use language used by Mills (2007), can paint Governor Deal in the best possible light in countless different scenarios. If STEM businesses are created, Deal can claim his support of STEM education led to job creation. If the next great American novel comes out of a Georgian author's imagination, Deal can point to his "Governor's Arts and Humanities Awards" as a measure he's taken to foster such creative sparks. Finally, his policy is not creating enemies in the state's higher education institutions. Governor Deal's balanced approach might not result in jobs or economic growth; such a result is not guaranteed. However, it is allowing him to build a stronger and more diverse advocacy coalition, which will help him claim credit for a broader set of political and economic victories.

1.2.3: West Virginia

West Virginia was the 2nd state to adopt the educational model advocated by the Partnership for 21st Century Skills (West Virginia Department of Education, 2011), which promoted an interdisciplinary approach to education designed to ensure West Virginia students developed the abilities necessary to thrive in a globalized economy. This includes, among other goals, implementing a portfolio-centered, project-based approach to secondary education modeled on Finland's system. In 2006, with the passage of HB 4690, the state created the West Virginia

Consortium for Undergraduate Research and Engineering (CURE), which was designed to improve the quality of STEM-based instruction and research at higher education institutions statewide (Zinth, 2006). Like Georgia, the initiatives created by the state government and public statements by policy makers did not make STEM promotion a zero-sum game. While rhetoric heavily concentrated on promoting STEM, no public attacks were made on the liberal arts.

The first page of West Virginia's "Global 21 Initiative" contains a quote from Machiavelli: "Whoever wishes to foresee the future must consult the past; for human events ever resemble those of preceding times. This arises from the fact that they are produced by men who ever have been, and ever shall be, animated by the same passions, and thus they necessarily have the same results" (WVDE, 2011, p. i). This sentiment is echoed throughout this document. In defining itself, as the second state in the nation to join the Partnership for 21st Century Skills (P21), West Virginia advocated the need for promoting critical thinking skills and global competitiveness, items also forwarded by the Spellings Commission (U.S. Department of Education, 2006). In promoting this 21st Century Skills vision, the WVDE stated:

> 21st century learning is built on world-class curriculum standards for both content and skills. It graduates students who have mastered core content while also cultivating an understanding of global awareness; financial, economic and business literacy; civic literacy; and personal health and wellness. It features the importance of 21st century skills, focusing on the development of (1) Information and Communication Processing Skills (2) Thinking and Problem-Solving Skills, and (3) Personal and Workplace Productivity Skills. (West Virginia Department of Education, 2011, pp. 8-9)

The state of West Virginia also demonstrates a strong commitment to STEM education, as evidenced by the CURE consortium, which promotes better STEM research and instruction at state higher education institutions. But its vision for a 21st Century education also includes a prominent place for skills learned in liberal arts disciplines. West Virginia's approach for combining STEM and the liberal arts to suit the needs for a globalized economy provides a model that could potentially be used outside its borders.

In addition to taking an interdisciplinary approach connecting K-12 instruction to higher education, West Virginia has taken measures which strongly emphasize STEM initiatives in vocational and technical education. The actions of Governor Earl Ray Tomblin illustrate STEM support in these fields with collaboration from the job creators in private industry who have an eye on workforce development. The rhetoric supporting a strong advocacy coalition with a clear, united goal is evident in the following press release from the Governor's office:

> Gov. Earl Ray Tomblin, joined by Chancellor Skidmore of the Community and Technical College System of West Virginia and Robert Orndorff of Dominion Power, today presented West Virginia Northern Community College (WVNCC) and West Virginia University at Parkersburg (WVU-P) $50,000 each from the Dominion Foundation.
>
> As new extraction methods are used in the Marcellus Shale region, advanced welding techniques and an extensive understanding of both mechanical and electrical technology will be necessary," said Gov. Tomblin. "In an effort to meet this demand for highly technical professionals, these grants will be used for cutting edge simulators which will allow students to learn in a safe classroom environment." (State of West Virginia, Office of the Governor, 2012)

Governor Tomblin stood side by side with members of two other stakeholder groups: Chancellor Skidmore and Mr. Orndorff of Dominion Power. WVU-P will use the funds to create an advanced, technical welding simulator for their students, and WVNCC will install a hydraulics simulator. Both programs have direct connections to needed training for jobs available in the state of West Virginia.

Chancellor Skidmore stated, "The development of the Marcellus Shale, along with other economic development efforts, hinge on increasing the number of technically proficient college graduates in West Virginia…These generous gifts by the Dominion Foundation provide a marketable-classroom experience for students" (West Virginia Department of Education, 2012).

Representatives of policymakers, higher education, and industry supported the single goal of workforce development. Dominion Power provided the funding, WVNCC and WVU-P provided the means of education with their physical plant and academic programs, and Governor Tomblin represented the political capital and support for the entire endeavor. Should these

measures lead to more jobs and a better trained workforce, each of the three groups can claim credit and benefit from the collaboration. It is not a zero-sum game, in which success for one group comes at the direct expense of another. West Virginia represents a balanced program in which interdisciplinary study at the secondary level is used as a basis for STEM, vocational, and technical support at the tertiary level. Such an approach seems to follow the advice of Lind (2006) who advocated using liberal arts in the German *Gymnasium*-style approach, in which a broad, liberal arts education in grades 7-12 is a prerequisite for a more exclusive focus on the major field of study at the university.

1.2.4: State Vignettes Summary

These short vignettes demonstrate *both/and* alternatives to the zero-sum strategies advocated by Governor Scott. These demonstrate places of potential policy convergence at the state level. The snapshots illustrate how coalitions can be built between policy actors, higher education representatives, and private industry leaders. These coalitions can advance policies that are beneficial for multiple stakeholders, in a manner that does not diminish non-STEM subjects. Georgia and West Virginia show alternative narratives to the Governor Scott's story, and demonstrate that these narratives produce successful STEM policy for their constituents.

2.0 REVIEW OF THE LITERATURE

I centered my review of the literature on three distinct aspects. First, I explored definitions and characterization of the liberal arts. It is a broad term. Liberal arts formed the basis of classical, Western education. Their story is complex. Many higher education leaders are confused by the animosity toward liberal arts subjects, especially since most universities, including my own, place STEM and liberal arts disciplines under the same organizational roof, utilizing management formations like the College of Liberal Arts and Sciences (CLAS). To properly research STEM and the liberal arts, I first had to determine how they were defined.

I examined the historical basis of STEM in the public sphere, and the evolution of STEM perception. STEM can be succinctly summarized by labeling each of the terms in its acronym, but the evolution of that acronym, and what is included within it, is a more complicated story. Arguments for more utilitarian courses of study at universities are not limited to the last half century. Items like the Yale Report of 1828 defended the classical curriculum of the liberal arts as viable against contemporary opponents who sought more practical job training on campus. However, aptitude in modernly characterized STEM disciplines has been seen by policy actors as essential for both economic security and national security. In examining historical characterizations of STEM, I was able to draw rhetorical parallels between Presidents Eisenhower and Obama. Each framed the necessity for promoting STEM as a race-particularly, a race the United States was losing. The metaphors I learned from studying the history of STEM

in the public sphere helped me glean an understanding of its popularity with modern policy makers. Additionally, I examined the evolving nature of STEM's relationship with the liberal arts. In Florida particularly, policy makers transitioned from not only promoting STEM fields, but also placing STEM disciplines in direct conflict against the liberal arts.

The STEM-centric ideas of policy makers like Governor Scott raise important questions about autonomy and accountability of public universities. Therefore, I explored these questions in detail in my review of the literature. How accountable to government oversight should public universities be? How does accountability impact the treasured tradition of university autonomy? In my exploration of the mission and purpose of American public universities, I discovered potential sources of contention between university and government leaders. Former University of Florida president Charles Young criticized policy makers like Governor Scott, stating, "It's sheer and utter nonsense. They have a total lack of understanding about what a university is and what universities do." (Anderson, 2011, October 10, p. 1). It is understandable why Dr. Young and Governor Scott disagree. They have fundamental disagreements about the purpose of university study. Policy makers tend to focus on the modern mission of universities to provide regional economic impact and drive the growth of commerce and industry, while university leaders prefer to concentrate on the traditional university pillars of teaching and service. The mission of research is a battleground, as universities and government policy actors wrangle about whether to search for so-called "Capital K" knowledge, that is, knowledge for knowledge's sake, or focus research efforts on things that are economically viable.

2.1 DEFINITIONS AND DIRECTIONS OF THE LIBERAL ARTS

Colleges of the liberal arts and sciences are often the largest on campus at universities across the country (Jennings, 2014). The term "liberal arts" is used broadly by policy makers, university representatives, and students. What it actually means is decidedly ambiguous. There are no singular definitions for the term and no mandated, standardized liberal arts curriculum (Bourke, Bray & Horton, 2009; Miller, 1975; Nesturuk, 2005; Starr, 1965). The roots of liberal arts education can be seen in the writings of Roman and Greek orators and philosophers, but defining *precisely* what constitutes the liberal arts is more difficult. There is a myriad of major courses of study at higher education institutions designated as liberal arts colleges. Even a half century ago, Starr (1965), discussing liberal arts curricula, notes, "Included were courses ranging from Greek to warfare, cabinet making, technical drawing, industrial chemistry, instrumental analysis, Gregorian chant, navigation, forestry, engineering, agriculture, astronautics, and aeronautics" (p. 227).

Rather than a strictly defined curriculum, the liberal arts were developed to provide mental acumen and flexibility. At the conclusion of studies, the liberally educated student should have the ability to look upon the surrounding world with a critical eye (Bourke et al., 2009; Conrad, 2014; Starr, 1965). From a classical perspective, the liberal arts student should pursue rigorous academic study in the pursuit of intellectual freedom. Constraints to this freedom could inhibit intellectual growth. Starr (1965), quoting Aristotle, notes that liberal education could be defined as "free men engaged in inquiry that is free and unhampered" (p.226). Knott (1975) notes, "Liberal education is here conceived as a process that develops specific human abilities rather than as a set of studies…The chief goal and end result of that process is the liberation of an individual's intelligence (pp. 27-28). Stewart (2004) was tasked

by Seattle Pacific University with teaching a university freshman seminar course that encompassed liberal arts principles. In his course planning, he centered his reflection on John Henry Cardinal Newman's 1852 work, *The Idea of a University*. Newman's words echo those of Aristotle, although Newman is slightly more voluble with his description. Quoting Newman, Stewart (2004) states, "the liberally educated person has…learned to think and to reason and to compare and to discriminate and to analyze…has refined his taste, and formed his judgment, and sharpened his mental vision" (p. 70). This type of inquisitive nature in liberal education can be found in the writings of Seneca the Younger, over a millennium before Cardinal Newman existed. Conrad (2014) notes,

> Seneca the Younger, in the first Century AD, wrote that 'liberal studies' had nothing to do with the Greek curriculum of general education, but were concerned with the cultivation of virtue…the study of liberal arts subjects was only a preparation for a truly liberal education: that which gives a man his freedom by setting the soul on its way towards virtue, the ultimate aim of which is to question the nature of the universe. (p. 51)

In making any attempt to define the liberal arts, the spirit of liberal education should be placed front and center. The process is as important as the planning, if not more so. Graduates of liberal arts programs develop a spirit of inquiry that allow them to critically examine the world around them. They have the flexibility to undertake many different career paths. Historically, an educated man was *expected* to possess these types of talents. Therefore, as the liberal arts become more defined in modern American higher education, it is important to recognize the importance of process. *How* the liberal arts are studied might be more significant than the precise subject matter.

That particular subject matter, despite the present level of variance, once centered on a fairly consistent set of courses: The *Trivium* and the *Quadrivium* (Conrad, 2014; Jennings, 2014; Knott, 1975). The Trivium was composed of grammar, logic, and rhetoric. Arithmetic,

geometry, astronomy, and music comprised the Quadrivium. Conrad (2014) notes that the formal classification of these seven liberal arts first emerged around the 5th century in *De nuptils Philologiae et Mercurii*, and describes how the subjects appeared as handmaidens at the wedding of Philology and Mercury. This wedding brought the handmaidens together as one and transformed the bride and groom into stars. Much like modern bridesmaids, the handmaidens of the liberal arts grew slowly apart and became less unified as an integrated curriculum. They began to associate with new friends-professional fields and applied sciences. The combination of the original arts with new scientific fields and disciplines during the 19th and 20th centuries created the curriculum structure we see today in modern CLAS configurations.

Like their 21st century counterparts, education critics in the early 19th century called for a greater concentration on professional courses of study that were more relevant to the economic needs of the time. Critics called for universities to train students for careers and to stop teaching antiquated subjects like ancient Greek. The *Yale Report of 1828* reaffirmed American higher education's embrace of the Trivium and Quadrivium, and stated in no uncertain terms that the purpose of higher education was not practical training for careers. Bourke et al. (2009) cite the *Yale Report* as the "locomotive that initially drove the core curriculum debate with its calls for focusing on the true purpose of a higher education: the furnishing of the mind" (p. 220). In defending the traditional model of education, with Trivium and Quadrivium at its center, the faculty of Yale College (1828) state,

> From different quarters we have heard the suggestion, that our colleges must be new-modelled; that they are not adapted to the spirit and wants of the age; that they will soon be deserted, unless they are better accommodated to the business character of the nation. At this point we have an important bearing upon the question immediately before the committee, we would ask their indulgence, while we attempt to explain, at some length, the nature and object of the present plan of education at college…the two great points to be gained in intellectual culture, are the *discipline* and *furniture* of the mind; expanding its powers, and storing it with knowledge. (p. 4) [emphasis authors']

The *Yale Report* was widely celebrated by traditionalists who objected to the increasing intrusion of professional fields and applied sciences into university mission and management. The report was a ringing rhetorical triumph and persuasively defended the classical curriculum against contemporary critics. The triumph, however, was short-lived. Near the turn of the 20th century, other schools, such as Harvard and the University of Michigan, began promoting more electives and applied fields of study in their curricula, while Yale steadfastly defended the old ways (Thelin, 2011). Yale was one of the final holdouts for a classical, fully prescribed Trivium/Quadrivium education. It also fell, eventually, to the 'new-modelled' spirit of the times. Liberal arts education evolved in the late 19th and early 20th century to a model most students would recognize today-general education requirements within a broader major course of study.

2.1.1: Liberal Arts and General Education

General education requirements are well-known to undergraduate students at universities nationwide. They typically involve undertaking a series of courses within the first 1-2 years of an undergraduate degree program in different categories like writing, humanities, biological sciences, and international studies. By and large, students choose their courses in a "cafeteria style" manner, meaning they pick introductory-level classes in order to fulfill their general education requirements (Pennsylvania State University, 2012). This represents a shift from the fully prescribed days of the Trivium and Quadrivium. General education has shifted from these centralized, prescribed curriculum requirements to *distribution* requirements, which allow students to choose elective courses in an array of categories (Bourke et al., 2009). Bourke et al. (2009) demonstrate that in most doctoral-granting institutions as well as liberal arts colleges, distribution requirements are used rather than a prescribed set of courses.

Placing the spirit and curriculum of the liberal arts within general education requirements can be a challenging task for universities. Jennings (2014) notes that liberal arts disciplines need greater clarity in both defining what they are as well as what outcomes a graduate with a degree in the field can expect. The role of general education programs has developed over time to complement major courses of study, and to ensure that breadth coincides with depth (Bourke, et al., 2009, p. 223). The level of depth has been criticized recently. Rhodes (2001) notes the weakness of present general education programs in promoting the study of liberal arts disciplines-courses that are essential in developing the critical thinking skills necessary to flourish in the Information Age. Rhodes (2001) states, "It is possible to graduate from 78% of the nation's colleges and universities without studying the history of Western civilization; 37%; without studying any history at all; 77% without studying a foreign language; and 33% without studying natural or physical sciences" (p. 90). Dr. Rhodes broaches an intriguing issue. How can liberal arts curricula retain rigor while still allowing students to elect their own schedule of courses? Returning to the Trivium and Quadrivium and turning the clock back to the 1828 *Yale Report* does not seem to be a viable option. St. John's College, with campuses in Annapolis and Santa Fe, has a fully prescribed liberal arts course of study, with a curriculum adapted from the classical model of the Trivium and Quadrivium. St. John's is the exception in today's education climate, rather than the rule. Students demand choice in their curriculum (Pennsylvania State University, 2012). How can liberal arts colleges, along with liberal arts departments at doctorate-granting institutions, adapt within the changing circumstances of general education? Bourke et al. (2009) state, "The days of a list of required course and sequences outside the major are waning…continual review of the status of general education will need to be undertaken" (p.

236). The literature offers many options that allow liberal arts disciplines to thrive within the context of general education.

Nesteruk (2005) suggests proposing an optional common curriculum at liberal arts colleges, in which integrated *sets* of classes could be chosen by students, instead of individual classes from the metaphorical cafeteria line. Nesteruk (2005) states, "Optional common curricula hold the promise of providing a different kind of general education at liberal arts colleges. It is a kind of general education that neither insists on a single common experience nor accepts the disconnection of individual experiences" (p. 272). That coincides with the integrated vision Rhodes (2001) has for general education. Rhodes (2001) forwards a vision in which science and humanities can, and should, coexist in a curriculum. This view supports providing a place for liberal arts in *all* disciplines, to develop abstract skills such as moral responsibility and democratic virtue alongside practical skills such as technical writing and critical thinking. Rhodes (2001) states, "A young man or woman will become a more humane physician after some exposure to Shakespeare and Dostoyevsky. The time to reflect on our mortality is not in the operating room, but in the classroom" (p. 135). Integration of the liberal arts within clusters or themes in modified general education programs is already occurring at universities from Stanford to the University of Ohio, often within living-learning communities, which place students in residence halls based on their selected cluster. Such arrangements could lead to the reform of general education programs, and change the manner in which liberal arts courses are designed.

General education programs at state universities have historically been tasked with the purpose of instilling critical reading, writing, and thinking skills in students, along with forging intellectual curiosity through the study of a broad swath of topics. Regardless of the major

students select, general education is designed to provide the prose literacy skills advocated by the Spellings Commission's (2006) report. However, recent literature has demonstrated that these "gen ed." programs are not fulfilling this task, and are instead seen as superfluous courses to complete before engaging in one's major course of study. A Penn State report on general education (2012) is especially critical. The Penn State report (2012) notes,

> Often, general education curriculum is both too broad and too narrow. It consists of a broad menu of lower division introductory courses that meander across wide swaths of classes. It is too narrow in that general education courses often correspond to contracted faculty research interests or are taught as elementary disciplinary classes rather than as integrative challenges that inspire students to think across the disciplines and professions. Additionally, general education curricula usually have few and often no commonly required courses. (p. 5)

Penn State recommends reforming general education into "bundles" of courses that connect common themes, giving students the choice of themes, and identifying that selection on university transcripts. Stanford University was one of the first in the nation to move general education requirements from cafeteria-style into unified themes such as "Thinking Matters", "Ways of Thinking", and "Writing and Rhetoric" (Stanford University, 2014). To satisfy the "Ways of Thinking" requirement, students can take program bundles such as "Immersion in the Arts: Living in Culture", "Science in the Making Integrated Learning Environment", and "Structured Liberal Education" (Stanford University, 2014). These programs can be undertaken in living-learning communities, in which students live with colleagues in the same program. This is a course of action supported by the University of California's "Report on General Education in the 21st Century" (Pennsylvania State University, 2012, pp. 6-7). Lurz (2012), used as a reference in Penn State's report, advocates cutting general education requirements in half and requiring students to select a minor outside their major field of study, in order to promote intellectual flexibility and depth of study. Lurz (2012) suggests that STEM and Business majors

select a liberal arts minor, and liberal arts majors select a STEM or business minor, and opines that STEM and the liberal arts are not mutually exclusive.

Policy makers should explore avenues to advance both STEM and liberal arts programs in higher education. This measure could produce graduates with both the technical skills provided by STEM, as well as the flexibility and advanced literacy skills provided by the liberal arts. The literature supports this stance, as well as the actions of most stakeholders associated with STEM and liberal arts state government policy. St. Olaf College President David Anderson defends liberal arts education for providing flexibility and preparation for a multitude of different careers. Anderson states, "If St. Olaf had given me an education that prepared me exactly for 1974…I would now be unemployed and irrelevant" (Gonnerman, 2012, March 20, p. 1).

These arrangements could help stem the tide of universities cutting general education programs in the name of greater concentration on major courses of study. Direct cuts to general education could have the effect of shrinking liberal arts departments, which rely on institutional general education requirements to promote student enrollment (Jennings, 2014). Faced with these cuts, along with external pressure from policy makers interested in job creation, liberal arts colleges are faced with difficult choices. While creative options such as general education clusters are available, Bourke et al. (2009) note that colleges and universities are increasingly willing to change or subvert their mission in order to "climb the ladder" of Carnegie Classification and perceived prestige (p. 232). Presenting one or two choices for liberal arts colleges trying to survive in a 21st century higher education climate would be disingenuous. Small colleges do not have to revert to the Trivium or subvert their missions to survive. There are a number of creative options that liberal arts departments and colleges can use to succeed alongside applied disciplines like STEM fields and business.

2.1.2: Liberal Arts in the 21st Century- Folklore & Facebook?

The liberal arts and applied sciences do not have to stand in direct competition. Liberal arts study has been touted as a means of freeing the mind and developing a scholarly identity that seeks greater understanding of the surrounding world. The nature and fundamental definitions of the liberal arts make it an ideal vehicle for the exploration of new technologies and subject areas. Scholarly literature illustrates how liberal arts colleges and departments can take on new roles in areas ranging from marketing to social media.

Academic scholars and policy makers were initially skeptical about the influence of Facebook. Its impact is no longer doubted. Moore (2012) states, "Now that there are more people using Facebook than there are people living in North America, it is impossible *not* to believe that something very significant is happening to the world" (p. 264). The ascendance of social media technology has confronted liberal arts instructors with the challenge of incorporating it into the curriculum. Given its roots in classical education models like the Trivium and Quadrivium, it might appear to the casual onlooker that liberal arts disciplines would not be effective tools for addressing 21st century issues like social media. However, the liberal arts are historically adept at developing identity and utilizing critical thinking capacity. This makes liberal arts study an extremely relevant means to investigate social media applications. Perhaps the nature of the liberal arts makes the exploration of social media an obligation rather than a possibility. Moore (2012) argues,

> If Facebook is indeed both a performance space and a new kind of politics, then the liberal arts are the natural locus for investigating it. Insofar as the liberal arts are concerned with modes of human expression, with cultural and ideological frameworks, and with power and its object, then Facebook and other social communications technologies are suitable subjects for serious study in liberal arts classrooms. (p. 272)

Formal folklore scholarship, which has been marginalized in recent years, could be a natural vehicle for incorporating social media within the liberal arts. Recently, many folklore

scholars have made ordinary people the focus of their studies, rather than far-flung exotic peoples and places. Brodie (2012) notes,

> …the folk were once conceived as that stratum of society with whom the academy, the middle classes, and the bourgeois had at best an ambiguous relationship. They were rustic, quaint, unlettered, proud, simply, pastoral: a host of adjectives that could be simultaneously celebratory and derisive…but it was observed that not only did resource-based workers such as foresters and cowboys have stories....but so did urban and more modern ones…Folklore, whether one wishes to refer to it by that name or not, occurs in all groups. (p. 234)

Discussion of folklore in the changing technology media of the 21st century has value in a liberal arts curriculum and a modern academic environment. Facebook has influenced the way users construct their identity, and is frequently a forum for self-promotion (Moore, 2012). As folklore scholarship explores ordinary people alongside exotic tribes, social media could be a natural ally. Sims and Stephens (2011) note, "Combining discussions of physical and social contexts with analyses…folklorists look deeply into the interconnections among communal, social, and political forces" (p. 198). Social media has significantly impacted the ways and means people communicate. Folklore, which explores communication patterns, provides an interesting avenue to explore this new technology. Since liberal arts have historically been centered on process and the creation of a scholarly identity, both folklore and social media, and folklore *within* social media, have a place under this broad tent. The study of people is conducive to the use of social media, and the use of social media is becoming more central to the formation of identity, especially in younger age groups. The liberal arts could benefit through stronger connection to former folklore scholarship. Overcoming the barriers of marginalization and perceived lack of rigor will be important tasks for the study of folklore within the liberal arts in a 21st century academic environment (Brodie, 2012).

My dissertation explores the perception that policy makers have of STEM and liberal arts disciplines. The liberal arts are not often touted as effective engines for driving economic

growth and promoting innovation and creativity in American businesses. However, many scholars challenge that generalization. It might be assumed that prestigious technology firms like Cisco and Siemens would demand advanced content knowledge from students and new employees. After interviewing several executives, Wagner (2010) demonstrates that top business managers were more interested in the ability of new hires to ask the right questions. So-called "soft skills" such as writing effectively, working in teams, and accessing the right sources of information were valued more than advanced knowledge of specific, narrowly-defined content areas. In short, content is less important than process. The liberal arts, which treasure intellectual process more than rigidly defined curricula, seem well-positioned to take on the responsibility of training graduates to develop the skills sought by the captains of American business and industry.

Entrepreneurship, as a creative act, could have more in common with liberal arts disciplines than with market economics and business degree programs (Rennie, 2008). Liberal arts colleges and departments have the opportunity to integrate entrepreneurship into degree programs in order to support innovation and new business creation. Entrepreneurship itself is non-ideological, and would benefit from practices that best fit its creative needs, regardless of labels (Rennie, 2008). Such a combination of curricula could also be beneficial in promoting business ethics. An exploration of the liberal arts within a business degree program promotes investigation into the role corporations play in promoting the public good while earning a private profit (Stewart, 2004).

By introducing marketing, entrepreneurship, and social media courses into the liberal arts curriculum, liberal arts colleges and departments could potentially combine the perceived relevance of applied fields with the reflection and depth of classical liberal education. While

these business themes might seem to be antithetical to the soul of the liberal arts, perhaps they can be reconciled. Petkus (2007) postulates that marketing coursework could be added to general education requirements, and suggests that such a move could benefit liberal arts outcomes for graduates. Marketing is a fundamental necessity in the 21st century global marketplace, and might be conducive to liberal arts study. Petkus (2007) also suggests that marketing is worthy of study as a scholarly subject within the liberal arts, stating, "The comprehensive pedagogy in marketing…the process by which human needs and wants are satisfied-imparts outcomes that enhance and extend a liberal arts education" (p. 40). Oral and written communications skills are important outcomes in both liberal arts as well as marketing curricula, and these shared outcomes could be used to develop marketing as a *component* of the liberal arts. The addition of entrepreneurship and marketing to liberal arts curricula could satisfy policy makers who have a negative perception of liberal arts study. Rennie (2008) notes,

> Liberal arts colleges can make a significant contribution to the future well-being of a global society by cultivating the ingenuity of its students through social entrepreneurship, political entrepreneurship, and economic entrepreneurship. Institutions of higher education recognize the value of entrepreneurship, and many are now mandated by their respective states to become the engines of the knowledge economy, stimulating the economy by commercializing the technology and creative ideas coming from their faculty, staff, and students (pp. 197-198).

It is possible that policy makers could change their perceptions of the liberal arts as a means of promoting innovation in the economy. Adding elements of entrepreneurship and marketing to liberal arts curricula could be beneficial for colleges and universities. Such measures could improve the perception of liberal arts disciplines as a viable choice in both personal and public economics. Additionally, the flexible and innovative nature of liberal arts disciplines make them a complementary partner to modern principles of business.

2.1.3: Liberal Arts Summary

These arguments for stronger inclusion of business and technology elements in the liberal arts would likely not satisfy true believers in a liberal arts curriculum centered on the Trivium and Quadrivium of classical antiquity. Faculty members who wrote the *Yale Report* of 1828 might call such claims to be simultaneously "new-modelled" and wrong-headed, and too focused on forcing higher education to be "better accommodated to the business character of the nation" (Yale College, 1828, p. 4). Such attitudes might be too reactionary in the complicated and crowded higher education environment of the 21st century. Policy makers might claim that the liberal arts cannot stand on the same platform as STEM or business fields in the economic climate of a globalized world. Liberal arts traditionalists might claim that *any* intrusion of the applied sciences into the curriculum would pollute and degrade the purity of instruction. Both claims are false. Higher education cannot be funneled into only two camps-one of ivory tower liberal arts elitism and one of job creation and real-world application.

The realities of liberal arts curricula, general education programs, and academic management are much more complicated. The purpose of the liberal arts has historically been the freeing of the mind and promotion of intellectual inquiry. However, liberal arts colleges are also eager to climb the ladder of Carnegie Classifications and gain more prestige. Additionally, they receive pressure from state government agents to create more jobs. These colleges also must listen to their own students, who worry about having the skills and credentials to obtain gainful employment after graduation. Some liberal arts colleges will keep close to the spirit of the classical curriculum used by traditionalists. Others will incorporate more entrepreneurial components into their degree programs. Some will use general education of the liberal arts as exploratory "cafeteria-style" arrangements, while others cluster them into themes. The reality is

that most will use some combination of all the aspects of the liberal arts discussed in the literature. How the liberal arts are *managed* is just as complicated to define as the liberal arts themselves. Despite these complexities, it is plain to see that the nature of the liberal arts does not place them in direct competition with more applied fields like engineering or accounting. Innumerable possibilities exist for collaboration and combination of curricula. The myriad of options associated with management of liberal arts departments and colleges will be useful for academic management professionals who are simultaneously tasked with serving students, honoring tradition, promoting civic engagement, and providing economic impact to the surrounding community.

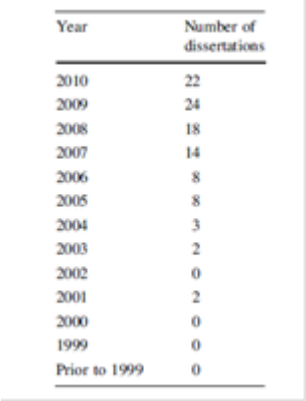
2.2 STEM-MORE THAN JUST AN ACRONYM

2.2.1 Introduction

STEM education policy is often portrayed as an essential mechanism for global competitiveness in a 21st century world (Daugherty, 2013; Gasiewski, Eagen, Garcia, Hurtado, & Chang, 2012; Kirwan & Streckfus, 2009; National Science and Technology Council, 2013; Wang, 2013). Even though only four components make up the acronym, determining what academic subjects can be classified as STEM remains a subject of debate. While engineering, technology, and mathematics are clearly regarded as STEM disciplines, not all sciences are labeled as STEM (Daugherty, 2013). This can create confusion and conflate policy issues concerning STEM education. The acronym itself is a recent invention. It was changed from SMET at the turn of the millennium, since the previous term sounded too much like ‘smut’ (Banning & Folkestad,

2012). No matter what it is called, it is obvious that STEM has been a hot topic in recent years, and is seen as a cure for economic and academic problems alike.

Literature reviews discussing STEM policy often begin with the Cold War-era Space Race and the U.S. government's response to the Soviet Union's successful launch of *Sputnik*. The urgent rhetoric of national interest, global competitiveness, and falling behind rivals can be seen in recent policy initiatives such as No Child Left Behind and Race to the Top, just as it was utilized in the era of NASA's Mercury and Gemini programs. Despite this commonality through decades of history, promotion of STEM education is often portrayed as a recent innovation designed for a 21st century world. Banning & Folkestad (2012) examined and categorized dissertation abstracts published over the last 20 years. From 2008-2010, the authors found 64 dissertations centered on STEM in the public sphere.



Year	Number of dissertations
2010	22
2009	24
2008	18
2007	14
2006	8
2005	8
2004	3
2003	2
2002	0
2001	2
2000	0
1999	0
Prior to 1999	0

Figure 1: From Banning & Folkestad (2012)

Between 1999 and 2002, the authors (2012) found a total of 2. There is no question that STEM is a hot topic in policy and education spheres across the globe. Whether it is a modern one that arose to fit the demands of a 21st century world, however, is a matter of debate.

The promotion of STEM at the federal and state levels precedes *Sputnik.* It precedes even the Constitution of the United States. The necessity for innovation through education and technological training can be seen in the writings of Jefferson following the Revolution. It can be seen in the federal government's concentration on modern transportation logistics during the

Civil War (Goldstein, Chesky, Luther, Wolfmeyer, & Todd, 2013). It is evident in the arms race that occurred in Europe at the beginning of the 20th century. The need for innovation for security and economic growth can even be found in the writings of Niccolo Machiavelli (trans. Bull, 1961) and records of King Alfred I of England, who reigned from 871-899 CE (Yorke, 1999).

The issue with constructing a narrative of STEM in the public sphere, therefore, is a question of scope. From Alfred to Elizabeth, Lincoln to Obama, and *Sputnik* to *Mir*, STEM promotion has been portrayed as a necessary means of ensuring national military and economic security. This section is centered on exploring the language and issues discussed in the academy as well as the corridors of power in state and federal government structures. How is STEM education portrayed? How is STEM used by policy makers? What are the dominant narratives concerning STEM policy?

2.2.2 STEM education for economic impact and national security

Promotion of the STEM disciplines of science, technology, engineering, and mathematics has long been seen as a means of ensuring security. One can point at numerous historical figures as examples of this argument, from Sun Tzu to Saladin; from Alfred's struggles with Viking invaders to the longbows of Agincourt. Yorke (1999), discussing Alfred (reign 871-999 CE), notes, "He became convinced that those in authority in church or state could not act justly or effectively without the 'wisdom' acquired through study, and set up schools to ensure that future generations of priests and secular administers would be better trained" (p. 1). Niccolo Machiavelli in the 16th century advised rulers to give tax incentives to guilds and businesses promoting innovation using terms that could just as easily have been written in this century, noting,

> A prince should also show his esteem for talent, actively encouraging able men, and honoring those who excel in their profession…one man should not be afraid of improving his possessions, lest they be taken away from him, or another deterred by high taxes from starting a new business. Rather, the prince should be ready to reward men who want to do these things and anyone who endeavors in any way to increase the prosperity of his city or his state. (trans Bull, 1961, p. 74).

An issue facing policy makers seeking to advance the cause of their own princedoms is the fact that technological innovation cannot be easily *predicted*. Camouflage was not created by a military research lab or government task force. Its innovation can be traced to the writings and theories of American painter Abbot Thayer in the late 1800s, who noted how patterns and countershading could mask shapes (Daugherty, 2013). Implementation of such ideas did not occur in a linear fashion. Colonel Theodore Roosevelt's "Rough Riders" charged up San Juan Hill during the Spanish-American War wearing overt blue uniforms, and the first American Marines who arrived in France with the American Expeditionary Force during the First World War wore plain khaki. Thayer's ideas, in fact, were mocked by President Theodore Roosevelt (Daugherty, 2013). Close to a century later, Apple's iPod was not an engineering improvement on Sony's Walkman, but rather emerged through Steve Jobs' shrewd understanding of the living patterns and needs of consumers (Nelson, 2007). This phenomenon is even evident in popular culture. The film *Back to the Future II* (1989) predicted the wide-scale use of flying cars and hoverboards by the year 2015. How were the makers of this film supposed to know that the major innovations of the early 21st century would be made in *information and communication* technology, rather than transportation? Telephones of 2016 look much different than 1985, while commercial airliners and city buses look somewhat similar to the mid-1980s.

Policy makers, on the other hand, prefer to construct a linear relationship that progresses directly from state STEM investment to high-tech jobs and economic innovation (Gittell & Sedgley, 2000). The rationale for making such investments in STEM education is often an

urgent narrative of falling behind competitors. In a report made to Maryland Governor Martin O'Malley, the Governor's STEM Task Force writes, "Competing states outperform us in terms of STEM graduates, STEM workforce development, and STEM-based economic development. If present trends continue, our competitors will overtake us. For Maryland, standing still is falling behind" (Kirwan & Streckfus, 2009, p. 1). The recommended balm for this malaise is tripling the number of STEM K-12 teachers and increasing the number of STEM college graduates by 40% (Kirwan & Streckfus, 2009). New Jersey Governor Chris Christie, lauding the economic impact created by the Stevens Institute of Technology, noted that New Jersey would have to fill 260,000 new STEM jobs by 2018 (Stevens Institute of Technology, 2013, October 4). The rhetoric of Maryland and New Jersey is similar to the language from President Obama's National Committee on STEM education, which states, "Evidence indicates the current educational pathways are not leading to a sufficiently large and well-trained STEM workforce" (National Science and Technology Council, 2013, p. vi). Similar to Maryland, the solution to the problem is more math and science teachers. Similar to New Jersey, the President's council also calls for more STEM college graduates. Together, the federal commission called for 100,000 new science teachers and 1 million additional STEM graduates, which would require a 34% increase in the number of STEM degrees presently awarded (National Science and Technology Council, 2013, p. 27). This rhetoric is reminiscent of statements made by the U.S. government about the Soviet Union during the *Sputnik* era. In 2013, the competition is China, rather than Russia. The federal report notes that only 19% of U.S. degrees are awarded in STEM fields, while over 50% of first degrees awarded in China are in these disciplines (National Science and Technology Council, 2013).

This represents language similar to the National Defense Education Act of 1958, which aimed to increase the number of students entering science and mathematics careers in the name of national security against Soviet competition. A key difference between the STEM report presented to President Obama in 2013 and the act signed by President Eisenhower in 1958 is that the NDEA also advocates for increasing the numbers of foreign language students and teachers (United States Congress, 1958). Some scholars point to this famous initiative as a model for modern-day STEM policy, and advocate for a new congressional act to promote STEM based on the NDEA, with loan forgiveness and tax incentives for STEM graduates, along with training and resources for STEM professionals seeking to jump from private industry into public classrooms (Brett, 2007).

The rhetoric associated with both measures reflects intense competition. President Obama evoked military metaphors while advocating the need for more math and science teachers at the White House Science Fair in 2013. He states, "We need to make this a priority to train an army of new teachers in these [STEM] subject areas, and to make sure that all of us as a country are lifting up these subjects for the respect they deserve" (White House Press Secretary Office, 2013, April 22, p. 1). Compare this with language used in President Eisenhower's radio address, which became policy with the passage of the NDEA. Eisenhower (1957) states,

> I must say to you, in all gravity, that in spite of both the present overall strength and forward momentum of our defense, it is entirely possible that in the years ahead we could fall behind. I repeat: we could fall behind—unless we face up to certain pressing requirements and set out to meet them at once…According to my scientific friends, one of our greatest, and most glaring, deficiencies is the failure of us to give high enough priority to scientific education and to the place of science in our national life. (p. 1)

Eisenhower, Obama, Christie, O'Malley, and even Governor Scott all give similar justifications for STEM promotions, despite possessing different political ideologies. Governor Scott is more combative toward the liberal arts while promoting STEM, but uses similar

rationales in forwarding his positions. It is an approach common in the literature associated with STEM. I call it the **linear equation**. Invest X dollars in STEM, add time, and gain economic impact, tax revenues, and national security as a result. Falling behind rivals creates the need for the investment in the first place.

Such an approach might not accurately illustrate the reality of how innovation occurs. A study measuring economic impact of higher education estimated that 30% of the high-tech jobs created by MIT alumni were located in California, representing a larger share than all other states, including Massachusetts (Gittell & Sedgley, 2000). The relationship between STEM education and economic and national security might be more nuanced and multivariable in nature than the approach commonly taken by policy makers. The reality of how innovation works is perhaps more like the improvised nature of jazz music rather than a cause and effect linear relationship between state planning and economic growth (Goldstein et al., 2013). Such a philosophy would likely incorporate arts education into the STEM model, creating more of a STEAM (science, technology, engineering, arts, and mathematics) dynamic. Daugherty (2013) notes, "If one of the goals of STEM education is to increase innovation and creativity in the U.S., then it makes perfect sense to integrate artistic design, artistic expression, reflection, and a multi-sensory appeal in the curriculum" (p. 14). Given the previous investigation into liberal arts purposes and definitions, a STEAM model could be the best option for practical higher education administrators. It combines the most effective aspects of the liberal arts with the applied, practical strengths of STEM, while also adding artistic creativity through promotion of the fine arts. As university administrators look for ways to retain the character and traditions of their colleges while placing additional focus on STEM disciplines, a STEAM model in conjunction with themed general education clusters could hold promise.

The labor market for STEM is often portrayed, erroneously, as a homogenous monolith, without taking into consideration the vast differences between STEM industries and even firms within the same industry (Hira, 2010). Policy makers seeking to advance STEM causes frequently focus on a single variable, such as college graduates receiving degrees in STEM majors, or the number of skilled STEM immigrants granted work visas. This approach does not recognize the nature of STEM innovation as a system of multiple, interconnected variables. The massive increases in military budgets in the 1980s led to higher enrollment in engineering majors, demonstrating the indirect effect government spending can have on STEM enrollment (Hira, 2010). Investment in green, environmentally-friendly energy could have a similar impact on augmenting STEM enrollment (Hira, 2010, National Science and Technology Council, 2013). These scenarios illustrate that economic effects do not always follow their perceived causes.

Many STEM graduates outside of computer science and health fields actually have lower rates of self-employment (Benedict & Hoag, 2012), despite the portrayal of STEM as a vehicle for promoting start-up businesses in high-tech fields (Florida House of Representatives, 2012). However, STEM graduates are more likely to be employed in a large firm (Benedict & Hoag, 2012) and median salaries are much higher in STEM fields--$56,500 vs. $34,000 in all other occupations (Hira, 2010).

States are also focused on keeping STEM graduates in-state in order to gain innovation and jobs (Gittell & Sedgley, 2000; Kirwan & Strekfus, 2009; Stevens Institute of Technology, 2013, October 4). Kirwan & Strekfus (2009) illustrate this in the report of Maryland's STEM task force, noting,

> Maryland's production of STEM graduates has not kept pace with the increasing market demand for STEM workers. Just as important, Maryland suffers from a 'brain drain', one out of three Maryland high school graduates who go on to college leaves the state….to meet its STEM workforce needs, Maryland is forced to rely upon imported STEM talent" (pp. 18-19)

Merit-based scholarships, such as HOPE in Georgia and Bright Futures in Florida, are presented as a solution to this brain-drain problem (Gittell & Sedgley, 2000; Ness, 2010a; Zhang, 2011). There is some evidence that such an approach could work. Following implementation of merit-based scholarship programs, the state of Georgia saw the total number of STEM degrees increase by 5-7%, and Florida saw increases of 11-13% (Zhang, 2011). The picture is more complicated than the statistics represent on their own. The proportion of degrees awarded actually resulted in a decrease of STEM degrees in relation to non-STEM degrees in Florida, despite the increase in gross numbers of STEM diplomas (Zhang, 2011). Ness (2010a, 2010b) suggests that merit-based aid at the expense of need-based scholarships might result in a decrease of lower-income students gaining access to higher education, echoing concerns from Heller (2000; 2004). Middle and higher-income students who would likely go to college without a scholarship take advantage of merit-based offerings. If funding is taken away from need-based to provide access to merit-based ones, lower-income students of underrepresented minority groups might be disproportionately denied access (Heller, 2000; Ness, 2010a; Ness, 2010b). These groups are often mentioned as populations that need to be recruited into STEM fields (Kirwan & Strekfus, 2009; National Science and Technology Council, 2013; U.S. Department of Education, 2006). Determining the quantitative impact of merit-based scholarship programs and STEM investment is difficult to measure, and results might not be reliable. Denying lower-income minorities access to STEM fields in higher education to *potentially* create economic impact for the state seems counter-intuitive, especially considering research that shows such investment often crosses borders into other states in the region and even across the country (Gittell & Sedgley, 2000).

Immigration policy is also mentioned as an area of concentration to promote STEM education and innovation. Lowell (2010) notes that policy makers frequently advocate for higher numbers of visas for skilled STEM immigrants, echoing the findings of Hira (2010), who discussed the desire of business leaders to lobby for easing immigration restrictions. Actual immigration figures regarding STEM workers are robust, and criticism of immigration restrictions is misleading. Lowell (2010) notes,

> The foreign born have continued to contribute to the growth of the core-STEM labor force, even during the so-called jobless recession…the foreign born made up an initially very small but then increasing share of the change in the number of core-STEM workers decade to decade from 1950 to 2000, respectively calculated as 6%, 8%, 15%, 17%, and 29% of the changing number of workers…not only have the foreign born made up an ever increasing proportion of STEM employment, but they have actually picked up their contribution during the period of jobless recovery. (p. 1040)

Additionally, Lowell (2010) demonstrates that concerns about the internal K-12 pipeline into STEM fields might be overblown, illustrating that the U.S. produces the largest *gross* number of secondary highest quintile scores on international science barometers such as PISA. This illustrates a challenge for policy makers in higher education-methods of comparison are not always easily adaptable across state or national borders. If the narrative of policy makers is centered on the idea that the United States is falling behind its economic rivals, how can the country catch up if the referee does not know how to keep score? How can the U.S. catch up in the game of STEM education if no one can even agree who the referee is? Who determines the score?

These questions illustrate the difficulties in reducing the complex issues of innovation and education policy to positions on a line graph that might or might not be accurate. The complicated world of the 21st century is ill-suited for the Cold War metaphors of falling behind the opposing superpower. Losing the Space Race to the Soviets posed serious and direct consequences for the United States. If 21st century Germany or China increase the distance of

the perceived education gap, would dire consequences await for the United States? Perhaps, but perhaps not. Increases in German or Chinese funding for STEM disciplines could result in opportunities and partnerships for American entrepreneurs. The falling behind metaphor is problematic at best and downright false at worse. If STEM education is a game, there are more than two players. Victory for one party does not mean defeat for all others. Instead of a race, perhaps a metaphor of a gym would be more accurate. Sometimes nations work together, other times they work alone, and each country, or state, for that matter, can choose how they approach their workout program. Olympic powerlifting programs are not the only way to gain strength. Yoga, calisthenics, or a rigorous swimming regimen could also be appropriate options, depending on body type and physical strengths and weaknesses. The metaphors of footraces and zero-sum games are not accurate fits for STEM education.

2.2.3 STEM as a zero-sum game

Despite its awkward fit, in the eyes of policy makers, STEM has become a zero-sum game. *Zero-Sum Games* are defined as 2-player engagements in which one player wins while the other loses (Ferguson, 2014; Von Neumann & Morgenstern, 1944). Ferguson (2014) defines the normal form of a two-person zero-sum game with the following figure.

Definition 1. The *strategic form*, or *normal form*, of a two-person zero-sum game is given by a triplet (X, Y, A), where

(1) X is a nonempty set, the set of strategies of Player I

(2) Y is a nonempty set, the set of strategies of Player II

(3) A is a real-valued function defined on $X \times Y$. (Thus, $A(x, y)$ is a real number for every $x \in X$ and every $y \in Y$.)

Figure 2: Ferguson (2014) p. 4

Essentially, the figure above is broad enough to describe zero-sum games varying in complexity This is a simple definition of an incredibly complex area of scholarship. Entire major areas of study are centered on game theory; Nobel Prizes have been awarded for excellence in the field. For the limited parameters of my exploratory study, this simple definition is sufficient. In zero-sum games, there is one winner and one loser, and gain for one player results in loss for the other.

The state of Florida, in recent years, has produced policy rhetoric which has turned STEM education into a zero-sum game. The liberal arts have been selected to serve as the opponent. They have been designated as the losers before the game begins. Governor Scott fired the opening salvo in 2011, when he stated, "If I'm going to take money from a citizen to put into education then I'm going to take that money to create jobs. Is it a vital interest of the state to have more anthropologists? I don't think so "(Anderson, 2011, October 10, p. 1). In recent years, more prominent policy actors from the state have put forward similar zero-sum positions with liberal arts fields. Florida Senate President Don Gaetz, in the months before he ascended to his role, pushed for a bill that would mandate Florida middle schools to distribute employment rates and salary data for various career fields, in an attempt to push 6th graders into STEM majors (Anderson, 2012, February 9). In defending the proposal, Gaetz stated, "Now if they choose to get a degree in political science or psychology or poetry that's fine, but we ought to tell them the truth about their chances of getting a job" (Anderson, 2012, February 9, p. 4).

Gaetz is not the only prominent Florida politician to take a shot at psychology. On the campaign trail during the 2016 presidential primaries, former Governor Jeb Bush stated, "Universities ought to have some skin in the game…When a student shows up, they ought to say, 'Hey, that psych major deal, that philosophy major thing, that's great, it's important to have

liberal arts…but realize, you're going to be working at a Chick-Fil-A" (Mills, 2015, October 24, pp. 1-2). Less than a month later, Gov. Bush's Floridian counterpart, Senator Marco Rubio, made headlines at a primary debate, stating, "Welders make more money than philosophers…we need more welders and less[sic] philosophers" (Krieg, 2015, November 11, p. 1). Zero-sum positions did not begin or end with Governor Scott's diatribe against anthropology. If anything, such attitudes have intensified. Florida politicians used the platform of running for president to bring their zero-sum perceptions to a national audience.

Why did the liberal arts become the sworn enemy of STEM disciplines to so many policy makers? Why is Florida the epicenter of such attitudes? Finally, are such attitudes justified? These questions helped spur me to pursue this dissertation research. The literature provides no definitive answers. It is clear that the rhetoric used in forming a zero-sum game between STEM and the liberal arts is borrowed from the Cold War. President Eisenhower issued a call for science to beat the Soviets to the moon. President Obama used the language of Eisenhower to compete against the Chinese. The Soviet Union was defeated. Overtaking the Chinese in STEM fields is a formidable challenge. It is possible that defeating easy targets like anthropology departments is a way to score political points. It could also be human nature to look for opposition during perceived dark times. Noted psychologist and journalist, Oliver Burkeman, notes that people have difficulty recognizing the present as a comparably favorable time period. Burkeman (2012) states,

> It is easy to feel, these days, that we live in uniquely insecure times, and that things are only going to get worse…yet it is easy, too, to find evidence that people have *always* believed that they are living in times of unique insecurity…try searching Googles library of digitised manuscripts for the phrase 'these uncertain times' and you'll find that it occurs over and over, in hundreds of journals and books, in virtually every decade…reaching back to the seventeenth century" (pp. 130-131).

On the other hand, Florida's economy was devastated by the Great Recession. It has only recently recovered the job losses incurred during those dark years, and the housing industry still has not reached the average home prices achieved before the bubble burst between 2006 and 2007. Psychology is one of the top two majors at six of the biggest public universities in the state (Logue, 2016, January 20). Florida's policy makers could, perhaps with some justification, argue that they are simply doing their job to push students away from the liberal arts and into fields with more perceived economic utility. That could be why former Senate President Don Gaetz has not softened his attitude over the past four years. He recently stated, "When the No. 1 degree granted is psychology and the No. 2 is political science, maybe before we ask $100 million more of taxpayers we should redeploy what we have…that way we make sure we're not sending graduates out with degrees that don't mean much" (Logue, 2016, January 20, pg. 1).

Before Florida "redeploys" $100 million dollars (or more), it is essential that the state determine if such a measure is beneficial or necessary, preferably both. The available scholarship demonstrates that such zero-sum measures do not match well with the reality concerning STEM promotion, economic impact, the nature of innovation, and the status of the global marketplace. The market is not a zero-sum environment, and boosting STEM does not require denigrating liberal arts programs in the process, especially since the liberal arts stand in neither competition nor opposition to STEM disciplines. There are alternative ways to reach the goals that Scott and Gaetz seek.

2.2.4 STEM summary

In conclusion, the relationship between STEM education, regional economic impact, and national security cannot be described as linear, despite the efforts throughout modern world

history to treat it as such. The solutions offered by policy makers, however, are often of the rigid, singular, zero-sum variety. Increasing the numbers of science teachers by arbitrary figures such as 100,000 or the number of STEM majors by 1,000,000 (National Science and Technology Council, 2013) could indeed benefit the U.S. economy. Redirecting more Florida students into STEM fields, or redirecting $100 million from psychology and anthropology departments, might also provide economic impact for the state. However, while it is impossible to predict the economic outcomes of such a measure, it is quite possible to warn that such ideas carry grave portends for the future of basic principles of higher education, such as academic freedom and university autonomy. Additionally, the literature demonstrates it is unreasonable to expect a direct correlation between investment and return. The most appropriate approach to create economic impact using STEM education might be a more nuanced partnership between the multiple groups of stakeholders involved, from labor representatives to CEOs, from museum directors to district superintendents, and from universities to national foundations (Johnson, 2012). Making predictions of STEM innovation by depending on this direct, linear relationship might result in inaccurate predictions such as those made by *Back to the Future II* in 1989. To promote innovation using STEM education, a balanced STEAM approach that incorporates the arts might be the most realistic option. If innovation is more like improvised jazz, as Goldstein et al. (2013) postulate, policy makers must be more nuanced and less zero-sum with their approach. Given the importance of liberal arts for developing intellectual identity and critical thinking, the importance of STEM in forging practical skills with technical relevance, and the importance of the arts in developing creativity, perhaps the acronym for best policy practices could use a few more letters. LA-STEAM, which adds the prefix of liberal arts to the STEAM model, would be a suitable option.

2.3 UNIVERSITY AUTONOMY & ACCOUNTABILITY

2.3.1 History

The introduction of the graduate degree and the German model of education served as a means to advance the cause of academic freedom and university autonomy (Bowen 2014; Thelin 2011). In the late 1800s, the American university of Johns Hopkins adopted the German prototype to merge traditional university missions of teaching and research, and forged graduate programs in professional fields. That model was soon replicated in universities nationwide. The pillars of academic freedom and university autonomy advanced along with this model. Bowen (2014) writes, "Ever since the founding of the University of Berlin in 1810, the German model of the university had been oriented around the principles of *lernfreiheit* [freedom of students to devise their own programs] and *lehrfreiheit* [freedom of a professor to pursue his subject without political consequences]" (p. 10). These principles were tested in the late 1800s as universities and policy makers reacted to the controversial writings of scientist Charles Darwin. Despite some pressure from government representatives who objected to Darwin's teachings, academic freedom held serve. The liberty to teach and debate Darwin's ideas on campus had the effect of not only advancing academic freedom, but also served to supplant religious influences within public universities and replace them with secular, scientifically-oriented ones (Bowen, 2014). These foundations of academe served to protect the intellectual freedom of faculty members, and fostered freedom of thought on campus.

The Morrill Acts of 1862 and 1890 established the American institution of the land-grant public university and introduced stronger measures of government oversight (Geiger, 2010; Thelin, 2011). The Morrill Acts helped establish the modern relationship between universities

and government agents of management. Rather than remaining isolated bastions of intellectual freedom, universities became connected to the interests of the state. This relationship continues to be complex and multifaceted. While universities have historical claims of autonomy and fiercely defend the principle of academic freedom, they also receive funding and experience oversight from government officials. The interests of academe and governments do not always align, and conflict often occurs between campuses and capitals.

2.3.2 Modern academic environment

Efforts to provide greater accountability within higher education are often linked with transparency measures designed to increase the flow of information from higher education institutions (HEIs) to entities of government oversight (Hauptman, 2008). An issue with addressing the question of autonomy vs. accountability is the fact that both are politically popular, and to survive the legislative process, ideas often have to promise both, resulting in confusion and ineffective measures (Lively, 1995). The American electorate supports the principles of academic freedom and university autonomy, but also calls for greater accountability to state and federal government bodies concerning issues like graduation rates, reining in tuition increases, reducing student loan defaults, and improving access and equity (Hauptman, 2008). University reforms in this present climate, as a result, are providing more autonomy in financial management and decision-making, while simultaneously exposing HEIs to more oversight and government scrutiny through reporting mechanisms, financial incentive systems, budgetary pressures, and strings tied to government grants (Christensen, 2011).

The tension between university autonomy and government oversight is further compounded by the policy making process. Funding, campaigning, and contesting reform

proposals in the public sphere produce results that do not always align with the best practices identified by research. Godwin & Sheard (2001) note, "Political science research shows that to defeat initiatives, opponents need only spend sufficient funds to scare or confuse voters" (p. 124). Efforts to streamline operations and governance structures at public universities in Oregon stalled, as the legislature was reticent to give up its regulatory powers in determining funding (Lively, 1995). Oregon state representative Tony Van Vliet, a former university faculty member, when discussing the goals of HEIs, notes succinctly, "They want all the perks that go with a public agency, such as access to funds, but the advantages of the private sector. It doesn't give much accountability either way. They can't be neither fish nor fowl" (Lively, 1995, p.1). Likewise, efforts of accountability measures by government entities are often portrayed by university representatives as a zero-sum game, with the viewpoint that extending accountability will impinge upon autonomy in all circumstances, and thus negatively impact the effectiveness of the academy (Neave, 2001). University officials make these claims despite the fact that higher education has typically enjoyed fairly wide degrees of autonomy, even when receiving substantial public funding (Neave, 2001). The risk of losing autonomy is alarming to public universities, but the risk of losing state funding creates a Faustian choice for many in academe.

The complex relationship between government and the academy in regards to public accountability has strained the traditional missions of the university. The research conducted at universities often is called into question by policy makers. Tucker (2012) argues that Humboldt's German model of education, with lifetime tenure, lack of financial accountability, and autonomy from state interference, has exhausted itself in a system that combines university research with government funding of that research. Tucker (2012) notes,

> They make a superfluous distinction between theoretical and applied research, ignoring the obvious historical fact that the applied sciences actually began as theoretical sciences in the mid-nineteenth

> century…Herman Göring quipped that when he heard the word *culture*, he reached for his gun. When academic managers hear the word *culture*, they reach for their budget cutting knives. (p. 108)

The current political climate extols the value of STEM research and curricula, which influences both the means in which universities operate as well as the methods government entities use to oversee them. Bowen (2014) notes,

> In the current social context in which we live, the prevailing mentality would place universities either in a position of contributing first and foremost directly to the 'economic development' of the state or going out of business. Thus, the focus today tends to go much too far in the direction of investment in STEM disciplines and not nearly far enough in the direction of teaching people to think philosophically…teaching people how to function as effective leaders is perhaps the most important…and it is at the same time something universities tend to not do well at all. (pp. 193-194)

How universities respond to political and economic pressures in regard to their research and curricula will influence the relationship between autonomy, academic freedom, and accountability over the next decade. Autonomy, in particular, faces threats from both internal and external sources, which I will discuss in the next section.

2.3.3 Internal threats to autonomy

Academic freedom is a stalwart foundation of higher education, but self-interest of faculty within the professoriate could function as a crack in that foundation. Society receives benefits from higher education, and the profession is given significant autonomy in return. The failure of the professoriate to maintain professional standards and sufficient levels of productivity could result in the degradation of society's confidence in trusting academe with such autonomy (Hamilton, 2006). The American Association of University Professors' Declaration of Principles in 1915 included protections for academic freedom. However, creating standards of professionalism within the professoriate is difficult because individual faculty members desire *personal*

autonomy, which takes precedence over a norm of collegial self-governance (Hamilton, 2006). Therefore, autonomy from government intrusion into the affairs of academe is threatened by a failure of the professoriate to regulate themselves. Hamilton (2006) notes,

> Without proper socialization to counter-balance self-interest and market pressures, too many faculty members tend strongly toward self-interest in terms of emphasis on protecting autonomy, job security, or personal advantage…if a significant proportion of the faculty fails in the duties of professionalism, the social contract is undermined and a long-term erosion of professional autonomy is inevitable. (p. 19)

Kallison & Cohen (2010) note that the American electorate is skeptical of higher education leadership, stating, "…the mantra of 'trust us and our accrediting bodies' is no longer acceptable to the public" (p. 41). State and local support for education per student hit a 25-year low in the 204-2005 fiscal year as a result of inflation and increased enrollments, despite a recent upswing in higher education spending (Kallison & Cohen 2010). Tuition has soared to make up the deficit. Therefore, the public sees government *gross* financial support of higher education increasing in recent years, but tuition also increasing. Despite the fact that per capita funding for higher education is decreasing, and tuition increases are a logical and necessary response, this math does not add up for the average voter. The American public's patience with higher education is wearing thin, and there is a general call for greater scrutiny concerning what goes into a degree program and identification of the skillsets such degree programs establish (Kallison & Cohen 2010).

A tension exists between the professoriate and academic financial administrators on campus regarding how to approach HEI management. Faculty members are resistant to measures designed to increase their teaching loads in the name of efficiency, even if they are no longer producing large volumes of published research (Immerwehr, Johnson & Gasbarra 2009). This can create tension with university financial administrators, who are pressured by government representatives to increase access to higher education. Such increases in access often

result in increased class sizes and course offerings. Professors are needed to teach such courses. Getting them on board with an idea to increase efficiency is essential, because financial officers recognize that if the academy cannot find a way to increase productivity on its own, external agents will step in and step on autonomy in the process. Immerwehr, et al. (2009), quoting an institutional financial officer, state,

> I can't call the administrative directors and tell them what to do, but we need to find a way to get the whole faculty to say, 'How are we, together, going to engage in a conversation about how to increase productivity'…Because if we don't come up with an idea, somebody's going to tell us how to do it and we're probably not going to like it. (p. 9)

In short, the American public wants to know if the juice is worth the squeeze. As higher education costs and tuition continue to skyrocket, it is not unreasonable to expect that voters will demand greater accountability to state and federal government entities, to ensure that higher education continues to remain a good investment. Internal measures alone from HEIs are not going to satisfy the public. External measures, which demand greater accountability to the state, also threaten academe's autonomy.

2.3.4 External threats to autonomy

Republican governors are often elected on the platform of erasing budget deficits without raising taxes (Kelderman, 2012). Higher education is often one of the first things placed on the government chopping block, and efforts to keep funding can result in the erosion of autonomy, because in today's climate of accountability, funding comes with ties (Berdahl, Altbach & Gumport, 2010). Even at the early date of 1986, scholars were critical of the government's infringement on university autonomy in regards to budgets and funding. Government efforts to restrict university flexibility through budget controls are unnecessary and even harmful (Jones,

Thompson & Zumeta, 1986). Such government pressure is often spurred by the perception that government and university spending are out of control, and reforms are needed rein in such frivolous waste. HEI administrators resist these pressures in order to maintain institutional autonomy and academic freedom. Jones et al. (1986) note,

> Cost standards, performance budgeting, and close managerial controls are simply unnecessary where competitive market arrangements are possible and preferable as is the case of higher education when student enrollments are stable or declining…they also lead to misallocation of resources and excessive control and information costs. And, in a value-carrying enterprise such as higher education, they may contribute to undesirable erosion of institutional autonomy and academic freedom. (p. 156)

It appears that some aspects of this pressure-packed climate have remained the same during the last three decades. Government entities often shine spotlights on institutions that are underperforming on state or federal performance measures, with the intent to "shame them into doing better" (Hauptman, 2008, p. 40). This method of oversight can be seen in the recent release of a list of 50+ HEIs that had failed to meet Title IX standards and had active investigations ongoing regarding sexual assault on campus (U.S. Department of Education, 2014). Only 1/3 of American universities are fully compliant with the reporting criteria required by the Cleary Act, with less than 50% offering sexual assault training for students and student affairs professionals (US Department of Justice, 2014). The federal government's release of a list of institutions not complying with Title IX requirements has placed pressure on these institutions to improve. Internal measures alone are not working to address this important issue on campuses nationwide.

Shining a spotlight on underperforming institutions might not be a strong enough response for policy makers. Hauptman (2008) notes, "Without significant financial incentives attached to these efforts, there is little likelihood that behaviors will actually change. Rather than shining a spotlight, federal and state policy makers may be able to achieve greater accountability…by sending signals to institutions…with real financial consequences" (p. 40). In

other words, it is not enough for policy makers to call attention to problems on campus. To affect real change, policy makers have to incorporate stronger measures of accountability, which could have the effect of reducing autonomy of HEIs. Kallison & Cohen (2010) suggest accepting greater accountability measures in exchange for more funding, noting that the American public supports more oversight of higher education and the funding shortfall needs to be addressed. They suggest using existing measures, such as ACT/SAT/GRE exams, professional licensing exams like the LSAT, graduation and retention rates, and student capstone projects in a multifaceted model to assess the value-added of higher education. They specifically note that measures used at the secondary level, such as a single high-stakes examination, are not applicable to the complex institutions of higher education. Suspitsyna (2012) is skeptical of such concessions of autonomy, and supports more concentration on service learning and civic engagement on campus. Efforts to expand service learning projects and produce democratically engaged graduates, however, are secondary next to a preoccupation with producing competitive graduates in a global market (Suspitsyna, 2012). HEIs have a difficult path in front of them. They must attempt to navigate financial obligations, affordability, and academic autonomy, all while under pressure from the general public calling for greater accountability.

2.3.5 Autonomy & accountability summary

The tension between the academy's autonomy and state interventions into university affairs can be traced to the Morrill Acts of the late 19th century, and even into the colonial era predating the birth of the country (Geiger, 2010; Thelin, 2011). Generally, the public supports the academic freedom of professors on campus, but also insists on accountability to state government agents of oversight. Skyrocketing tuition, a difficult job market, and the perceived diminishing value of a

college degree have all led to calls for stronger accountability measures. State and federal government agencies have used calling attention to poor-performing institutions as a mechanism for affecting change. As calls for accountability grow louder, accountability measures are likely to shift to initiatives that provide financial and administrative penalties for struggling institutions while also giving incentives and benefits to schools that reach performance targets. The optimal scenario for universities would be to receive state and federal funding while maintaining full autonomy in utilizing the funds. This scenario is unlikely in the coming years. Universities that wish to receive state and federal funding will likely be asked to fulfill performance obligations in exchange for such rewards. The pathway forward will be difficult. Universities must navigate a complicated morass of filling budget shortfalls, placating a perturbed professoriate worried about academic freedom and teaching duties, and attempting to maintain autonomy in a political climate obsessed with accountability. If universities themselves do not produce the reforms necessary to produce graduates with meaningful degrees, it is highly likely that state and federal government entities will intervene, resulting in diminished autonomy on campus.

3.0 METHODS

My preparation guided my methodology choices in this dissertation. A combination of many issues has resulted in an inadequate vision of STEM and liberal arts policy formation. Misperceptions have helped entrench the current linear model, which draws a straight line between STEM investment and economic impact. I focused my methods on answering the central questions of this dissertation. What are the key policy narratives of STEM and the liberal arts? How are these narratives utilized within the education policy making process?

As I explored the dominance of that linear model, further questions came into focus. Are policy makers aware that the linear model is flawed, but promote it anyway based on political expediency and reelection concerns? Or do they truly believe that STEM promotion produces a simple and direct impact, and are frustrated by naysayers who dare to question this viewpoint? The possibility also exists that their perception is a mixture of the two, resulting in proposals with good intentions, but without the nuance and research-based depth to adequately respond to the challenges of formulating balanced higher education policy that would benefit institutions and state economies alike.

I conducted a three-pronged, descriptive study to explore these questions and evaluate the perceptions of those involved in higher education policy formation in Florida. I utilized a quantitative survey instrument and qualitative, semi-structured interviews. Additionally, I analyzed a sample of press releases from Governor Scott's office, categorizing them based on

their subjects and message. The individuals I selected for my sample were chosen purposefully to properly gauge the perception of the broader population of policy actors in the state. I analyzed the results of my investigation using a theoretical framework revised from previous research I presented in Berlin, Germany with the chair of my dissertation committee (Porter, Lurz & Herman, 2014).

3.1 CONCEPTUAL FRAMEWORK

I wrote this dissertation in the framework of policy analysis, evaluating the role narrative plays in the formation of policy. Narrative's role is especially relevant in regards to state government policy toward STEM fields. The present political narrative ties STEM to new jobs, despite research from Gittell and Sedgley (2000) which showed that state investment in STEM programs did not directly equate with high-tech jobs in the state, as a result of factors such as neighboring states benefiting from STEM investment.

The language coming from the public sphere does not reflect these facts. The narrative and beliefs, shared by the public and policy makers alike, affirm that STEM concentration is the answer for a 21st century economy, and the public at large sees a linear progression from state investment in higher education, to innovation, to high-tech jobs. It is therefore valuable to examine the effect the present narrative has on policy and what role it plays in education policy formation.

The conceptual base of this study lists **policy actors** and **advocacy coalitions** as the principal agents of policy formation, drawing heavily from the work of Ness (2010a, 2010b), Mills (2007), Doyle (2007), and McLendon (2003). Policy actors are the power players in

advancing an individual cause into policy. They may or may not be the ones who originally came up with the idea. Consider a first-term state legislator from a rural district. She might not have the political capital to push an item through the legislative process. But if she finds an ally who would also benefit from the proposal, like a veteran legislator from the largest city in the state, her idea could be moved forward. Policy actors are the standard bearers of ideas, and push to have those ideas become policy.

Advocacy Coalitions are associations of actors which promote a common interest (Sabatier, 1988; Sabatier & Jenkins-Smith, 1993). Ness (2010a), drawing from Sabatier & Jenkins-Smith (1993) refers to these as "stable over time and sharing common belief systems…consisting of elected officials, governmental agency staff, interest group leaders, media representatives, and researchers" (p. 34). These coalitions can include actors outside of the traditional policy-making field who are united by common beliefs and worldviews. They can also include organizations such as think-tanks and special interest groups. For the purpose of this dissertation, members of advocacy coalitions include senior administrators and faculty members of higher education institutions, members of state education agencies, education union representatives, and members of interest groups.

The sources I use for a conceptual base illustrate a relationship between policy actors, advocacy coalitions, electoral connections, and advertising. Kingdon's (1984;1998) development of the multiple streams framework was instrumental in forming the conceptual base for my study, since it is situated primarily within the *politics* stream in Kingdon's model. Many of my sources who explored Kingdon's frameworks discussed the convergence of policy streams and formation of **Policy Windows** (Doyle, 2007; McLendon, 2003; Mills, 2007; Ness, 2010a; Ness,

2010b). The ways these scholars utilized the original frameworks of preeminent scholars in the field informed and refined my research.

It is important for me to demonstrate that my theories are built on the shoulders of the scholars who came before me. It is not a revolutionary new theory that stands in stark contrast to the frameworks used by most scholars who study public policy formation. Rather, it is a wrinkle within existing theory, especially that of Kingdon (1984; 1995) and Sabatier & Jenkins-Smith (1993). These scholars' work with policy windows and multiple streams provided an opportunity for me to explore these ideas further, and investigate their utility in studying my research topic of Florida education policy.

Policy windows include social attitudes and values, political atmosphere, and stories drawing attention from local and national media outlets. Previous frameworks and theory concerning policy windows view them as favorable conditions or opportunistic sets of circumstances that allow ideas to be formed into policy. This framework takes into account the *agency* policy actors and advocacy coalitions have in creating policy windows of their own, without waiting for fate or circumstance to open a window for them. If policy actors or advocacy coalitions have a particular axe to grind, they can advance their cause by *creating* a policy window. Much like a cartoon character painting a door or window on a wall, and then walking through it, these actors can create their own policy windows to push their cause into the public sphere. It can, therefore, be determined that policy windows can arise out of a set of favorable circumstances or policy actors can create them out of their own volition. Rather than have the policy window be an opportunistic starting point, policy windows in this framework can open when opportunity arises *or* through the successful *reasoning rhetoric* of a persuasive policy actor.

This base of theory was used to form a conceptual framework used to construct the narrative of STEM in the public sphere. It provided a foundation in the literature that grounded this study and limited its scope. The available literature concerning policy formation spans a plethora of social science fields, and also borrows from the management theories used in business. The literature selected from this study represents a solid base to analyze the selected theme of STEM and liberal arts policy narratives.

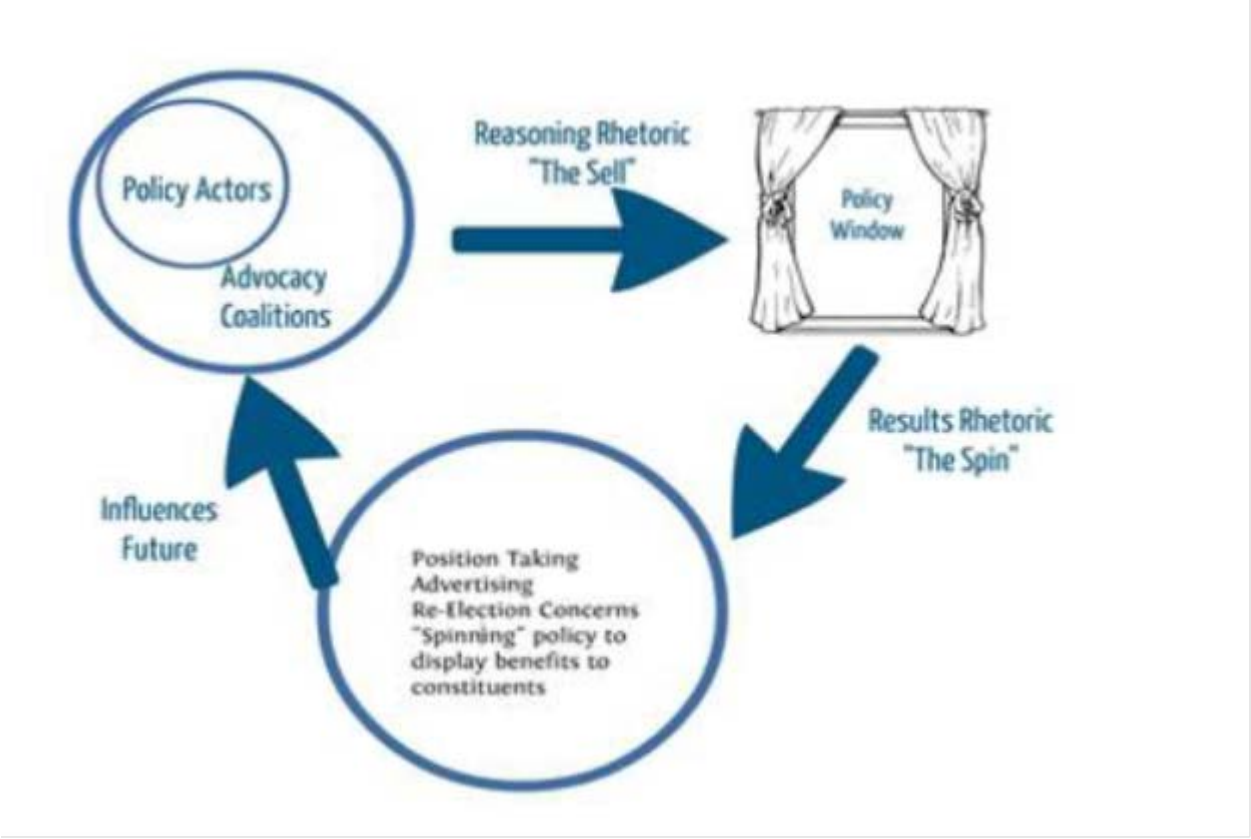


Figure 3: Initial Conceptual Framework Presented at DGfE in Berlin (2014)

Figure 3 displays conceptual framework I developed in conjunction with my colleagues from the University of Pittsburgh in order to explain policy formation related to STEM and Civic Engagement in Higher Education. We presented this framework at the Deutsche Gesellschaft für Erziehungswissenschaft (DGfE) in Berlin (Porter, Lurz & Herman, 2014). This framework falls

into the *multiple streams* approach to policy making (Kingdon, 1984, 1995; Ness, 2010b). Ness (2010b), again drawing from Kingdon (1984, 1995), states that the multiple streams framework "emphasizes the dynamic, fluid, and serendipitous nature of policymaking" (p. 23). Three major streams of **problems, policies,** and **politics** represent the fundamental portions of multiple streams. The conceptual framework in *Figure 3*, which we presented in Berlin, is located in the "politics" stream. Ness (2010b) states,

> The *politics* stream accounts for the many influences external to the specific problems and policies. The national mood, public opinion, political culture, electoral turnover, and interest group activity represent the most common elements…the stream may exert the most influence, especially as policy decisions are made among the alternatives…regardless of the specific policy recommendations, decisions ultimately come from the preferences or proclivities of powerful committee chairmen…constituents may serve as another source of influence and information within the politics stream given officials' inherent decision to link their preferred policies with their districts' interests. (p. 24)

We split policy formation rhetoric into two categories: **reasoning rhetoric** and **results rhetoric**. **Reasoning rhetoric** is the persuasive language policy actors use to advance an idea into policy. It is used to create the initial policy window policy makers use to advance their agendas. This type of rhetoric sells a political idea to stakeholders: both inside and outside the policy making arena. It can include lobbying efforts, interviews with media outlets, and the defense of research supporting the idea (along with attacks of research which contradicts the idea). Returning to the issue of STEM policy in the state of Florida, Rick Scott's reasoning rhetoric was centered on higher education's purpose of job-market preparation. In a letter published in college newspapers across the state, Governor Scott employs this rhetoric persuasively (Gore, 2011, November 15). Scott states,

> I am posing a different question to Florida's college students today: 'Will your major prepare you for that job?' Hopefully your answer explains how your major is compatible with your skills and talents…However, at a time when more than 900,000 Floridians are looking for work, I encourage you to also consider what is perhaps a more important question: 'What jobs will be in demand when you graduate?'…By 2019, Florida will need more than 171,000 people to fill new STEM jobs…many high-skill, high-wage jobs depend on STEM. (p. 3)

Governor Scott was not the only player using reasoning rhetoric during the "sell" phase of policy formation. Merrill Eisenberg, president of the Society for Applied Anthropology, wrote a letter of retort to the Governor, stressing the flexibility of his field (Gore, 2011, November 15). Gore (2011), quoting President Eisenberg, writes,

> An undergraduate degree in liberal arts, and particularly in Anthropology, is an excellent basis for further training in STEM professions. The late Steve Jobs, who built one of the most successful technology empires in the world…credited Apple's success to working at the 'intersection of technology and the liberal arts'…The utility of anthropological training for the sciences is so clear that the National Science Foundation classifies anthropology as a science, the 'S' in STEM. (p. 2)

The most important part of the "sell" is not the beauty of words. It's the strength of the seller. Merrill Eisenberg might have written more eloquently than Governor Scott. However, because of his position, the Governor can shrug off such criticism with phrases like, "I got accused of not liking anthropologists the other day…but think about it, how many jobs do you think there are for anthropologists in the state?" (Gore, 2011, November 15). Governor Scott does not have to confront Mr. Eisenberg's strong, evidence-based letter. Because of his position and level of political capital, Governor Scott can brush past Mr. Eisenberg and ignore him completely. More often than not, strong policy actors exert more influence than advocacy coalitions like the Society for Applied Anthropology. Ness (2010a) writes, "The roles of individual policy actors and of serendipitous timing can hardly be understated…these individuals exert enormous influence and spend valuable political capital to advance their preferred policy solutions" (p. 55). Mr. Eisenberg quoted Steve Jobs and the National Science Foundation in illustrating how anthropology was a valuable part of innovation through education. Governor Scott used unemployment figures and the persuasive rhetoric of falling behind in STEM fields. Mr. Eisenberg would likely defeat Governor Scott in the vacuum of a debate competition. The

"sell" process, however, combines rhetoric with *influence*, and influence is the more important variable. Governor Scott was determined to impart his vision of higher education on the state of Florida. At a time of high unemployment and economic turmoil, Scott's vision and influence carried weight with lawmakers. Thus, in terms of both influence and "serendipitous timing", Scott's position was difficult to counter during his first term as Governor.

To continue with the framework's explanation, **results rhetoric** is the language used to *justify* the policy after it has moved from theory to rule of law. This language of legitimization is used to put the policy maker's position in the best possible light, in order to aid the policy maker's reelection efforts. We labeled it as "results rhetoric" because it is language centered around the consequences of the policy once it has already been created, while **reasoning rhetoric** is language used to get the policy created in the first place.

Therefore, we labeled **results rhetoric** as **The Spin**. Once a policy measure is passed, the policy actor will try to spin her role in the creation of that policy and make herself look as strong as possible. If her constituents dislike the policy, the policy actor might stress her opposition to the policy or point to an amendment that she tried to attach to it, even if the amendment failed. That way, the policy actor can tell her constituents that she did her best to make it better. Spinning results can become complicated if the policy actor voted in favor of a law that quickly becomes unpopular with her district. The No Child Left Behind Act was signed into law by President Bush on January 8th, 2002, having passed the House of Representatives 384-45 and the U.S. Senate 91-8 (U.S. Congress, 2002). As the law became more and more unpopular with upset parents, a vast majority of lawmakers were on the defensive. How could a policy actor justify her actions if she voted for the bill? Perhaps she could point to her attempts to

change the bill in committee, or even highlight her dissenting vote within committee. That can lead to confusion, which can also be used against a policy maker. A famous example of this was Democratic candidate John Kerry's now infamous claim regarding a supplemental appropriation for the wars in Iraq and Afghanistan during the 2004 presidential campaign, when Kerry stated, "I actually voted for the $87 billion before I voted against it" (Rosselli, 2004, September 30).

In Florida, Governor Scott touted his policies for augmenting the number of STEM jobs in the state. At the end of 2012, Governor Scott stated,

> As Florida's economy continues to grow, demand for STEM related fields is increasing. Today, STEM jobs advertised online are up by nearly 14 percent from last year…the evidence is clear-we have to ensure we make STEM education a priority for Florida children…Florida has a highly-skilled workforce that is uniquely prepared to fill these positions and meet the demands of the 21st century economy. (Office of the Governor, 2012, December 1)

In 2014, all over Governor Scott's website, the message, "It's working", could be seen. Governor Scott supported additional funding in 2012 for the new medical school at Florida International University. In April 2012, FIU President Mark Rosenberg noted, "When we made the case for this medical school, we said it would help our community by educating new doctors and providing expanded access to medical services…today, we honor the rest of the promise by inviting members of our community to receive excellent care from FIU Health providers." (Florida International University, 2012, April 11). In February, 2013, Governor Scott spoke at a launch ceremony for Coastal Cloud, an Information Technology consulting company in Flagler County, with the promise of creating 100 new high-tech jobs and $29 million dollars of economic impact (Flagler County Department of Economic Opportunity, 2013, February 25). Governor Scott successfully tied his STEM education policy to economic growth, and supported those ideas with numbers. The two-word spin of "it's working" seems to have produced the desired result for the Governor. He was re-elected in November, 2014.

This entire process of selling **reasoning rhetoric** and spinning **results rhetoric** influences *future* policy actors and advocacy coalitions. Depending on how successful the process is, future rhetoric will either use the process to defend new policies or decry it to support alternatives. This framework is flexible enough to be used to evaluate the role rhetoric plays in the formation of numerous policies. It fits the issue of government policy toward STEM and liberal arts education exceptionally well. Despite the strength of this initial framework, my committee and I determined it could be improved. The framework found in *Figure 4* was used for my initial dissertation research.

[1]

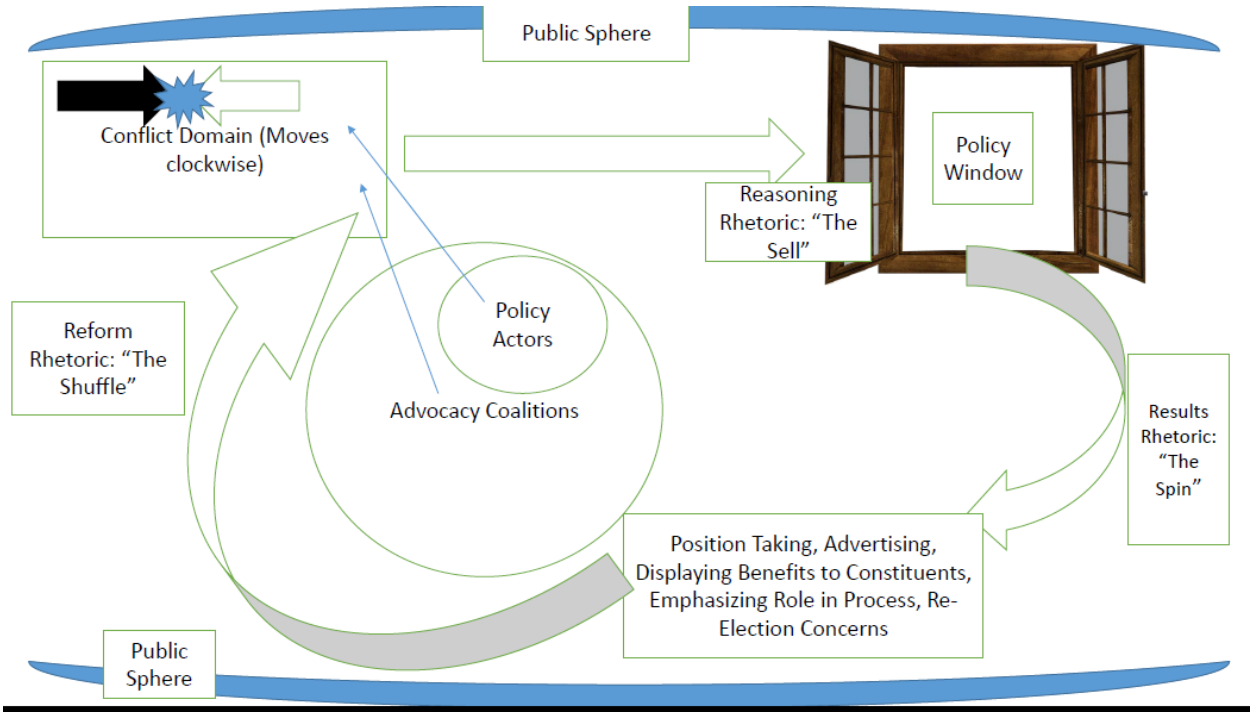


Figure 4: Initial Dissertation Framework

[1] Position taking, advertising, and re-election concerns are terms utilized by David R. Mayhew (2004) in his work, *Congress: The Electoral Connection* (2nd Ed.). Mayhew's work was instrumental in helping me evaluate Florida education policy. It was especially valuable in this part of my conceptual framework, as it provided the many of the motivations policy actors possessed to advance their agendas.

After extensive conversations with my doctoral committee, I determined that the conceptual framework developed for the DGfE conference required revision to fit the scope of my current research. First of all, the policy window was not quite in the right position. By placing it before the arrow of reasoning rhetoric, the policy window accounted for agency of a policy actor to create a policy window of her own making. However, it did not account for policy windows opening up as a result of external circumstances, such as *Sputnik*'s launch prompting the passage of the USDEA Act of 1958, or Florida's economic crisis during the Great Recession providing Governor Scott an opportunity to connect zero-sum STEM with jobs. Therefore, the policy window was bumped to the left, in order to overlap with reasoning rhetoric. With this revised framework, policy makers have the means to create policy windows of their own or take advantage of those opened by external circumstances.

Secondly, the positioning of policy actors and advocacy coalitions at the beginning of the framework was problematic. It suggested that they were static throughout the process. That is not the case. Policy actors and advocacy coalitions can join the process at any point within the framework, and leave it as well. They can change sides. Therefore, I moved policy actors and advocacy coalitions to the center of the framework. Arrows can be drawn from either policy actors or advocacy coalitions to any point in the framework, indicating their entrance or departure from the process, along with any changes in position or allegiance.

The movement of policy actors and advocacy coalitions was important. It allowed for the creation of a *conflict domain*. This conflict domain is **mobile**, and moves clockwise throughout the process. Policy actors and advocacy coalitions can take their places within the conflict domain at any point in the Sell or the Spin. Making the conflict domain mobile illustrates the fluid and rapidly changing environment of policy formation. Policy actors who were considered

allies might switch sides if persuaded by powerful interest groups or constituents in their district. Policy actors and/or advocacy coalitions can join the conflict domain from the onset and pick sides, or sit the fight out until the outcome is no longer in doubt.

Additionally, I named the process of forming new policy based on the results of a past policy. After policy actors and advocacy coalitions spin their role in the formation of policy, **reform rhetoric** is used to advance new policy that sprouted as a result of past policy. Advocacy coalitions and policy actors regroup, reflect on the completed process, and examine how constituents and the public are reacting to it. The resulting rhetoric is used in an effort to reform existing law. I named this **the shuffle**. After **selling** policy to power players, and **spinning** one's role in the process, policy actors **shuffle** to a perceived winning side as the process begins anew.

I realized that the framework was missing an important component: the general public. The public sphere is a wildcard in the policy formation process. Advocacy coalitions or even powerful policy actors can emerge from the public at any point in the process. Thus, I created arches surrounding the entire framework. Concerned citizens can bind together and form an advocacy coalition supporting or fighting a policy. Charismatic figures can emerge to become powerful policy actors in their own right.

In summary, this framework was developed over the course of several years and modified to fit the exact circumstances of my research. I stand on the shoulders of policy scholars who are a lot brighter than I am. It is my hope that other scholars in the field take this framework and test its utility in explaining other types of policy formation outside of education. I believe it is flexible enough to be adapted to multiple types of policy formation.

3.1.1 Research within policy formation: Policy scholars and policy actors

Research plays a role within this framework of policy study. Scholars and policymakers have observed a tension between policy making and scholarship from the academy concerning policymaking. Although research has been used to justify and legitimize policy, both policy scholars and policymakers have been skeptical of the influence scholarship has played in formulating policy. Robert Birnbaum (2000) described this relationship bluntly when he wrote, "Policy scholars are from Venus; policy makers are from Mars" (p. 124). Other literature concerning this matter generally illustrates a similar disconnect between policymakers and policy scholars. Birnbaum (2000) illustrates that policy makers and policy scholars utilize different methods and have vastly different objectives in mind. Birnbaum (2000) states,

> Scholarship is static, policy making dynamic. Scholars weigh the evidence, are sensitive to nuance, consider things first on one hand and then on the other, and view their conclusions as tentative and conditional… Policy makers cannot be, and should not be, rational analysts who rely solely on intellectual arguments and data to make decisions." (p. 129)

Mills (2007), in discussing policy making procedures related to the state of Florida's reorganization of higher education governance structures, concluded that policy making was a complicated mix of narrative "stories" which defined the issue in the public sphere, alliance-making, and "policy entrepreneurs" who championed the cause in question.

Taken as a whole, the literature suggests that the formation of policy has little to do with an honest and candid approach centered on collaboration between policy makers and leaders in the academy. Despite the example of South Dakota (Martinez & Nilson, 2006), policy making is much more based on relationships between policy makers, responses to issues in the public eye, pleasing constituents, and concerns for re-election (Doyle, 2007; Mills, 2007; Ness, 2010a). Henig (2009) illustrates the kind of role research plays in the academy, which echoes the

descriptions made by Birnbaum (2000). He writes, "Research as a collective enterprise…can enrich our knowledge base…Research can inform decisions but cannot, in itself, displace the need for judgment" (p. 6). That judgment, in the context of this framework, is supplied by policy actors and advocacy coalitions, who use research as a tool in their effort to formulate policy that places them in the best possible light for reelection (Doyle, 2007; Mills, 2007). STEM policy, in this present era, provides an excellent policy window for policy makers of either party to advance their own interests in the name of innovation and greater good for society. Policy actors do not often use scholarly research demonstrating how STEM investment results in directly proportional gains for state economies in order to advance STEM education policies. Instead, they point at current statistics like percentages of students majoring in STEM in different countries, and note the dangers of falling behind rivals. Framing STEM promotion as a competition, rather than weighing the scholarly studies in the field, is more effective for policy actors in advancing their agendas and securing re-election.

Additionally, the viewpoint of research as another tool in the justification of policy formation, rather than a holistic device used to advance knowledge, can help policy makers continue to advance the tired and flawed portrayal of STEM investment as a linear equation leading to high-tech jobs and start-up businesses. Research that seems to contradict that portrayal can be discarded or ignored. Finally, research in the academy involves an open process of critique from one's peers. A scholar presents research and opens herself up to the criticism of the scholarly community. As a result, the language used within academic research is often equivocating in nature, and does not make many broad, generalizing statements without careful documentation and evidence (Birnbaum, 2000). Policy actors do not utilize these approaches, because equivocation can be perceived as weakness in the public sphere. John Kerry's

experience in the 2004 U.S. Presidential Election [see (Rosselli, 2004, September 30)] is just one example of how nuance can be seen as "wonkish" or "flip-floppy". Broad strokes in rhetoric are criticized in academic research, but the electorate seems to respond well to policy actors who speak boldly and without reservation.

This can draw frustration from policy makers, who wonder if this sort of research says anything of value at all (Birnbaum, 2000). Policy makers prefer clear language that can be sold to constituents and interest groups. They are not bound by the same confines of open academic debate, and can pick and choose what to use as evidence (Birnbaum, 2000). In doing so, the research they use is less likely to be a thorough presentation of all angles of the issue, and more likely to be like an "expert witness" in a court case that is brought in to present one's client in a favorable light to the jury. It is my understanding of the policy formation process in relation to STEM that this framework, which shows how research can be used and even twisted to justify policy actions in the public sphere, shows how policy makers continue to portray the relationship between STEM investment and economic impact as a linear equation, despite all the scholarly evidence that depicts it in a more complicated manner.

3.1.2 Summary

This is a limited framework. It is not designed to replace the multiple streams framework, it is designed to fit within it, specifically within the *politics* stream described by Kingdon (1984, 1995). It can be tied directly to the research questions I formed for the study of this topic. Reasoning rhetoric, which I labeled "The Sell", illustrates the key elements of the policy narratives related to STEM and the liberal arts. Strong policy actors like Governor Scott employ the linear narrative, tying STEM support to job creation and economic impact. Liberal arts

supporters such as the advocacy coalition of the Society for Applied Anthropology and some higher education leaders like former University of Florida President Charles Young stress balance, flexibility, and intellectual depth associated with the study of subjects like anthropology. Results rhetoric, which I labeled "The Spin", illustrates how these narratives are utilized within the policy making process. Job creation is measured in terms of new employment postings and labor department statistics like unemployment rates. Economic Impact is measured by wages, tax revenues, and new start-up businesses. Reform rhetoric, which I labeled, "The Shuffle", demonstrates how policy actors revise or even reverse their previous stances. It is politically unwise to be left standing for more than a few moments on the losing side at the end of the policy formation cycle.

If economic indicators appear promising, supporters of the linear narrative like Governor Scott can tie their "spin" to those numbers with the claim of "it's working". Liberal arts supporters have a much tougher job; quantifying balance or intellectual flexibility is a difficult task. In short, policy actors prefer arithmetic to calculus, especially when they can tie policies directly to positive results.

3.2 RESEARCH DESIGN

The literature guided my thoughts concerning my dissertation. A combination of many issues has resulted in an incomplete vision of STEM and liberal arts policy formation. Misperceptions have helped guide the present linear model that progresses directly from STEM investment to economic impact. Are policy makers aware that this linear model is flawed, but promote it anyway based on political expediency and reelection concerns? Or do they truly believe that

STEM produces a simple and direct impact, and are frustrated by naysayers who dare to question this viewpoint? Could their perception be a mixture of the two, resulting in proposals with good intentions, but without the nuance and research-based depth to adequately respond to the challenges of formulating balanced higher education policy?

I conducted a two-pronged, descriptive study that aims to evaluate the perceptions of those involved in the higher education process in the state of Florida through quantitative survey research and qualitative, semi-structured interviews. The individuals I selected for my sample were purposefully chosen to properly gauge the perception of the broader population of those involved in the process. This research aimed to investigate the perception of individuals who have a role in forming higher education policy in the state. The population of such figures includes lawmakers, executive staff members, university administrators, secondary school district superintendents, and members of the media. Since the population is so difficult to precisely define, any sample used to study it had persistent issues with internal validity. It is important to recognize, therefore, that this study is **exploratory** in nature. A random sample and a double-blinded, two-tailed study that aims to prove direct correlations to be generalized to a well-defined larger population would not fit the parameters of my research. I tried to recruit individuals with influence in formation of education policy. Since the overall population is large and difficult to precisely define, I was flexible with the selection of my sample. I selected my participants on the basis of my review of the literature and my knowledge of the higher education climate in my home state. Additionally, Blackwell & Cistone (1999) conducted a study evaluating the perception of influence of various players in the policy formation process. They surveyed over 300 individuals, asking them on a 7-point Likert-Scale to describe how influential they believed each group was, with 7 being the most influential, and 1 being the least influential.

The "M" is the mean of the responses. The authors published the table below, ranking the groups in order of influence.

Table 1. Blackwell & Cistone, 1999, p. 116

Policy group rankings from highest to lowest total mean

Ranking	Policy group	*M*
1	Leading members of legislative committees	5.9457
2	Key legislative staff consultants	5.8915
3	The State Legislature	5.8915
	———	
4	Chancellor of the State University System	5.4574
5	The State Board of Regents	5.2791
	———	
6	The Governor and the Executive Staff	4.7829
7	Federal policy mandates to the States	4.7132
8	Lobbyist for public institutions	4.6279
9	The Chief State School Officer and Senior Staff in the State Department of Eduction	4.5039
10	Non-educator interest groups	4.2326
11	Lobbyist for independent institutions	4.1705
12	The Courts (state or federal)	4.1473
13	All the education interest groups	4.1240
	———	
14	Faculty organization(s)	3.5814
15	Direct referenda initiated by citizens	3.3798
16	Student organization(s)	3.1628
17	Education research organizations	3.0620
18	Producers of education related materials	2.9767

———, statistically significant (at 0.05) difference between policy groups.

Blackwell and Cistone's (1999) study is somewhat dated, but still provided a good starting point for recruitment of a sample. I sent my 20-question, quantitative, Likert-Scale survey to participants in these categories. Additionally, university and community college leaders were part of the initial outcry against Governor Scott's initial statements against the liberal arts. I portrayed them as part of an advocacy coalition regarding my research topic, and therefore added them to my recruitment list.

I sent my survey by postal mail to these participants, and then, a few weeks later, electronically using the Qualtrics survey system utilized by the University of Pittsburgh. On the survey, I included the option to volunteer for follow-up interviews. I wanted follow-up

interviews with a balanced group with representatives of as many categories as possible. Seven participants volunteered, and three completed their interviews. Those interviews were completed by a district superintendent, a higher education union leader, and a university administrator. The free response questions on the survey instrument helped fill this gap in qualitative triangulation of the quantitative data. I initially hoped for at least one member from each of my categories, which included lawmakers, university administrators, district superintendents, interest group representatives, state union representatives, state agency leaders, leaders of faculty unions, members of the governor's staff, and members of the media.

I analyzed the quantitative survey data using STATA statistical software, investigating the relationship between a policy maker's perception of STEM's impact on the regional economy and opinion on how public universities should be funded. I also explored relationships between fear of economic rivals and the zero-sum, *either/or* STEM-centered approach. Finally, I investigated support for STEM fields and liberal arts disciplines. Additionally, I evaluated descriptive statistics such as mean, median, mode, and standard deviation regarding each of the survey items, separating respondents by occupation category. I triangulated the results of the quantitative survey with the semi-structured interview responses and free-response items on the survey instrument. To match the perceptions of advocacy coalitions and policy actors with policy measures utilized in the state, I examined a 6-month sample of press releases from Governor Scott's office. The period of January-June 2015 was selected, because it was publicly available and represented the beginning of Governor Scott's second term. Combined, these elements represented the data I collected and evaluated for this dissertation.

3.2.1 Predictions

I predicted a strong, positive relationship between a policy actor's perception of STEM's economic impact and the policy actor's belief that government agents of oversight should have a strong role in determining funding at public universities. I predicted further that those who strongly agree that STEM investment results in economic impact would have a negative perception of liberal arts disciplines. I based this expectation on my evaluation of the literature concerning STEM and liberal arts policy in the state along with my own experiences working in the Pennsylvania State Senate for an education committee member. Legislators I worked with, by and large, had strongly conceived notions concerning STEM education, and it was a focus of many hearings and education meetings. The policy literature I evaluated strongly suggested that policy actors had a fairly linear view of STEM investment leading directly to jobs and economic growth. Given the popularity of Cold War-era rhetoric used to promote a zero-sum STEM model, I also predicted that fear of economic rivals and STEM-centric approaches would be linked.

3.2.2 Sample, data collection, and coding

My research is grounded in a test of my conceptual framework. I include snapshots of each element (policy window, selling, with reasoning rhetoric, spinning with results rhetoric, shuffling with reform rhetoric) in analysis of my data. Additionally, I tested the zero-sum, *either/or* approach to STEM education favored by policy makers in my analysis of the literature. I looked for metaphors of falling behind, along with more amicable *both/and* approaches that also saw value in liberal and fine arts. Testing my conceptual framework and examining my data in

relation to the literature provided the coding for my study, which can be found in the table below.

Table 2: Coding

Approach to STEM/Liberal Arts	Linear Model (zero-sum, *either/or*)
	Hybrid Model (Dual benefit, *both/and*)
	Classical Liberal Education Model (*return to Trivium/Quadrivium, either/or against STEM-centered promotion)*
Approach to Policy Formation	The Sell (*reasoning rhetoric)*
	The Spin (*results rhetoric)*
	The Shuffle (*reform rhetoric)*

My selected population is not rigidly defined. The players who influence higher education policy in Florida are constantly in flux. Members of that population are likely to strongly disagree with one another on who exactly was legitimately part of that population. Therefore, my research is attempting to hit a moving target instead of a stationary one.

To further expand this metaphor, I am attempting to hit a moving target in a house of mirrors. Therefore, I sacrificed a measure of internal validity of my sample and capacity for generalization to the larger population. The data I analyzed can therefore be used to describe my sample, and projections for the larger population are more difficult to claim.

I made these sacrifices of validity and generalizability because I believe that my research fills significant gaps in the existing body of literature. The perceptions of different policy actors related to STEM and liberal arts fields is an important subject of study. Policy decisions are

being made right now in Tallahassee that will impact higher education management in Florida and beyond. Blackwell & Cistone (1999) evaluated the perception of influence of different policy actors in the state over 15 years ago. Mills (2007) looked at the importance of political stories in policy formation in the state. I am looking at how the policy actors themselves feel about STEM, the liberal arts, the purpose of university education, and the role of government in university management. Such a topic provides important implications for state officials and academic leaders alike. Admittedly, it is difficult to hit a moving target in a house of mirrors. That is likely a central reason why the body of literature in this research area contains these gaps. That is also why I have labeled my dissertation research as *exploratory*. It is my hope that other scholars use my research, and perhaps even my conceptual framework, to advance the body of knowledge further. Perhaps scholars more savvy than I am *will* be able to provide firmer definitions of the population of policy actors in Florida, and will use such definitions to create a study with random sampling and greater generalizability. There is always an element of risk when investigating new populations and attempting to fill gaps in the literature with exploratory research. I believe that is an important function of academic research: seeking to advance the body of knowledge by conducting investigations of populations and areas that are difficult to quantify and even harder to generalize beyond a sample size.

The data I collected deal with perceptions, prejudices, and strong personal viewpoints related to a hot education topic. These data cannot be called sterile or clean. These data are messy. The research topics in question require a paradigm that views knowledge as socially constructed, rather than an objective, quantifiable measure. That is why I chose a mixed methods approach with a flexible guide for coding and data analysis. I had triangulation of data through quantitative and qualitative analysis, and a flexible means in which to code and investigate the

data I collected. A good study tackling this complex labyrinth of data cannot rely solely on one method or instrument. I believe the mixed methods course I chose is suitable for the complex subject of study.

I believe this methodology was appropriate for the scope of this research. I combined quantitative analysis with qualitative measures such as interviews and coding, and added a 6-month sample of press releases from Governor Scott's office to connect these research data with policy documents. When reviewing the press releases, I utilized an inductive method of analysis. I read each document, noted primary and secondary focuses of each press release, and tabulated the rough data. I then analyzed these tabulations and cleaned the data, placing similar topics of focus into combined categories. Additionally, I used a deductive approach in seeing if the major sections of my conceptual framework (Spin, sell, and shuffle) were reflected in the press releases. This close and multifaceted examination of the press release data helped me identify trends and patterns in the Governor's strategy, including ones I was not necessarily looking for.

Constructing a *narrative* required a nuanced approach. The data are rich and complex, and are more amenable to examination using the measures I have proposed. As a researcher with a constructivist paradigm, I do not believe, as positivists do, that knowledge is a tangible and quantifiable entity that can be discovered using the right tests or the right methods of analysis. In short, the methods I chose for this study fit both its scope and parameters as well as my own ontological beliefs.

The purpose of this study was exploring the political narrative of higher education policy in the state of Florida. 377 individuals, at least 18 years of age or older, were invited to participate in this study. Blackwell & Cistone (1999), who provided the basis for my sample, sent their survey instrument to 290 individuals. Since university management was directly

affected by my topic of study, I added higher education administrators to my sample. Because colleges and universities in Florida are fed by secondary school districts, I added district superintendents as well. Since student organizations, education research organizations, and suppliers of textbooks were found to have low levels of influence (Blackwell & Cistone, 1999), I did not include them in my sample. Participants were targeted for recruitment based on their roles in the policy making process. Legislators, university leaders, journalists, union representatives, and interest group representatives were identified in policy literature as both stakeholders and actors in this process. Individuals in these categories had contact information that was publicly available. I made first contact with my participants with a mailed packet with a letter introducing my study and my survey instrument. Follow-up interviews were conducted via telephone, which was the choice of my participants. Out of the 377 people in my sample, I received responses back from 69 participants, representing a response rate 18.3%.

Table 3. Sample and Response Rate

Role	Number	Response Rate
Lawmaker (FL House, Senate, US Reps, US Senators)	13	6.9%
University Administrators and Faculty	21	52.5%
District Superintendents	26	36.6%
Interest Group Representatives	1	4.8%
Union Representatives	4	36.4%
State Agency Representatives	4	17.4%
Governor's Staff	0	0%

Table 3 continued

Members of the Media	0	0%
Total	69/377	18.3%

When the Governor's staff and members of the media are removed, the response rate increases to 19.4%. However, their absence weakened the study results. Governor Scott's staff are important policy actors in Florida. Additionally, the media play an important role in advancing the stories which influence the movement of policy through the conceptual framework created for this study.

Numerous respondents included free response items on the survey instrument itself, which were used to help triangulate the quantitative data. 7 respondents volunteered for follow-up interviews. 3 were completed. Those three were a district superintendent, a union representative, and a university administrator and faculty member.

The final category of data I examined were press releases from Governor Scott's office. I selected a sample between January, 2015 and June, 2015. This time period was selected with purpose. The review of the literature examined much of the dialogue from Governor Scott's office during his early years. As he was advancing his ideas into policy, these data could be categorized into *reasoning rhetoric* using the conceptual framework, or *selling*. He was trying to sell his ideas to policy actors, advocacy coalitions, and the public at large. The literature review also explored some early spinning of his achievements, which could be classified as *results rhetoric.* To explore any potential *shuffling* to the next phase in my conceptual framework, which using *reform rhetoric* and resetting to the starting point of the next policy cycle, I had to explore material from later in Scott's tenure.

I divided the 258 press releases into several different categories. Regarding my conceptual framework, I separated them into: reasoning rhetoric/selling, results rhetoric/spinning, reform rhetoric/shuffling, and neutral/not applicable (NA). I also categorized them by focus and sub-focus, and narrowed down the central messaging strategy used in the article to communicate the Governor's points. I named these styles as they emerged, using elements of grounded theory (Charmaz, 2006). To determine the financial figures used to justify Scott's policy positions, I also tabulated job figures, capital spending of private companies, tax incentives, and government spending, which Governor Scott often referred to as "investment". Finally, I centered my focus on STEM references, and noted how often they are connected to jobs, and whether the STEM reference used a zero-sum *either/or* strategy, a *both/and* neutral position with other disciplines, or a simple STEM-only promotion, without any visible antagonist.

3.2.3 Summary

I cannot claim that the results of this study can be generalized across the population of all policy actors and members of advocacy coalitions. It is exploratory in both purpose as well as its method. The sample I selected to study my population and the methods chosen to conduct the research were purposely based on the best available literature. However, the fact remains that there are not many studies in the body of scholarly research that I could use for guidance. When filling gaps in the literature with exploratory studies, it is unlikely the methods selected will be perfect. The methods of the study provided acceptable levels of response rate and participation, and yielded results that are intriguing, although still exploratory and preliminary in nature. The evaluation of press release data provided perhaps the most thorough picture of policy formation

in Florida. This exploratory study provides a path forward to make press releases from state governors' offices the focal point of research. Unlike some public servants, these releases are readily accessible and provide a clear picture of the strategy used to formulate policy.

4.0 DATA ANALYSIS

As frequently mentioned in this dissertation, this is a limited, exploratory study. Results cannot be generalized across broad groups with labels like “policy makers” or “legislators”. Despite the limited parameters of this dissertation research, I discovered intriguing results. The conceptual framework of selling, spinning, and shuffling held well across the different varieties of data examined by this research. Additionally, while policy actors and members of advocacy coalitions officially expressed the desire for a balanced approach which saw benefit in both liberal arts and STEM disciplines, the language and arguments they used coincided strongly with the linear equation.

In addition to having linear beliefs of a direct, proportional, predictable economic impact from promotion of STEM disciplines, the policy actors I surveyed and interviewed also leaned heavily toward the zero-sum animus toward liberal arts disciplines in favor of STEM ones. Unlike Governor Scott or Senator Gaetz, who are straight-forward and clear with their positions, many people I interviewed would say kind things about the importance of liberal arts study, but then follow it by dismissing its economic significance or lump it into broad, stereotypical groups like “French Literature”.

The quantitative survey data illustrate balanced positions, or a both/and perception of liberal arts and STEM study. This matches with the positions taken by federal figures like President Obama or state leaders like Georgia Governor Nathan Deal. STEM is promoted, and

perhaps slightly favored, but liberal arts are also seen as important. Perception data for both liberal arts aspects like "critical thinking" or the necessity of the K-12 STEM pipeline were robust scores between 5.0-6.0 on a 7-point Likert scale. Furthermore, survey items which asked for blunt opinions of the necessity of state interference with the curriculum at public universities, or diverting funding from liberal arts disciplines and giving that money to STEM departments, were soundly rejected by policy actors across demographic groups. Policy makers also rejected fears of being overtaken by China, along with the idea that STEM education was the most important issue facing the U.S. since the Space Race. The data show a loose relationship between fear of economic rivals and promotion of STEM disciplines. This would appear to reject the premise of zero-sum STEM stimulus, which uses Cold War-era rhetoric of falling behind to encourage STEM investment.

The qualitative data do not match the both/and balanced approach illustrated by the quantitative survey data. When given chances to speak in more detail about their feelings concerning STEM and liberal arts education, on free response survey items and semi-structured interviews, policy actors fall in line behind figures like Senator Gaetz and Governor Scott with either/or arguments. It is possible to warmly support and encourage liberal arts study, until discussing economic impact through education and STEM fields. When given the freedom to control discussion, leaders look for an adversary to place in competition with STEM. Like Scott and Gaetz, they pick the liberal arts for the other side of their either/or positions.

Perhaps the clearest data collected during this dissertation research are the press releases from the Florida Governor's Office. By exploring a 6-month sample of press releases, I was able to determine the rhetorical strategies used to highlight and promote the positions taken by Governor Scott. Unlike other policy actors, the Governor is remarkably clear and consistent with

his message. Job growth and economic impact are stressed consistently, regardless of the subject of the news article. Whenever new job figures were released, STEM education was mentioned, 100% of the time. STEM was not alone in the Governor's job-centered messaging. Jobs were interwoven into stories mentioning fishing licenses, the Everglades, Major League Baseball, and multiple other subjects.

The data collected during the course of this dissertation tell an intriguing story. Most policy actors are not as blunt as Senator Gaetz or Governor Scott. They do not openly disparage liberal arts study. Their survey responses demonstrate some respect for their value. Behind the survey data, there are indicators that their perceptions might be more sympathetic to the either/or, zero-sum attitudes common in the state. Furthermore, examination of the Governor's press releases explains why such attitudes are beneficial. The review of the literature studied for this dissertation raised questions as to how policy makers "kept score" of items as abstract as economic impact through STEM education. The Governor's press releases answered those questions. Business relocation or expansion, Department of Labor statistics, and most importantly, jobs, are used to justify the zero-sum game associated with STEM. The literature demonstrates that augmentations in any of those "scoreboard" indicators cannot be statistically tied to STEM investment at the expense of the liberal arts. However, in politics, perception is reality. By stating it consistently and clearly, Governor Scott has made STEM a central part of his success with job growth in the state. He was re-elected easily, and his motto has changed from "Let's get to work" to "It's working".

I have divided the results of my research into three sections. My first section is centered on the Likert-scale survey data, which analyzed the perceptions policy actors and members of advocacy coalitions had of STEM and the liberal arts. My second section examines the data

gathered from free response questions on the survey and semi-structured interviews with participants. My third section examines the 6-month sample of press releases from Governor Scott's office. The final section examines relationships between these items and offers conclusions from the data collected.

4.1 LIKERT-SCALE SURVEY DATA

Using STATA software, I evaluated the data collected from the survey instrument. I conducted basic descriptive statistical analyses of my data and focused on three primary areas. Was there a relationship between fear of falling behind economic rivals and strong support of STEM education? That would support the rhetoric utilized by policy actors as ideologically diverse as President Eisenhower, President Obama, Governor Christie, Governor O'Malley, and Governor Scott. Did policy actors who promote strong STEM support also believe that the government should have more control over the curriculum and management over public universities? Such data would corroborate the zero-sum, *either/or* positions taken by Governor Scott and his allies who place STEM in an adversarial role against other disciplines. Finally, were STEM and liberal arts support reconcilable? Could there be a future for a *both/and* model favored by the literature and some policy makers? Additionally, I looked for unusual and unexpected relationships, such as strong zero-sum STEM support and a belief that universities should return to the ultra-liberal arts classical model of the Trivium and Quadrivium.

To test the conceptual framework established for this dissertation, and to probe the linear narrative of STEM investment for economic growth from the literature, I conducted statistical analyses of the data centered on the following topics: STEM Promotion, liberal Arts promotion,

fear/falling behind, and the state's relationship with academe. Policy actors generally had positive perceptions of both STEM fields as well as the liberal arts. They were not as fearful about falling behind economic rivals as the literature led me to believe. Most also rejected the idea of state interference with the curricula at public universities in the name of promoting economic impact through STEM. This seems to fortify the *both/and* position which promotes STEM without creating a zero-sum game with the liberal or fine arts.

However, there were some hints of the *either/or* zero-sum position, especially among lawmakers. Although the overall mean scores for government interference with the university curriculum were low, the tabulations of total responses indicate that many policy actors agreed with the perception that the state should create budgets for universities depending on the perceived economic utility of the academic fields in question. At first glance, the quantitative data appear to support a *both/and* approach to STEM and liberal arts policy, but there are strong indicators of the zero-sum strategy which were revealed after closer inspection of the results.

These statistical analyses would have benefited from a larger sample size. I constructed rudimentary correlation matrices from the survey data, and even ran a few ordinary least squares (OLS) regression analyses. I was interested in investigating whether strong, statistically significant correlations could be demonstrated using the data collected for this study. However, because of the number of surveys analyzed, these analyses did not have the power to demonstrate any kind of statistically significant takeaways. While these explorations were deleted from this study, future research can explore finding more substantial quantitative findings, as long as higher *n*-values can be obtained for each of the categories analyzed.

4.1.1 STEM promotion

The responses centered on STEM promotion alone received generally high scores across demographic categories. When STEM-centric survey questions also involved criticizing the liberal arts, response were generally negative. Although respondents provided favorable perceptions of linking STEM investment directly to economic benefit (5.75 mean, *n*-69), they were less likely to link that investment directly to innovation (4.32 mean, *n*-66).

I looked at several survey items to evaluate the perception policy actors and advocacy coalition members had of STEM promotion. On survey question #1, which states, "I believe investment in STEM (science, technology, engineering, & mathematics) disciplines will result in direct economic benefit to Florida, respondents across demographic categories generally agreed. Survey question #3 states, "Florida needs to do a better job in creating a STEM pipeline from Kindergarten through College Graduation". Respondents gave that item a mean score of 5.38 out of 7. Both of these responses seem to give support to the linear model of STEM promotion found in the literature, which draws a straight line between STEM investment and economic impact. Survey item #20, which states, "Innovation can be linked directly to STEM education", was not as likely to receive a positive response. The 2nd half of the linear model of STEM promotion promises innovation, along with economic impact. Participants in this research validate the economic impact portion of the linear equation, but not the promise of innovation. Finally, survey items which provided negative views of the liberal arts received low responses, even if they provided positive opinions of STEM. Survey item #7, stating, "Liberal arts are a waste of time", received a mean score of 2.15 out of 7 (*n*-69), and survey item #2, which states, "STEM subjects are more important than liberal arts subjects (such as humanities) at public universities", received a mean score of just 3.57 (*n*-69). Survey item #8 speaks directly to the

zero-sum STEM positions taken by Florida policy makers, stating, “The state government should provide 6th grade students a list of the ten highest paying majors and ten lowest paying majors in order to encourage more students to get interested in STEM”. This survey item received a mean score of 3.70 (*n*-69), indicating skepticism in this idea, although lawmakers (mean 4.08, *n*-13) were more likely to agree with it. Taken as a whole, there was broad support for ideas like STEM’s creation of economic impact, and the need to create a stronger STEM pipeline to the tertiary level in order to augment the number of STEM majors. However, the types of actions floated by zero-sum STEM proponents to achieve these results, such as taking money out of liberal arts departments or pushing middle schoolers into STEM interest with salary figures, were less popular, even among lawmakers. Support exists across advocacy coalitions and policy actors for promoting STEM, but it is less clear how to accomplish these goals.

Table 4: Response Distribution for "Liberal Arts are a Waste of Time"

University Leaders			**Lawmakers**			**Superintendents**		
Response	**Freq.**	**Percent**	**Response**	**Freq.**	**Percent**	**Response**	**Freq.**	**Percent**
1	17	80.95	**1**	6	46.15	**1**	5	19.23
2	3	14.29	**2**	3	23.08	**2**	8	30.77
3	0	0	**3**	0	0	**3**	7	26.92
4	0	0	**4**	1	7.69	**4**	2	7.69
5	0	0	**5**	2	15.38	**5**	2	7.69
6	0	0	**6**	0	0	**6**	0	0
7	1	4.76	**7**	1	7.69	**7**	2	7.69

These data demonstrate that of the demographic groups with at least ten or more respondents, district superintendents seem to have the strongest pro-STEM perceptions. Their perception that liberal arts was a waste of time (2.85, *n*-26) was over a full point higher than university leaders on a 7-point scale, and 0.7 points higher than the overall sample. Lawmakers' STEM scores were higher than the overall sample, while university leaders' responses were substantially lower.

These data were not surprising. The microcosms of positions related to this issue located in the literature, such as the *Sarasota Herald-Tribune* article published following Scott's anthropology comments (Anderson, 2011, October 10), showed university leaders rising quickly to the defense of the liberal arts. It is more interesting that district superintendents were more likely than lawmakers to label the liberal arts as a waste of time. Perhaps they feel the pressure to ameliorate the shortage of math and science teachers in their districts-a shortage described in detail by President Obama's STEM council (National Science and Technology Council, 2013). While lawmakers' perception of STEM education is often built on popular consensus or following the lead of more powerful policy actors, district superintendents are intimately familiar with the everyday tasks of filling vacancies and finding qualified candidates for jobs in their districts. Their strong support of zero-sum STEM promotion, and even their willingness to be extremely critical of liberal arts fields, could perhaps be traced to these issues.

Although the overall mean scores for zero-sum, *either/or* STEM positions were low, the range of responses and dot-plot distributions illustrate a more complicated story. The most common answer choice for a direct pathway between STEM and economic benefit was 7-very strongly agree. The most common choice for both building a STEM pipeline and a direct relationship between STEM and innovation was a 5-somewhat agree. The zero-sum responses

which placed STEM against the liberal arts had fairly low mean scores (3.57, 2.15, 3.70 respectively). However, these numbers were weighed down by several responses of 2 (strongly disagree) or 1 (very strongly disagree). 5 (somewhat agree) was one of the most common answer choices for the survey item stating, "STEM subjects are more important than liberal arts subjects (such as humanities) at public universities". 30.44% of respondents answered 5, 6, or 7 on that survey item.

On the more extreme survey item, "Liberal arts majors are a waste of time", 1-very strongly disagree, was the most common response. However, it was far from a unanimous choice. While over 95% of university leaders either very strongly disagreed or strongly disagreed with that statement, 23.08% of lawmakers agreed with it, along with 15.39% of district superintendents. Requiring the state to provide 6th grade students with a list of the ten majors with the highest salaries and ten majors with the lowest salaries had a fairly even distribution of responses, with 4(neither agree nor disagree) being the most common response. Therefore, while initial impressions of the data would suggest a strong rejection of zero-sum positions which put STEM fields in direct competition with the liberal arts, a closer look at ranges and variance in response indicates that many policy makers lean toward zero-sum perceptions. With both lawmakers and district superintendents demonstrating support for zero-sum positions, it is not surprising that major policy actors like Governor Scott boldly pursue policy initiatives that express these positions.

4.1.2 Liberal arts promotion

For the most part, policy actors had a positive perception of promoting the liberal arts, with similar figures and support as they gave to STEM fields. Given the prevalence of zero-sum

positions in the literature, I expected lukewarm responses to pro-liberal arts survey items. The positive responses to liberal arts questions indicate potential for *both/and* policy positions on these subjects. Promoting STEM education does not have to mean creating a zero-sum contest with the liberal arts. I categorized several survey items using the label, "Positive Perception of Liberal Arts".

On survey item #9, which states, "A liberal arts education provides graduates with a broad set of skills that allow them to enter many well-paying career paths", participants responded with a mean score of 5.13. That's similar to the average of 5.38 from respondents hoping to build a stronger STEM education pipeline, although not as high as the 5.75 average of respondents who believed STEM investment had a direct, beneficial impact on Florida's economy. Survey item # 11, which states, "Teaching college students to think critically is more important than training in specific fields at public universities", respondents had a mean score of 5.03 out of 7. Both pro-liberal arts positions are solidly in the category of "somewhat agree" on the 7-point Likert-scale survey. Survey item #16, which states, "The United States should concentrate less on STEM fields and more on writing and critical reading", did not receive such affirmative responses. This survey item received a mean score of 3.44. When participants were asked to judge the benefits of the liberal arts alone, they gave positive responses. When presented with liberal arts in a zero-sum game with STEM, they were less inclined to favor the survey item. As liberal arts proponents look for takeaways from this study, they should make note of that fact. While some policy actors create zero-sum games between STEM and the liberal arts to advance their agendas, trying to win that game is not an effective solution. Policy actors and members of advocacy coalitions have a more positive perception of liberal arts when they are standing alone on their own merits. The best option in the present education climate

could be removing zero-sum from the equation, and making STEM and liberal arts education a *both/and* relationship instead of an *either/or*.

Table 5. Liberal Arts Mean Scores

Variable	Lawmakers	Superintendents	University Leaders
Liberal Arts Ed. Provides Broad Skill-Set	4.77	4.48	5.81
Critical Thinking>Job Training at College	4.77	4.42	5.81
Writing/Critical Reading>STEM	3.31	3.08	3.74
Return to Trivium & Quadrivium	3.46	2.84	2.00

Providing a *both/and* alternative to zero-sum STEM positions would be advantageous for liberal arts proponents, because these figures are boosted heavily by university stakeholders. Lawmakers and superintendents have liberal arts perception mean scores that are over a full point lower than university leaders on a 7-point Likert-scale. The one outlier was lawmakers' perception of the classical liberal arts curriculum of the Trivium and Quadrivium. Survey item #5, stating, "Public universities should get rid of electives and return to the classical education model of the Trivium (logic, rhetoric & grammar) and Quadrivium (arithmetic, geometry, astronomy & music)", received higher scores from lawmakers than both superintendents and university leaders. The rejection of this concept by university leaders could be the fact that they are aware that electives and general education requirements strengthen their enrollment figures

(Jennings, 2014), and are reticent to return to a curriculum model that might gut their course catalogues. They might also see the Trivium and Quadrivium as archaic elements of a bygone era, and would prefer to focus on learning communities and general education clusters. Furthermore, lawmakers did not support this classical liberal arts curriculum model in large numbers; the mean score for this subgroup was only 3.46. Nonetheless, it was an interesting outlier in the data, which trend to the pattern of superintendents being the strongest STEM supporters and most skeptical of the liberal arts, with lawmakers close behind, and university leaders representing the liberal arts' most loyal defenders.

4.1.3 Fear & falling behind

Fear of falling behind economic and political rivals has been a consistent force behind promotion of STEM education. Governor O'Malley of Maryland expressed concern over a "brain drain" resulting in his state losing talent and economic opportunity to its neighbors (Kirwan & Strekfus, 2009), President Obama drew attention to China awarding over 50% of degrees in STEM fields, compared to less than 20% in the United States (National Science and Technology Council, 2013), and President Eisenhower worried about Soviet domination of outer space. Given my examination of the literature, I expected strong agreement with survey items that suggested the United States was being surpassed by its rivals, and STEM promotion was a way to catch up.

Table 6. Fear and STEM Promotion

Variable	Lawmakers	Superintendents	University Leaders
Other Countries Better with STEM	5.15 (*n*-13)	4.33 (*n*-24)	4.33 (*n*-21)
Risk of China Domination	3.39 (*n*-13)	3.96 (*n*-24)	3.05 (*n*-21)
STEM=New Space Race	3.46 (*n*-13)	3.88 (*n*-25)	3.33 (*n*-21)

The responses did not match my expectations. At first glance, participants did not agree with any survey item related to fear of falling behind. They strongly disagreed with portrayals of STEM promotion as a new Space Race, despite the fact that the rhetoric policy makers use to promote STEM is similar to the words used by Eisenhower to light a fire under the American populace after the launch of *Sputnik*. While the subgroup of lawmakers worried about other countries doing better in STEM education than the United States (5.15 mean score), they rejected the notion that failure to bridge the gap in STEM would result in economic domination by China (3.39) and that competing against China and India in STEM represented the most important issue facing U.S. education since racing the Soviet Union to the moon (3.46). Among all participants, no other fear/falling behind survey item reached a score of 5 (somewhat agree) on a 7-point Likert-scale.

Despite the low mean scores, 5 (somewhat agree) was the most common response on STEM representing the new Space Race for the United States. Once again, response distribution demonstrates that the data are more complicated than a single mean score. Although many of the policy actors and members of advocacy coalitions weighed down scores with responses of 1-2, the number of respondents who chose "somewhat agree" for this survey item reinforces the idea that falling behind economic competitors creates similar urgency to the Space Race.

4.1.4 State role in academic management

Even among policy actors who strongly supported STEM, most also support university management over curriculum and do not want the state involved with determining courses of study. Despite the comments made by former Governor Jeb Bush equating a liberal arts degree with a career at Chick-Fil-A (Mills, 2015, October 24), or Senator Marco Rubio's claim that the country needed more welders and fewer philosophers (Krieg, 2015, November 11), policy actors and members of advocacy coalitions, by and large, did not support state interference in the management of public universities. Superintendents were the most likely to favor state determination of academic budgets based on perceived impact on high-tech job growth (mean score 4.54), but lawmakers (4.08) were more ambivalent and university leaders (1.79) strongly rejected this idea. All groups strongly disagreed with both government control over the curriculum (1.90) and states taking money directly from liberal arts disciplines and giving it to STEM departments (2.08).

Table 7. The State & University Management

Survey Item	All Participants	Lawmakers	Superintendents	University Leaders
#4: The State Gov't should determine budgets for ac. departments based on capacity…to create high-tech, high-wage jobs.	3.37 (*n*-67)	4.08 (*n*-13)	4.54 (*n*-26)	1.78 (*n*-19)
#6: The State Government should determine which courses are taught at public universities	1.89 (*n-69*)	2.46 (*n-13*)	2.46 (*n*-26)	1.14 (*n*-21)
#14: The State should have the power to take money from liberal arts departments… and give that money to STEM departments instead.	2.08 (*n*-67)	2.85 (*n*-13)	2.48 (*n*-25)	1.38 (*n*-21)

Table 8. Response Distribution: "The State Should Determine Academic Budgets Based on Capacity to Create High-Tech Jobs"

Likert-Scale Score	All Participants	Lawmakers	Superintendents	Univ. Leaders
1	17 (25.37%)	2 (15.38%)	1 (3.85%)	9 (47.37%)
2	10 (14.93%)	2 (15.38%)	2 (7.69%)	5 (26.32%)
3	15 (22.39%)	2 (15.38%)	7 (26.92%)	5 (26.32%)
4	3 (4.48%)	1 (7.69%)	2 (7.69%)	0
5	7 (10.45%)	1 (7.69%)	5 (19.23%)	0
6	8 (11.94%)	3 (23.08%)	4 (15.38%)	0
7	7 (10.45%)	2 (15.38%)	5 (19.23%)	0

One might expect that third aspect to be higher, and similar to the first on that list. Survey item #4 states, “The state government should determine budgets for academic departments based on the capacity of those departments to produce graduates who will create high-tech, high-wage jobs”. The overall mean score from respondents for this survey item was a 3.37 out of 7, with superintendents favoring the item more than a full point higher (4.54). Survey item #6 states, “The state government should determine which courses are taught at public universities”. This received a mean score of 1.90, with no subgroup scoring higher than 2.50. This seems to suggest that while most participants did not believe the state government should interfere with individual university budgets, even fewer wanted the government to take responsibility for determining university curricula. Despite lawmakers’ and superintendents’ willingness to determine budgets for academic departments based on job utility, participants

were less likely to agree with a direct, zero-sum proposal. Survey item #14 states, "The State should have the power to take money at public universities and give that money to STEM departments instead". This survey item received just a 2.85 mean score from lawmakers and 2.48 from superintendents. University leaders responded with a 1.38 for that survey item.

These data illustrate a challenging scenario for policy actors pursuing zero-sum STEM promotion. There is broad support across categories that attests to STEM's potential to benefit state economies, and the need to build a stronger STEM pipeline. Although mean scores for fear indicators were low, the response distribution for these survey items showcases that many lawmakers and superintendents are fearful of international competition in STEM fields, and even see STEM education as a new Space Race. Therefore, there's both a recognition of the need for STEM funding, along with a motivation to close perceived gaps with economic rivals. However, the data demonstrate very little support for codifying some of the measures proposed by more forceful zero-sum STEM advocates. It is clear that many policy actors fear falling behind in STEM education, and would like to see the United States push more students into STEM majors. Many also have negative perceptions of the utility and necessity of liberal arts subjects. Despite these feelings, they do not show much interest in altering the present relationship between universities and state governing bodies, even if it were under the pretense of promoting STEM at the expense of the liberal arts. If policy actors wish to achieve these goals, they will likely have to find an alternative pathway. State interference in management of state universities, even to help STEM education, was not a popular option among any of the groups surveyed.

4.1.5 Likert-scale analysis summary

Initial analyses seem to indicate strong support for a *both/and* position regarding STEM and liberal arts education policy. Survey items which stressed support for STEM or the liberal arts, without denigrating the other, tended to receive positive responses across demographic groups. Among subgroups, district superintendents gave the strongest support for STEM, followed by lawmakers and university leaders. University leaders provided the most positive responses for pro-liberal arts survey items, and were more likely to see both economic benefit from STEM and value in liberal arts study.

At a closer glance, support began to emerge for *either/or*, zero-sum positions. Although mean values were low on zero-sum survey items, response distribution indicates that many policy actors express agreement with these positions, especially superintendents and lawmakers. While superintendents did not supplement their zero-sum support with fear indicators, lawmakers also expressed concern about economic rivals like China and India. These layers of STEM promotion, interwoven with fear of falling behind on the world stage, back up conclusions from the literature about the history of STEM education.

However, the strongest scores across *all* demographic groups were evident in recognizing STEM education's economic impact and the need to create a stronger K-20 STEM pipeline. This relationship was evident in all quantitative measures used to evaluate the survey data. They were the survey items which showed consensus between numerous stakeholders and policy actors, and have promise to be an area of cooperation in future policy formation.

Further research is required to study these relationships further. While *both/and* positions received strong support, the presence of zero-sum models in the data is clear. Policy actors who were not university leaders displayed a moderate level of animus to liberal arts disciplines, which

was reflected in response distributions on *either/or* survey items. The difference between the survey participants and policy actors like Governor Scott is also clear. Governor Scott openly disparages the liberal arts, while the survey participants give them praise and simultaneously express support for items which threaten their vitality at public universities. These complexities within the data were explored further in semi-structured interviews with survey participants, along with qualitative free response items in the survey instrument.

4.2 EVALUATION OF QUALITATIVE SURVEY DATA AND INTERVIEWS

The qualitative data provide clarity and nuance to the quantitative material. Within the Likert-scale survey data, hints emerged supporting the *either/or* argument for STEM promotion at the expense of the liberal arts. In the free-response section of the survey as well as the semi-structured, follow-up interviews with participants, these hints became more direct. While some policy actors became more explicit in their criticism of the liberal arts, others provided robust defense for both liberal arts disciplines as well as a *both/and* approach to STEM education policy. The responses are categorized into positions of *zero-sum* STEM promotion, *both/and* STEM and liberal arts promotion, fear of economic rivals, and various viewpoints on the role of the state in university management.

4.2.1 Zero-sum STEM promotion

In free-response survey items, along with follow-up interviews, participants espoused positions that supported a zero-sum position promoting STEM at the expense of the liberal arts. In many

cases, participants said kind words about the liberal arts at other points in the interview or survey. Nevertheless, the rhetoric they employed often mirrored that of more bellicose policy actors. Although they might have noted the benefits of the liberal arts when asked directly, when they spoke of STEM, criticism of liberal arts fields was tied to promotion of STEM disciplines.

Liberal arts majors were seen as frivolous or expendable. One lawmaker states, "I am telling students now to take two majors, one they like, and one to get a job in-especially innovative tech jobs." Another lawmaker, after listing his college major as political science, referred to that decision as a "big mistake". A district superintendent felt that future elementary school teachers should not bother with taking liberal arts courses at the university level. Early in his interview, he says bluntly, "it seems ridiculous for a K-3 person to take French Lit" (P1, p. 1). When discussing teacher training in particular, he states, "I think in training teachers…they need to spend more time learning how to be a teacher and learning how to teach STEM courses rather than, in my opinion, wasting time with liberal arts at the university" (P1, p. 1). Such ideas are not confined to the state of Florida. Discussing policy actors, a Florida university administrator notes,

> [They're] trying to dictate what kind of majors are being offered at the university, limiting opportunities to have students, um, trying to decide that students in certain majors will have to pay more than other students for courses for their major, because their major is not, 'in high demand', and the constant belittling of, for example, colleges of education, or the liberal arts…now, North Carolina's governor, Pat McCrory, who by the way was a political science major, uh, came out a couple of years ago saying, "What's the point of the liberal arts? Are the liberal arts even necessary? If you major in the liberal arts you're an idiot." (P3, p. 2)

These attitudes appear to mirror former Governor Jeb Bush's comment that psychology majors will eventually find themselves working for Chick-fil-A (Mills, 2015, October 24). These qualitative responses counter the low mean scores received for anti-liberal arts quantitative survey items. Even though the majority gave those items low scores, the minority who favored them were quite vocal when given the opportunity to explain their ideas.

4.2.2 *Both/And* STEM & liberal arts balance

As the quantitative data demonstrated, the *both/and* position of simultaneous promotion of both STEM and liberal arts disciplines generated the strongest levels of support. A U.S. Representative from Florida states, "We should and can do both-promote and encourage STEM and liberal arts education, and in secondary school STEM and vocational. We must not resign one to the other." This attitude was echoed by participants in other groups. A university administrator writes, "Dualistic thinking (either/or) on STEM vs. liberal arts is wrong-headed. Both/and thinking is more useful". A union leader spoke directly to the zero-sum issue in a follow-up interview. He states,

> I don't think it's a zero-sum game, there can, well, there should be plenty of funding for both, you know, like what I always tell people is, we're the richest country in the world, there's no reason why we should have homeless people or people hungry. Or people not healthy. It shouldn't happen. We've got more wealth than the rest of the world combined, so the same applies for education; there's no reason why you can't [have] plenty of ways to fund both STEM and liberal arts. They should co-exist. (P2, p. 6)

A more pressing concern to most policy actors was jobs. Although they tied STEM to job growth, most did not insult the liberal arts in doing so. A lawmaker and business owner writes, "STEM majors are valuable-but a big problem is the cost of paying talented people in the U.S. and abroad-far more cost-effective outside the U.S. We have a lot of talent in STEM, but U.S. companies are reluctant to pay at that level." Translating that talent into jobs is a difficult equation, particularly in education. A district superintendent notes, "If Florida's serious about STEM, and if the nation is serious about STEM, those people…you can't pay them $34,000 starting salary. We need the flexibility with our union to say, "Hey, this person worked 10 years with NASA on the shuttle…we should be able to give them that kind of experience" (P1, p. 2). University leaders and some union representatives saw robust support of both STEM and liberal arts disciplines as a way to provide economic impact, but cautioned against turning the state

university into a training ground. A university faculty member writes, "STEM is important but higher ed. is not job training. Education→ to lead out of ignorance; to produce critical thinking, is still the basic vision of higher ed." (emphasis respondent's). A union leader states, "Plenty of people with science backgrounds create technologies which make work easier for people…it makes a huge impact on the economy. I think you need both…You have to have the free thinkers and you have to have the logical, scientific people who can take an idea and turn it into something" (P2, p. 5). A *both/and* approach satisfied policy actors who saw universities as economic engines as well as centers for promoting service. A university administrator states, "…the purpose of a university education is to create a well-rounded and engaged citizen who is able to go earn a living and contribute to the civic culture and life of a community. Right now we focus more on the earn a living part" (P3, p. 6). To those who ascribed to the *both/and* approach, the liberal arts were complementary partners of STEM disciplines in producing citizens who had the technical capacity to create innovation, and the civic responsibility to harness that innovation in a manner which benefited society.

University leaders were more likely to acknowledge the necessity of STEM but also urge balance in the curriculum. A university administrator states, "I think STEM investment is important and necessary…We're always looking at the economic benefit of education and not anything else…do I think STEM has a huge economic impact? I think it does. I think it supports Florida, but I think we've gone overboard in that direction" (P3, p. 5). The policy actors who supported balance in university purpose were less likely than zero-sum advocates to profess a fear of economic rivals. That point will be discussed in detail in the next section.

4.2.3 Fear of falling behind

Policy actors who placed STEM in zero-sum competition against the liberal arts tended to also express wariness or alarm at the advance of economic and political rivals, particularly India and China. This provides support for the linear model of STEM promotion, which has been forwarded by Presidents Eisenhower and Obama alike. STEM education was seen as a means of closing the ever-widening gap between the United States and countries it competes with in the global marketplace. One superintendent states,

> P1 I mean, my tax returns are taken care of in *India*…I think that's dangerous for the United States with things like that. (long pause). But if we're gonna have people that are, you know, smart enough, and somehow we've got to change the outlook on education, and I can say this from experience. Students in the United States score better on AP advance placement courses worldwide, than anybody else…and if you take all of our AP kids and you compare them to the kids in China and Europe that are going to college that were sent to vocational-type schools, then you'll see our kids do just as well as they do, but it's become a political issue to (long pause), for public schools. Because we subscribe to….well, you're downtrodden and you're blueberries and we'll teach em' all to read.
>
> RL: Ok…
>
> P1: And our country is educating more foreign students than probably ever before.
>
> RL: Ok….
>
> P1: (long pause) That's a threat to national security. (P1, p. 7, emphasis respondent's)

Another superintendent, when asked about the danger of economic domination by China and India, writes fatalistically, "They have so many more people; that will probably happen anyway." To some respondents, success in STEM is vital for both economic and national security. While the superintendent quoted earlier found the arrival of international students to be dangerous, others saw it as proof of the competitiveness of America's own education system, which includes STEM. Another district superintendent opines, "I have no fear of China or India. If they're overtaking us, why do they send their best students here- over 250,000 annually?" A different superintendent, scoffing at the notion that STEM education represented a new space race, states, "I'm not worried about competitions; I'm worried about jobs." As a subgroup,

district superintendents were direct with their responses, and landed in both balanced and zero-sum positions regarding STEM. Superintendents who were more zero-sum with their qualitative and quantitative responses were also more likely to be worried about economic rivalries with India and China. Those who ascribed to a *both/and* approach were less concerned.

University leaders recognized the economic and security benefits of STEM, but instead of expressing alarm about closing the gap, they sought ways to get more students into STEM fields while also valuing the benefits of liberal arts disciplines. One university administrator writes, "Universities and colleges respond to enrollment demand-we need to stimulate interest in STEM from early ages through graduate school." This backs up the strong support university leaders gave in quantitative responses to fostering a robust K-20 STEM pipeline. Another university administrator notes, "When you're talking about NSA, and you're talking about encryption, talking about military defense, I think those things, STEM has a huge impact on national security. But I also think that liberal arts has a huge impact on national security. Think about the arguments over the Constitution, for example. You can't approach that from a STEM perspective. I mean, you can't. You have to understand the history. You have to understand the politics" (P3, p. 5). A union leader states bluntly, "[STEM] impacts national security in lots of ways. I mean, you got drones, these pilotless drones that mean you don't have to put a pilot's life at risk. You put the drone in the air, sent it a thousand miles, and let it strafe the shit out of something, or surveil the shit out of something, come home, and there's the pilot, and he's sitting at the controls at the console" (P2, p.5).

As a whole, policy actors had complicated responses to the issue of competition with political, military, and economic rivals, and STEM's role in those competitions. Superintendents and lawmakers tended to express more alarm at being overtaken by China and India, and were

more likely to display *either/or* attitudes in placing STEM in competition against the liberal arts. However, no group was homogenous in nature. Interesting qualitative responses across demographic groups display ways in which STEM and liberal arts programs can co-exist and each provide benefits for America's national and economic security, without placing one in competition against the other.

4.2.4 The state and university management

Policy actors had different views on the state's role in STEM education and university management. Most did not see Governor Scott as a major power player in Florida higher education policy, and 2/3 of the interview participants pointed at State Senator Don Gaetz as one of the primary drivers of governance. One union leader states,

> RL: Ok, so, from your perspective, who would you identify as the education power players in Florida policy formation?
>
> P2: I guess in the Senate you have Don Gaetz…not an education expert, but thinks he's an expert. Latvala, to some extent, I think. On the House side, I cant' really think of anybody on the House side, they're all crazy as bat shit over there. Um, outside the Legislature, I'd say the Board of Governors, only because of their role in controlling universities…
>
> RL: So would you say the Legislature and the Board of Governors are bigger power players than the Governor in this area?
>
> P2: Oh, absolutely. The Governor is marginally-he's been marginal on everything, particularly education. Nobody listens to him. (P2, p. 2)

A university administrator also pointed at the Legislature and Don Gaetz as power players, but discounted the role of the Board of Governors, stating,

> I would say Don Gaetz, who is involved in the legislature, I think he's Senate appropriations chair…but basically I would say the power players are the state legislature, who dictates funding for resources…obviously the Governor, um, the Board of Regents has some power, but they're pretty much puppets of the legislators and the Governor, which have the power of appointment there...So that list is short, doesn't take long to read, the state legislature is really the power for directing the power here. And I'm not sure how open they are to real education experts. (P3, p. 3).

A district superintendent echoes the view that the state legislators are the primary engines of policy, and notes that they often promote their own interests while pushing for education

legislation. He states, “We have, uh, legislators that think they have good ideas and they don’t see information about implementation…and we have legislators that own charter schools that are for-profit. And they’re introducing legislation in the legislature that lines their pockets” (P1, p. 5). Whether legislators are incompetent, well-meaning, or using their offices to advance their own interests, most university leaders want them out of higher education governance. One university administrator writes, “The state government must accept university and college governance and stay out of the curriculum” (emphasis respondent’s).

That brings up a challenging issue for both university administrators and legislators moving forward. Higher education leaders are happy to accept state funding, but averse to giving up autonomous governance over university affairs. Legislators control funding, and often introduce legislation which provides money to higher education, but want their ideas incorporated into university management. This conflict expressed in the data supports material found in the literature. Former university faculty member and Oregon State Representative, Tony Van Vliet, when discussing HEI leaders, notes, “They want all perks that go with a public agency, such as access to funds, but the advantages of the private sector. It doesn’t give much accountability either way. They can’t be neither fish nor fowl” (Lively, 1995, pg. 1). In Florida and across the nation, policy actors must figure out their roles in higher education governance. The quantitative and qualitative data gathered in this study demonstrate that these roles are still a subject of debate.

4.2.5 Unique insights from interview data

Many unique insights emerged from the follow-up interviews that were not express objects of focus in this dissertation study. They are included to provide additional insight to this research

and open avenues for future research. Furthermore, these nuanced perspectives demonstrate the complexity of this issue. STEM and liberal arts education policy has been framed as a zero-sum game. However, even among policy actors who favored that viewpoint, points of divergence emerged among *either/or* proponents.

The district superintendent that was interviewed in this study adopted rhetoric indicating support for the zero-sum position placing STEM in competition with the liberal arts. He also diverged with zero-sum actors on issues such as school choice, charter schools, and teacher performance pay. He states, "You know, the Medical Board has all doctors on it. The Law Board, I mean, the Bar, has all lawyers on it. The CPA has all CPA accountants, but the Board of Education has no educators. Not even one. And they're totally controlled by Jeb Bush. And the quicker Jeb drops out [of the 2016 Presidential race] the better off we will be" (P1, p. 5).

He spent much of his interview commenting on the difficulty on recruiting qualified math and science teachers. A primary focus was certification. He felt that the state should be more flexible in allowing pathways into the classroom for qualified professionals in STEM fields, and that the district should have the means of compensating them properly. He states,

> Our local community program has a teacher prep program and, gosh I can't say it, education we're worse than the military on having acronyms, but it's a teacher education program for people who do not have a degree from the school of education, which I think is ridiculous. They have to go through that program all year to get certification. Case in point, I hired a lady…she graduated with a degree in aerospace engineering. She worked for NASA at the Cape and Houston, working on the shuttle and the space station. And mathematically, she was certified 6-12 through the state of Florida in math…but they would not certify her in physics…This lady, she was our teacher of the year, and God, she should have been the state teacher of the year…she doesn't need to waste her time, doing, you know, 'here's how you should be doing'…and certainly didn't need to go take that *test*, and pay *$200*, to be certified in physics! (P1, pp. 3-4, emphasis respondent's)

He was also especially critical of the pet projects of legislators that he saw as wastes of time and money. This was particularly true with teacher pay, which one legislator attempted to tie to a teacher's college entrance exam scores. He notes, "And last year, one of the legislators had a great idea, he…wanted to pay teachers a $10,000 bonus based on their SAT or ACT score

that they took when they were 18...there's no correlation between an SAT score and an effective teacher in the classroom. No more than a doctor, an MD, and his or her ability to be a great medical doctor…it would waste $40 million dollars" (P1, p. 5). The pathway to strong STEM results was not rewarding teachers for a test they took in high school. It was smoothing out the pathway to certification for STEM professionals and starting them on a higher step in the pay scale based on their experience in scientific fields.

The higher education union leader interviewed for this study might have been one of the strongest voices for the *both/and* balance between STEM and liberal arts fields. He was a proponent of Capital K research and not relying on the linear model of crafting or controlling university research for the purpose of perceived economic impact. He was concerned that a race to the bottom with faculty salaries and benefits will diminish the quality of HEIs in Florida and threaten their ability to provide economic innovation for the state. He states,

> Right, move the nation ahead, globalize the university, bring bucks into the university, grant bucks and royalty bucks, you know Florida State, its big money-maker for years was Taxol. They made a ton of freakin' money off of Taxol. As in hundreds of millions, cause it's a widely used cancer drug….Sir Harry Kroto, Nobel Prize winner in Chemistry and he was part of the faculty for some time, semi-retired and moving back to England…how do you keep those kind of guys on the faculty if it's a race to the bottom? (P2, p. 10)

He also saw corporatization of the university as a threat to both academic freedom as well as university autonomy, noting "Trying to get universities to get corporate, private funding…it's having a negative influence on higher education…Koch Brothers just being one available, yet all sorts of corporate donors and private individuals making donations, you know and they do it all they time, but there's always been a clear line between the donor's wishes and the desire of the university and particularly the faculty to keep themselves at arm's length from any donor, so that the research isn't tainted" (P2, p. 3). The union leader lamented that higher education has lost its status as a non-politicized neutral zone, and that performance metrics created by the legislature have forced universities to compete for previously allotted funds. Such actions create zero-sum

games at the state level, forcing universities to compete against each other. He saw that as antithetical to the purpose of higher education: the pursuit of knowledge for knowledge's sake. He states,

> P2:I've always believed that the purpose of a university education is to produce and enlighten an educated citizenry. Period. It ain't to produce an economic engine, and it ain't to satisfy the politics of one party or another. It's to create knowledge for knowledge's sake. You know, and hopefully that knowledge gets used in a way that benefits all of society…
>
> RL: So would you say that some of this research that's pursued…could some of that potentially have economic benefit? That it wasn't originally designed for?
>
> P2: Yeah, sure…you produce knowledge for knowledge's sake, and some creative mind can take something that some researcher did at the University of California and combine it with something that somebody did at the University of Florida and put the two together and come up with a product or service or something that improves our lives (pause)…hell, yeah. That's what it's there for. (P2, p. 8).

This perspective falls in line with the university administrator interviewed for this study. He was concerned with the need for civic engagement and called for new performance metrics which took into account elements like service and participation in the community. Like the union leader, the university administrator was also concerned with corporatization on campus, but he was more worried about its potential to erode the academy's mission of service and creating well-rounded graduates. He saw the liberal arts as a means of *completing* STEM study, and noted that STEM-only concentration can potentially lead to dangerous results. He states, "I believe that it doesn't matter how educated you are in the sciences and in math, if you do not have an understanding of human nature and human history, you can do (pause)…not necessarily good things with your science and math background. I mean, no one wants a technocrat with no understanding of human beings (P3, p. 1).

He provided an extreme example of some of those "not necessarily good things" that STEM-centric graduates could do with their unbalanced education. He notes,

> Let's step back on this thing and put it into an American context. Um, think about, for example, groups like Al Qaeda and even Daesh…ISIS. A lot of their members seem to be engineers. That's a fascinating thing to me. What that suggests to me is that perhaps a heavy emphasis on the STEM disciplines does not *provide* you with an opportunity to work with other people and think about other people and *their* perspectives and their beliefs. It tends to make you believe that you have the one right answer…I think

> honestly in the hard sciences…in these STEM disciplines, I think there's less of a, um, questioning yourself…I mean certainly you're questioning hypotheses, scientific hypotheses, but you might not be questioning the rightness of your beliefs. (P3, pp. 4-5, emphasis respondent's).

Each of these items was not a primary focus of this study, but emerged organically in the course of these semi-structured interviews. Generally speaking, non-lawmakers identified the state legislature as the primary mover of education policy, and they did not consider it a strong ally of education. Funding models, certification pathways, and performance metrics were major concerns to the participants involved, even more so than perceptions policy actors had of STEM and the liberal arts. Even though they were not central features of this study, they could be strong avenues for future research.

4.2.6 Summary

None of the subgroups were homogenous in nature. The *either/or*, zero-sum position received more overt support from several policy actors, most notably superintendents and lawmakers. However, the *both/and* balanced viewpoint, which stressed STEM support as well as value for liberal arts fields, also showed strong support across demographic groups.

Zero-sum proponents were more likely than *both/and* advocates to express alarm toward economic rivals like India and China. However, policy actors of all viewpoints expressed varying opinions on how to approach those competitors, with jobs and salaries as a primary concern.

The participants who completed follow-up interviews had many valid concerns that were not primary focuses of this study. K-12 certification pathways, salary scales, union negotiations, performance matrices, and the relationship between government and academy stakeholders were all more pressing issues than the perceptions policy actors had of STEM and liberal arts

education. These perspectives bolstered this study by adding unexpected viewpoints, and mapped out new research possibilities.

Finally, the state legislature was seen as the primary driver of education policy in Florida, and it was not viewed as a friendly ally of the academy. While the legislature provided funding for higher education, that funding often included conditions which threatened academic autonomy and freedom. Union representatives and university administrators were also concerned with the consequences of the corporatization of higher education. That raises an interesting dilemma. The state government as well as private companies and individuals all offer funding opportunities for colleges and universities, and each of those opportunities contain downsides. Unless higher education institutions can emerge as financially self-sufficient entities, they might have to decide which conditions they are comfortable with accepting.

4.3 ANALYSIS OF PRESS RELEASES

The Governor's Office makes press releases publicly available. Each statement released from the office contains a link that can be accessed for up to a year, and then they are archived and available for retrieval. I chose to examine a sample of 258 press releases, published between January 2015 and June 2015. January 2015 represented the beginning of Governor Rick Scott's second term. Since much of the material I examined for the literature review of this study focused on the Governor's first term and his theme of "Let's Get to Work", I wanted to explore the rhetorical style and issues he stressed as he began the second half of his tenure.

I examined each of the press releases that were published in that selected time period. Using elements of grounded theory (Charmaz, 2014), I attempted to make sense of the data. I

identified the issues discussed in each press release, categorizing them as **focus** and **sub-focus**. I then attempted to identify the messaging strategy used to promote the Governor's position, and categorized that position as **message**. Finally, using the conceptual framework developed for this study, I categorized the message of each press release as **Selling, Spinning**, **Shuffling**, or **Neutral**. I included additional tallies for each press release, noting how many jobs the Governor claimed were created, how much economic impact and/or capital investment was estimated, and the total amount of tax relief that the Governor claimed. These items were not included in the final results of this dissertation study, since my concentration was on narratives, perception, and policy formation. Although they were excluded from my final data set, they represent an interesting avenue for future research.

Table 9. Press Releases (Jan. 2015-Jun. 2015 by Focus

Rank	Issue	Focus	Sub-Focus	Total	% Of Sample
1	Jobs	111	19	130	50.38%
2	STEM	3	52	55	21.32%
3	State Pride	13	35	48	18.61%
4	Economic Impact	1	42	43	16.67%
5	Law/Legislation/Governance	23	20	43	16.67%
6	Tax Rates	11	17	28	10.85%
7	Government Procedure	7	21	28	10.85%
8	Service	14	13	27	10.47%
9	Education	24	2	26	10.08%
10	Military	17	8	25	9.69%
11	Infrastructure	3	11	14	5.43%
12	Health Care	12	0	12	4.65%
13	Environment	7	1	8	3.10%
14	Low-Income Citizens	0	6	6	2.33%
15	Minority Issues	3	0	3	1.16%
16	International Relations	3	0	3	1.16%

Table 9 continued

17	Innovation	3	0	3	1.16%
18	Sports/Leisure	1	2	3	1.16%
19	Religion	2	0	2	0.78%
20	Emergency/Disaster	1	0	1	0.39%
21	Family Values	1	0	1	0.39%
22	Women's Issues	1	0	1	0.39%
23	Mandates	0	1	1	0.39%
24	Voter Rights	0	1	1	0.39%
25	Terrorism	0	1	1	0.39%

Following my initial categorizations of the press releases, I cleaned the data by organizing similar topics or messaging themes together. For example, "Boast", "Naming", and "Florida Wins" were originally three separate messaging strategies I identified during my first evaluation of the press release data. As I examined the releases a second time, I realized that "Boast" was a redundant categorization. However, it was important to distinguish when the Governor was boasting about the *state's* victories and when he was listing the accomplishments of *individuals*, utilizing credit-claiming strategies to strengthen his own position (Mills, 2007; Ness, 2010a). Boasts that were centered on the state's success were categorized as "Florida Wins". Boasts centered on individuals were shifted to the "Naming" category. "Naming" was a popular messaging strategy, second only to "Florida Wins" in number. That makes sense. Claiming credit for successes has been noted by many policy scholars as a means of strengthening odds of re-election. *Sharing* credit is an effective mechanism to build advocacy coalitions and recruit allies. Dale Carnegie, author of the best-selling book, *How to Win Friends and Influence People*, recognized this fact decades ago. He notes,

> Gunter Schmidt, who took our course in West Germany, told of an employee in the food store he managed who was negligent about putting the proper price tags on the shelves where the items were displayed…Reminders, admonitions, confrontations with her about this did not do much good. Finally, Mr.

> Schmidt called her into his office and told her he was appointing her Supervisor of Price Tag Posting for the entire store…this new responsibility and title changed her attitude completely…
>
> Childish? Perhaps. But that is what they said to Napoleon when he distributed the Legion of Honor and distributed 15,000 crosses to his soldiers and made eighteen of his generals 'Marshals of France' and called his troops the 'Grand Army'. Napoleon was criticized for giving 'toys' to war-hardened veterans, and Napoleon replied, 'Men are ruled by toys.' (Carnegie, 1936/1964, pp. 245-246)

By naming and recognizing the accomplishments of others, Governor Scott ties their successes to his own record, and creates opportunities for alliances. Much like Napoleon's Legions of Honor, Governor Scott spends much of his time awarding his own metaphorical medals in his press releases. He is both consistent and successful using this messaging strategy. In building strong alliances through recognition, Scott also is looking out for his re-election interests and political future (Mayhew, 2004). Even though Scott is in his final term as Governor, the re-election motivation interests described by Mayhew (2004) are still valid. Governor Scott's alliances can be useful to him in pursuing other political positions. By securing the favor of allies through recognition, Scott is keeping his options open.

Additionally, it was necessary for me to keep similar items in separate categories when the differences between them were important to distinguish. For example, "Economic Impact" and "Economic Opportunity" might seem suitable to be placed in the same category. However, they are not only different categories, they represent entirely different categorizations within the press release data. "Economic Impact" was an *issue* discussed within press releases, such as the Governor noting the capital investment made by a high-tech start-up company, or the amount of tax revenue generated by a firm that was relocating to the state. "Economic Opportunity" was more often a *messaging strategy* used by the Governor to sell his ideas to policy actors and spin the results of his enacted policies. He uses the strategy of economic opportunity to promote his plans for tax cuts, noting the necessity of providing relief to Florida families trying to balance

their budgets. He also uses the strategy to celebrate success, noting that when companies relocate to Florida, residents have the opportunity to win gainful employment and live their own version of the American Dream. Distinctions like these were important to retain in the final publication of this research.

Table 10. Messaging Strategies

Rank	Style	*N*	% of Sample
1	Florida Wins	100	38.76%
2	Naming	54	20.93%
3	Competitive Edge	30	11.63%
4	State vs. State	18	6.98%
5	State vs. Federal	17	6.59%
6	Patriotism	16	6.20%
7	Economic Opportunity	7	2.71%
8	Family Budget	7	2.71%
9	Natural Beauty	6	2.33%
10	Small Government	2	0.78%
11	Disaster Preparedness	1	0.39%

Table 11. Conceptual Framework Components: Press Releases

Component	*N*	% of Sample
Sell	37	14.34%
Spin	158	61.24%
Shuffle	6	2.33%
Neutral	57	22.09%

As a whole, If "Let's Get to Work" was the motto that catapulted Rick Scott into the Governor's office, "It's working" can be portrayed as a consistent theme following his reelection. As a focus or sub-focus, the issue of *jobs* was featured 130 times, or in 50.38% of the total number of press releases published by the Governor's office during the 6-month period

between January 2015 and June 2015. Governor Scott frequently made trips out to various companies to highlight job growth and economic impact. Additionally, the Governor's office published Florida economic and labor statistics every month, separated by metropolitan area. In each of these reports, STEM education was mentioned 100% of the time, and a total of 55, most often as a sub-focus, making it the second most common theme of the sample, present in 21.32% of the press releases.

4.3.1 Brief timeline of major events in sample

I selected this sample to evaluate the 2nd Act of Governor Scott's tenure in Tallahassee. This 6-month sample, from January, 2015 to June, 2015, includes his 2nd Inaugural Address, in which he outlines the accomplishments from his first term and the plans for his second term. The messaging of both his inaugural address as well as the aggregate collection of press releases in the sample is clear and consistent. Scott claims credit for Florida's economic successes during his first four years in office, uses that success as a rationale for adopting his agenda for his second term, and announces his intentions to recruit private firms located in other states. Additionally, he boasts about Florida's investment in education, and touts the state's accomplishments in STEM fields. This sample of press releases contains many examples of spinning and shuffling found in the conceptual framework used for this study.

Scott's Inaugural Address (January 6) can be seen as a textbook case of credit-claiming (Mayhew, 2004). The recovery of Florida's housing market and low unemployment were touted as proof of the success of Scott's policy agenda. He made compelling arguments to continue moving that agenda forward in this speech. It was a well-organized address that tied the Governor to the state's economic rebound. The act of throwing down the gauntlet and

challenging other states economically was directed at his constituents, along with firms located in places like New York, Pennsylvania, Illinois, and California. In comparing the favorable economic climate in Florida to those perceived rival states, Governor Scott positions himself and his state as success benchmarks on the national stage. Even when term-limited, re-election interests (Mayhew, 2004) still play a role in framing arguments. Scott elevates himself through claiming credit for Florida's success, and even more so by taking the economic fight to other states. By mentioning STEM success and education investment, he makes education a major pillar of Florida's economic attractiveness.

The 6-month sample, taken as a whole, shows that Governor Scott fulfilled the messages in his inaugural address related to education. The major pillars of his education investment include career and technical education, STEM projects, and charter schools. When making the argument for investing, he tied education to jobs, and then to making Florida a top destination for major firms looking to relocate. Scott followed through with his promises from his Inaugural Address. He placed $20,000,000 for technical schools in his "Keep Florida Working" budget (January 8). He called for $100,000,000 in education investment for charter schools (January 15). He advocated increasing concentration on STEM education and STEM investment at all levels (January 21) and proposed $460,000,000 for performance funding at state universities, including provisions for STEM projects (February 4). These items in the budget are in addition to the millions set aside for secondary public school districts. To make certain that the public was aware of the Governor's role in securing this funding, separate press releases were made (February 26; March 2; April 20; May 19) for individual school districts that received portions of that funding. This was a savvy move by Governor Scott; he tied his message of economic recovery to education investment as a whole, specifically STEM education, and then brought that

message to local districts, which made it more relevant to the lives of his constituents. To please a broad group further, he also supported measures to reduce the amount of testing at the secondary level (February 18; February 24; February 25), which had broad, bipartisan support, and presented SHINE awards to local educators in each of the months I examined. Even if members of advocacy coalitions did not support some of his proposals, like $100,000,000 for charter schools, these disagreements were softened with popular measures like honoring teachers and reducing the number of state tests required by Florida children.

Scott also fulfilled his promise to challenge other states for the business of private companies. He celebrated the decisions of two Major League Baseball (MLB) Franchises, the Nationals and the Astros, to continue playing in Florida for Spring Training (February 11), and also boasted about Florida hosting its first MLB All-Star game that summer (February 13). He bluntly told Pennsylvania policy actors, "I'll see you in February", in announcing his intentions to recruit job-creators to come to Florida (January 9), and then delivered the news that WaWa was expanding its number of locations in Florida (February 23; April 23). He took out advertisements in California to promote opportunities for relocation to Florida (April 8). He flew to Paris, France, to open a pavilion for Florida at the Paris Air Show to promote Florida's aerospace industry (June 15), and boasted from French soil about the relocation of STEM firms to Florida from Arizona and California (June 15). Governor Scott took his message of a job-friendly, positive economic climate to Pennsylvania, spent tax dollars to advertise that message in California, and even flew all the way across the Atlantic to tout Florida's victories and opportunities. At the center of that message were low taxes and excellence in STEM fields, and the locations and businesses highlighted by Governor Scott, such as the Paris Air Show, accentuate that message.

Through the entirety of the 6-month sample, Governor Scott tied STEM education to job growth in monthly labor and employment reports. He made sure to claim credit for state investment in education and made announcements in each individual district when he doled out the funds. In addition to the larger metropolitan area labor reports, Scott's office released announcements when firms would expand, add jobs, announce capital investment plans, or publish economic impact reports. Press releases were generated even when companies were only adding a few jobs. If these companies stressed STEM fields, they were more likely to receive mention.

Florida's GDP growth outpaced that of the nation (June 18), and compared favorably to other large states like New York and Illinois. By consistently drawing attention to positive employment figures and economic indicators, and then showcasing individual businesses providing jobs to Floridians, Governor Scott presented a compelling case for the linear approach to STEM investment and promotion. Zero-sum STEM promotion has not been shown to produce more economic growth than simply ignoring liberal arts subjects and promoting STEM; it is statistically impossible to prove that Florida experienced stronger STEM gains than other states because policy actors made sure to denigrate anthropology and psychology in the process. Despite that fact, with his consistent and disciplined messaging strategies, Governor Scott drew the line between the two for his constituents. If members of advocacy coalitions such as university leaders or unions wish to present an alternative perspective, they will have to produce compelling quantitative figures like Governor Scott's office did in this sample. Even if their conclusions cannot be proved, if their arguments and numbers are convincing, they are likely to continue to attack liberal arts fields while promoting STEM education in the name of economic advancement.

4.3.2 Jobs at the center, linked to STEM

50.38% of press releases in the 6-month sample mentioned jobs. Many of them were promotions of job gains at small and large firms alike. On January 21st, 2015, Scott announced the expansion of Aerosync Support, Inc., a manufacturer of helicopter equipment. The expansion promised 25 new jobs in Santa Rose County. Scott states, "We are working hard to make Florida the number one destination for businesses. By working with the legislature to eliminate the sales tax on manufacturing equipment, we have made Florida an ideal place for manufacturing businesses like Aerosync Support to grow and succeed, which means more jobs for our families" (January 21). These remarks echo language in another press release on March 5th in Tampa, when Scott celebrated 35 new jobs at Jagged Peak, an ecommerce company. Scott says, "In the last four years, 35 more Floridians were able to find a job and provide for their families thanks to the growth of Jagged Peak. We want Florida to become the global destination for jobs, and we will keep working to provide companies like Jagged Peak with the environment to grow and succeed in our state" (March 5). There are numerous other announcements like this one in the 6-month sample I examined. Governor Scott celebrated over 700,000 new jobs created during his first term as Governor in his inaugural address (January 6), and between January and June, he celebrated dozens of private companies, large and small alike.

In addition to the promotion of job growth at the micro-level, Scott claimed credit for strong employment figures, published monthly statewide. In each of these few dozen reports, STEM education is mentioned, normally with the same statement. The March 17, 2015 release, noting 32,900 jobs added in the Tampa-St. Petersburg-Clearwater metropolitan area in a one-year period, states, "The metro area was also first in the state in demand for high wage, high skill science technology engineering math (STEM) occupations with 12,525 openings in January"

(March 17). Tying STEM directly to job growth mirrors rhetoric from Scott's inaugural address in January. Scott states, "Florida has led the nation in education reforms, providing equal opportunity in education for all, and we will continue to do that. We will also compete globally for jobs by investing in workforce training programs that focus on science, technology, engineering and math" (January 6). In his initial remarks on STEM education during his first term, Scott notes, "If I'm going to take money from a citizen to put into education then I'm going to take that money to create jobs. Is it a vital interest of the state to have more anthropologists? I don't think so" (Anderson, 2011, October 10). STEM is so closely entwined with jobs, that both even are mentioned in seemingly neutral press releases like presenting awards to outstanding reading and English teachers. A January 13th press release notes, "During today's Cabinet meeting, Governor Rick Scott recognized nine outstanding educators…with the Governor's Shine Awards…This year's theme, 'Reading Accelerates success', connects the value of literacy with careers in science, technology, engineering and mathematics (STEM)" (January 13). Whether Governor Scott is shaking the hand of an English teacher or an entrepreneur, he is incredibly consistent and disciplined with his message.

When selling zero-sum STEM policy, in his first term, Scott tied STEM with jobs and decried liberal arts as wasteful. As he began his second term, he noted the addition of over 700,000 new jobs in Florida, and mentioned STEM as a major driver of that progress. In each of the monthly job reports in every single metropolitan area in the state, STEM is mentioned 100% of the time, and a total of 55 times in a sample of 258 press releases. Scott's portrayal of STEM as an engine of economic growth has been remarkably consistent. The employment numbers support his claims that his zero-sum approach to STEM and the liberal arts is successful. The Governor's Office has done a good job in communicating that message, which is echoed by

allies in the state legislature. If university leaders in the state want to counter Scott's zero-sum approach with a *both/and* proposal, they have an uphill battle ahead of them. 700,000 jobs and a consistent, steady message of zero-sum STEM successes represent a powerful opposing argument.

4.3.3 Looking for competition

Two consistent themes of the press releases were seeking competition and declaring victory. 38.76% of the press releases contained a messaging strategy of "Florida Wins". This style involved Governor Scott announcing victory over numerous other states and/or private entities, or crafting a blanket statement in which he states Florida is the "best", be it at education reform, a competitive economic climate, or Major League Baseball Spring Training attendance. For example, in his inaugural address on January 6th, Scott compares Florida's economic successes to failures in New York, Illinois, and the nation at large. He states,

> If there is one thing I hope you remember from this message today, I hope it is this: Florida must stay committed to smaller government and lowering taxes to become the top destination in the world for jobs! I know there is a great temptation in government to think that you can spend people's money better than they can. But, if that were true, more than one million people would not have left New York and Illinois over the past 20 years for Florida and other lower tax states… I have a message today to the people of New York, Illinois, California, Pennsylvania and others: move to Florida! We want you to keep more of the money you make because we understand it's your money. We want your businesses to grow and succeed. We want to compete globally and win. Over the next four years, I will be traveling to your states personally to recruit you here. In Florida, we are in the business of growing opportunity for families, not growing government. (January 6)

In the many dozens of press releases announcing job growth at various companies, Scott frequently uses this terminology of "winning". He also focuses on the competition mentioned in that inaugural address. When a press release focused on a specific, targeted state that was placed in a zero-sum battle against Florida, it was categorized as "State v State". If the competition was the federal government, it was categorized as "State v Federal". Governor Scott kept his promise

to visit other states in pursuit of bringing private industry to Florida. He went on a "Domestic Mission Trip" to Philadelphia in an attempt to recruit firms to come to Florida (February 12), and celebrated Wawa's decision to expand in SW Florida (February 23; April 23). Florida bought ad space in California (April 8; April 9) in advance of Governor Scott's trip to the west coast. This drew a sharp rebuke from California Governor Jerry Brown. In a letter to Scott published in the *Los Angeles Times,* Governor Brown criticized Governor Scott's stance on climate change and his aggressive economic recruitment, even attaching several scientific reports warning of the effects climate change could have on Florida. Brown writes, "Rick…a fact you'd like to ignore: California is the 7th largest economic power in the world. We're competing with nations like Brazil and France, not states like Florida…So, while you're enjoying a stroll on one of California's beautiful beaches this week, don't stick your head in the sand" (Myers, 2015, May 31). Scott even traveled overseas to the Paris Air Show to host a pavilion and promote Florida's aerospace industry, and announced the relocation of businesses to Florida from California and Arizona (June 15). Whether speaking in broad terms about making Florida a top global destination for jobs, or pointing specifically at individual states, Governor Scott embraces zero-sum competition in his messaging. Liberal arts disciplines are far from his top target.

Other states were not the only targets for Governor Scott's competitive posturing. While state v state messaging made up 6.98% of the sample, the federal government and the Obama administration also were frequent topics of press releases. These constituted 6.59% of the 258 press releases evaluated in this dissertation study. The most frequent area of dispute between Governor Scott and the federal government during this period was healthcare. Scott advocated a continuation of the Low-Income Pool (LIP) program (March 4; April 27; May 4; May 5; May 6; May 12). Very few of the press releases in this sample (2.33%) could be categorized as

"shuffling", or responding to settled policy measures and starting a new policy window cycle. Governor Scott's battles with the federal government were all either selling or shuffling. In addition to the fight over LIP and Medicare expansion, Scott wrangled with the federal government over algae in Lake Okeechobee and foreign policy related to Cuba between January and June, 2015.

4.3.4 Other insights

While jobs and economic impact constituted the majority of press releases evaluated in this sample, other interesting insights also emerged. Announcements of pending or signed legislation, along with procedural appointments to various state boards and courts, constituted nearly a third of releases from the Governor's office. Additionally, while most of the statements could be placed in the conceptual framework of Selling, Spinning, or Shuffling, 22.09%, or 57/258, were neutral in nature. Much of the announcements made by Governor Scott were celebrations of service or state pride not tied to his policy agenda. Scott honored heroic firefighters, thanked veterans for their service, noted outstanding essays written by students about Martin Luther King Day, celebrated the careers of officers in the Florida National Guard, and discussed the superiority of Florida scallops, among other various statements. This demonstrates that not everything done by the Governor could be considered a cynical rhetorical strategy to advance his agenda. While several interview participants lamented the fact that higher education had become politicized and was no longer neutral territory, the evaluation of press releases shows that neutral ground still exists, especially related to service and the military.

On the other hand, Governor Scott was highly successful in tying many issues to his agenda of jobs and economic growth. While he did not talk about the environment often (3.10%

of press releases), when he did, he often tied it to either infrastructure or tourism, and he linked both with jobs and economic growth. When discussing sports and leisure activities such as allowing the sale of 64 oz. growlers in Florida breweries (May 14), or celebrating the Houston Astros' and Washington Nationals' decisions to keep their Major League baseball teams in Florida for Spring Training (February 11), he swung the discussion back to jobs and economic impact for the state.

As a whole, the press releases tell a complicated story. They justify in many ways the decisions made by Scott to transform STEM and liberal arts policies into a zero-sum competition. The documents show that this is not the only competition framed by Scott as an *either/or* contest. By framing issues as binary choices, the Governor creates more opportunities for victory. It is difficult to argue with results like the job growth and economic revival experienced by Florida over the past six years. How much impact did Governor Scott have in creating this growth? If one examines the statements from his office, he is a dynamic leader not afraid to make difficult choices in order to stimulate the economy. Opponents will spin the results to say that Florida is succeeding in spite of Scott, rather than because of him, or hand the credit to federal policy actors like President Barack Obama. Another option is to frame him as "marginal", as a union leader referred to him in a follow-up interview. No matter how one views Governor Scott, the press releases give a rationale to his stances on STEM and liberal arts education policy. Whether or not he is the reason for Florida's success, it can be *argued* that he is. The Governor has been consistent, focused, and successful in his framing of himself as the architect of Florida's economic recovery, and a zero-sum approach to STEM has been part of that blueprint.

4.4 CONNECTIONS AND ALTERNATIVES

The connections between the data gathered for this study tell an interesting story. I use the term "story" purposefully. Since this study focuses on policy narratives and their role in influencing policy formation, the stories told by policy actors have major impacts on how policy is made. The conceptual framework created for this study was presented in Berlin (Porter, Lurz & Herman, 2014) and revised using the literature evaluated for this dissertation study. Perhaps the most important result of this study is providing tangible data which further refined and solidified this framework. It explains the narratives and mechanisms of policy formation well. Finally, these data, combined with the literature and conceptual framework, provide alternatives to the dominant narratives of STEM and liberal arts policy. These alternatives are better options for a 21st century economy, and do not create zero-sum competitions in areas which are neither lucrative nor necessary.

4.4.1 Connections in survey, interview, and press release data

The findings of this research tell an intriguing story. Surface perception of liberal arts and STEM disciplines are both relatively positive, indicating support for a *both/and* approach for higher education policy. These data seem to suggest that a conciliatory relationship between STEM and liberal arts disciplines is possible, and higher education policy should support both.

A closer look at the data reveals that the zero-sum, *either/or* approach to STEM and liberal arts policy has substantial support from lawmakers and district superintendents. University leaders as a subgroup overwhelmingly reject zero-sum arguments. Although mean scores for anti-liberal arts survey responses were low, response distributions display some agreement with statements like "Liberal arts are a waste of time". Additionally, lawmaker data show a linkage between STEM support and concern about economic rivals like China and India. STEM promotion, interwoven with animosity to the liberal arts and alarm about widening gaps with rivals, is synonymous with the zero-sum approach of policy actors like Governor Scott.

Creation of a stronger K-20 STEM pipeline could be a point of convergence between *both/and* proponents and zero-sum advocates. These items had strong support across demographic groups, and university leaders were among the fiercest proponents for such a position. If state policy actors are looking to support STEM and build a strong advocacy coalition which includes higher education leadership, promoting a robust STEM pipeline from elementary to tertiary levels would be a positive first step.

The qualitative data provided further depth and nuance to these quantitative findings. While many participants gave conciliatory praise to liberal arts fields, rhetoric often revealed prejudicial perceptions of the liberal arts, and gave support to *either/or*, zero-sum positions associated with policy actors like Governor Scott. Some policy actors were dismissive of liberal arts fields, characterizing them as stereotypes like French literature, or advising college students to have one major for enjoyment, and another for future employment.

Despite these negative perceptions, which provided tangible zero-sum rhetoric to some of the response distributions of the quantitative data, respondents also provided eloquent defenses of liberal arts study. Liberal arts and Capital K research were seen as pathways to unexpected

innovation which could provide economic benefit to states. Additionally, liberal arts study was seen as a necessary component of higher education-one that provided graduates with a sense of civic responsibility. Some even saw it as a *completion* of STEM study, in which graduates would obtain an understanding of human nature and an inquisitive approach to new ideas to complement the technical skills learned in STEM subjects.

Finally, the evaluation of the six-month sample of press releases from Governor Scott's office illustrated the appeal of using zero-sum, *either/or* rhetoric associated with STEM and the liberal arts. While competition-fueled language appears to be a poor fit for a 21st century economy, its usage provides opportunities for claiming victory, and thus claiming credit for successes. Governor Scott focused on jobs in over 50% of the releases evaluated from the sample, and tied many of those jobs directly to STEM education. It is difficult to dispute the successes Florida has experienced over the past six years in job growth, capital investment, and economic expansion. The level of consistency and focus with the Governor's message is impressive, and he has created a persuasive argument for being the impetus behind Florida's success. STEM education is a central part of that messaging. If alternatives to the zero-sum STEM model are to compete with this messaging, they must provide an equally compelling argument for economic impact.

4.4.2 Connections and revisions of conceptual framework

The conceptual framework was equally capable of organizing data gathered during the study as well as ideas found in the available literature. STEM education has often been sold as a means of closing perceived gaps with economic and political rivals. Governor Rick Scott and other zero-sum policy actors changed the reasoning rhetoric associated with the selling points of

STEM. It was not enough to promote STEM education. That would not keep America from falling behind India, China, and Germany. For zero-sum advocates, STEM had to be promoted and liberal arts had to be tossed aside in the process. Therefore, former Governor Jeb Bush portended that psychology graduates would wind up at Chick-Fil-A (Mills, 2015, October 24), Senator Marco Rubio stressed the need for more welders and fewer philosophers (Krieg, 2015, November 11), and Governor Scott proposed shifting funding away from liberal arts disciplines such as anthropology (Anderson, 2011, October 10). These zero-sum approaches in the literature were matched by qualitative data. Policy actors associated liberal arts with labels such as "French literature" and advocated majoring in STEM fields to gain employment in technical fields. These ideas justify the idea of prioritizing STEM education, and can be classified as a *sell*: an attempt by policy actors to swing others in the conflict domain to adopt their ideas and transform them into policy.

The majority of *spinning* items, as described in the conceptual framework, can be seen in the press releases from Governor Scott's office. Spinning uses *results rhetoric* to portray policy actors who supported or opposed a policy item in a positive light. 100% of the monthly employment reports from every Florida metropolitan area mentioned STEM as a factor. It was frequently mentioned by the Governor as part of the reason for the state's job growth and economic recovery, in his 2nd inaugural address along with speeches around Florida at various firms. Governor Scott points at 700,000 new jobs in Florida over the past 5 years as evidence of his success. If *both/and* proponents wish to challenge this characterization, compelling results rhetoric must be found. Governor Scott and his allies have been successful in tying zero-sum STEM policy to economic impact and job creation.

In the conceptual framework, I defined *the shuffle* as efforts to advance new policy in the wake of a completed spin-cycle. The shuffle uses *reform rhetoric*, in which advocacy coalitions and policy actors regroup, reflect on the completed process, examine how constituents and the public react to it, and form new selling strategies for the next policy window. The data did not present many elements that could be categorized as shuffling. Most data were either arguing for the value of STEM disciplines or spinning results to give STEM promotion credit for economic and political success.

The data that were categorized as shuffling presented intriguing conclusions. In the press releases, Governor Scott's office only shuffled to start new policy windows after they had failed in their efforts to sell their policy ideas. They often skipped the *spinning* portion of the conceptual framework altogether. When Florida failed to prevent the federal government from pulling matching funds out of the LIP program, Scott immediately went on offense. He filed a lawsuit against the federal government that was quickly joined by Kansas and Texas and condemned President Obama's effort to push those states into Medicare expansion as part of an effort to garner increased participation in the ACA marketplaces. A higher education union leader and university administrator pushed for different performance and funding matrices to advance their causes, when the present models were not working well for them. This echoes a theme in the literature that when policy actors do not succeed in achieving their goals, they will likely try to find a place where they will succeed (Mills, 2007). Mills (2007), quoting Stone (2002), notes, "Arguments about [structure] are always attempts by someone who is not winning in the arena where policy is currently made to shift decision making to an arena where they might prevail" (p. 183). Failure to sell one's policy ideas can spur the desire to start over in a field where success is possible. Hence, there is no great motivation to spin a failure. Rather,

policy actors are eager to start the cycle anew. That could pose interesting questions using this conceptual framework for future research, both within STEM policy and in other areas.

On the other hand, if policy actors experienced success during the sell phase of the framework and saw their policies yield results, they attempted to stay in the spin portion of the framework as long as possible. Over 50% of Governor Scott's press releases mentioned jobs, and over 60% could be categorized as spinning in the context of the conceptual framework. Since Florida added over 700,000 jobs during Scott's tenure, and experienced strong growth in capital investment, tourism, and tax revenue, the Governor has strong incentive to spin these successes indefinitely. Small firms which added a few dozen jobs were lauded with the same enthusiasm as multinational corporations. Scott has little incentive to move on to a new conflict domain since he fulfilled his initial campaign promise just 5 years into his tenure, and has several years remaining in office. He has every incentive to claim credit for each job added by Florida- past, present, and future.

The conceptual framework depicts a mobile conflict domain which cycles through the *sell*, the *spin*, and the *shuffle.* It can be found in the methodology section of this study. After reviewing the data for this study, I have slightly revised this conceptual framework. Instead of cycling through every stage, policy actors and advocacy coalitions can skip the spin and go directly to the shuffle if they fail to sell their ideas successfully. That makes sense. Instead of lingering and attempting to spin a failed policy, power players will move forward and attempt to fight in a new conflict domain where they might achieve more positive results. Likewise, if policy actors and advocacy coalitions successfully sell their ideas and create positive results with their new policy, they have little incentive to shuffle to a new conflict domain. The data from this study illustrate that people will attempt to spin their accomplishments indefinitely, and hold

that position in the spin portion of the framework as long as possible. They will cut off the road leading to reform rhetoric and the next conflict domain, because it is in their best interest to continue to draw attention to their success. The revised conceptual framework, with the additions described, can be seen in the figure below.

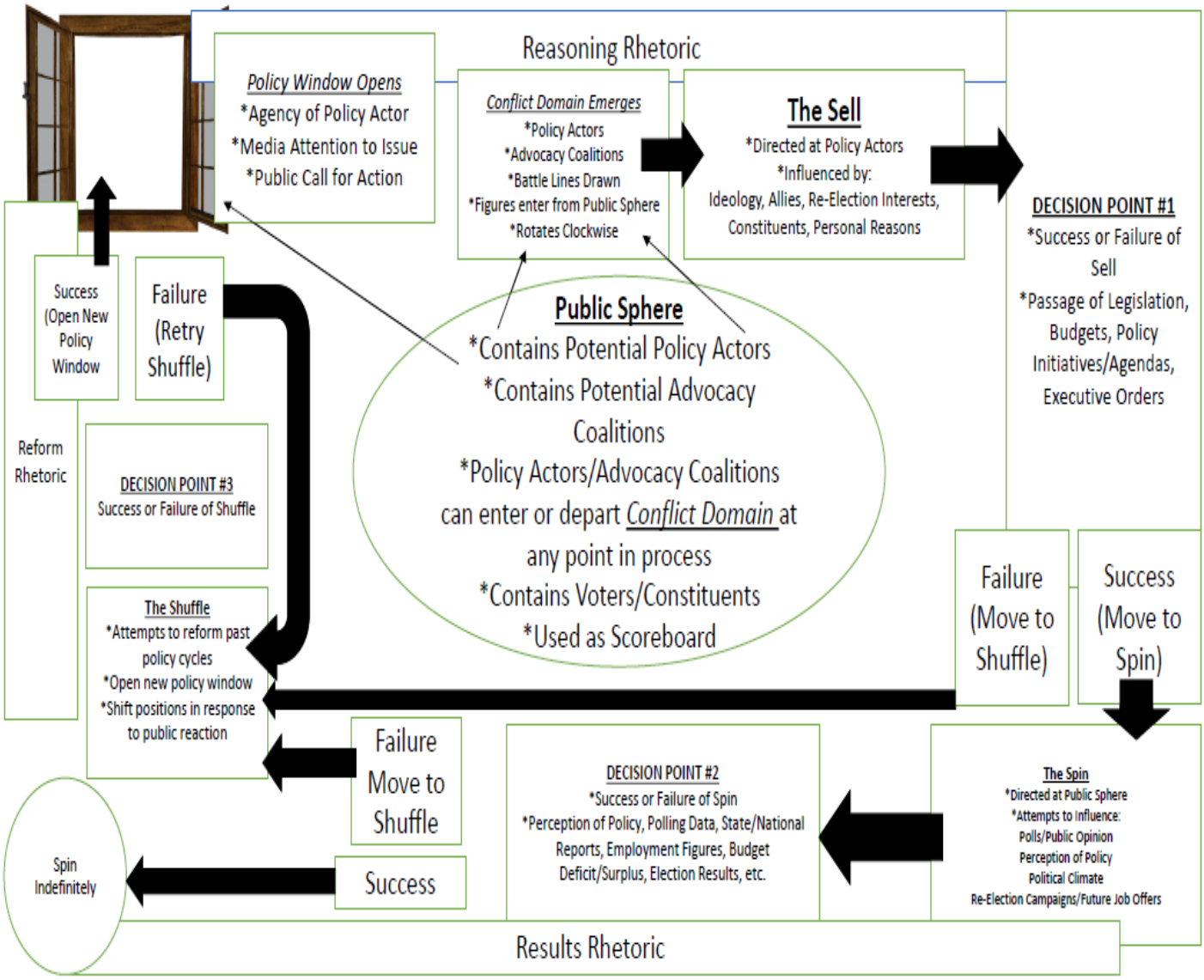


Figure 5: Final Conceptual Framework

These revisions emerged from reviewing the data collected for this study, and returning to the literature of policy scholarship. As I mentioned in my research design, both the initial framework and final version owe a lot to the policy scholars that came before me, especially Kingdon's (1984,1995) work with multiple streams. Especially in my revised framework, **The Sell** contains strong elements of the coupling of policy and problems streams (Kingdon, 1995). Additionally, while the study examined numerous policy actors and advocacy coalitions, its focus was primarily centered on a single policy entrepreneur, Governor Scott. Scott's role as a powerful **policy entrepreneur** with the capacity and motivation to affect immediate change was strongly suggested by much of the data I collected for this study. This influenced the final version of this framework, as did viewing the Governor's strategies through the lens of Baumgartner & Jones (1993), who discuss the ability of major policy entrepreneurs to move their agendas forward quickly, despite the sometimes muddied atmosphere of modern politics. Returning to Kingdon (1995), I owe a lot of **The Spin** and **The Shuffle** to the "agenda-setting" function of his multiple streams model.

I noted in my research design chapter that the model created for this study is neither revolutionary nor novel. The final conceptual framework, informed by the literature and strengthened by data collection, is likewise placed firmly in the realm of previous research. I see this final model as a wrinkle whose place is most closely tied within Kingdon's (1984, 1995) multiple streams model, and enhanced by elements of the advocacy coalition framework (Sabatier & Jenkins-Smith, 1993). It is also bolstered by the theories associated with credit-claiming and re-election concerns (Mayhew, 2004), and finally, especially with the opening of a policy window, the capacity of a powerful policy entrepreneur to push an agenda forward and cut through the limitations associated with modern democratic processes (Baumgartner & Jones,

1995). As I said before, I stand on the shoulders of scholarly giants, and I am infinitely thankful to them for providing the conceptual base for me to conduct my own research and advance policy scholarship forward.

This framework provides four distinct moments which occur during the policy formation process. It evaluates the narratives utilized within each aspect of policy formation. The process begins with the opening of a policy window, which occurs by the individual power and agency of a policy actor, an event or story that draws the attention of the media or the public, or some combination of the two. The mobile **conflict domain** forms, in which advocacy coalitions and policy actors from the public sphere form positions within the domain. These positions can change as the domain moves clockwise through the framework.

Decision Point #1 is reached when the success of **The Sell** is determined. Was a policy actor or advocacy coalition able to successfully sell their ideas to others with power to advance their agenda? Did key items of legislation such as budgets or bills pass? If policy actors are successful at the first decision point, the conflict domain moves to **The Spin**, in which different actors dispute the results of the policy initiative in question. If policy actors are unsuccessful at the first decision point, they will likely skip the spin entirely and move directly to **The Shuffle**.

Decision Point #2 is reached when the success of **The Spin** is determined. How was the finished policy received by the voting public? What impact did it have? Did the bill, legislation, or policy initiative achieve the promised results? How is it perceived by the media? What do polling data say about the initiative? If policy actors are successful at the second decision point, they attempt to spin their success indefinitely. They have no motivation to move to **The Shuffle** and reform a policy initiative that resulted in re-election, positive polling figures, praise from the media, economic benefit, job creation, or all of the above. If they are unsuccessful, they will

indeed move to **The Shuffle**, and try to optimize their ability to win favor in the public sphere and open a new policy window. **Decision Point #3** is reached when the success of **The Shuffle** is determined. Were policy actors able to shift their position and win enough favor to open a new policy window in the wake of the finished policy formation process? If they stood on the wrong side of a position, were they able to minimize their role? If policy makers are successful at this decision point, they open a new policy window, beginning the process anew. If policy makers are unsuccessful, they return to **The Shuffle**.

In addition to this baseline conceptual framework, which has the adaptability to be used to evaluate numerous policy initiatives, I used this framework to describe the issues of STEM and Liberal Arts policy in Florida in greater detail, giving examples of language and narrative strategies within each stage of the policy formation process. The issue of Governor Scott's promotion of zero-sum STEM education policy in Florida was analyzed, and can be seen in *Figure 6* on the following page. This figure highlights Scott's role as a major policy entrepreneur who opened a policy window, successfully sold his agenda to political allies, and tied his decisions to Florida's economic success. Governor Scott continues to spin STEM policy using results rhetoric, and because of Florida's job growth, it is not necessary or prudent to move to a new policy window in this area.

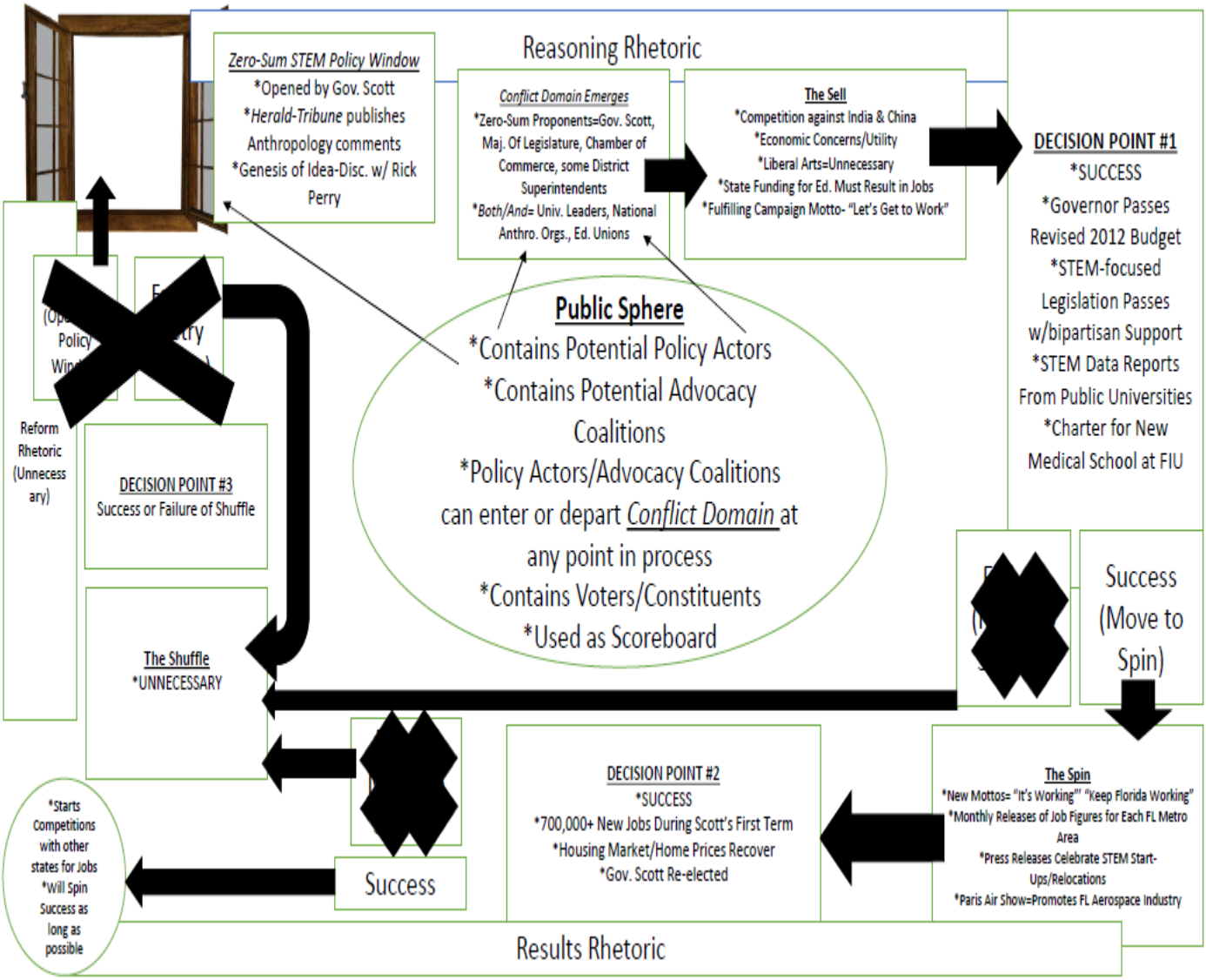


Figure 6: Governor Scott & Zero-Sum STEM Promotion

Governor Scott opened the policy window for zero-sum STEM promotion, as a result of his own agency, his personal ideology, and discussions with Texas Governor Rick Perry at a meeting in summer, 2011. His statements against anthropology, which appeared in the *Sarasota Herald-Tribune* and quickly went national, are indicative of a policy actor opening the window as a result of his own agency. The conflict domain emerged, with actors and advocacy coalitions such as Senator Gaetz, the Foundation for Florida's Future, and the Chamber of Commerce supporting the Governor's position, and anthropologist organizations, university leaders, and a few higher education union leaders standing against it.

Decision Point #1 was a success for the Governor. Despite negative media coverage, Scott was able to sell his zero-sum ideas to other policy actors. He passed his budget, passed STEM-centric legislation such as HB 7135, helped open a new medical school at Florida International University (FIU), and cut funding for budget items like university writing labs. He then moved directly to **The Spin,** hitting the road and building momentum for his policies. He drew attention to job growth, lower unemployment numbers, and seemingly every possible start-up and relocation he could find. He went after other states and attempted to spin his record as a man who kept his promises. The old campaign slogan of "Let's Get to Work" gave way to the new model of, "Keep Florida Working". Scott was successful at **Decision Point #2**, as he gained credit for helping the state create 700,000+ new jobs. He was re-elected fairly easily. In the area of STEM-centric, zero-sum policy, he has no reason to leave The Spin. He will stay indefinitely, and offer recognition and shared credit to policy actors and advocacy coalitions which help him do so.

This conceptual framework was born as an idea, guided by collaboration with colleagues and mentors, informed by the literature available, and then refined by the fire of dissertation

study. While it has the capacity for evaluating other areas of policy, such as the Governor's cantankerous battle with the federal government over Medicare expansion and LIP funding, it is particularly well-suited to describing STEM and Liberal Arts policy.

4.4.3 Pathways to the alternative model of "opportunistic communicators"

This research illustrates alternatives to the zero-sum, linear support of STEM which dominates discourse in the public sphere. The rhetoric of falling behind economic and political rivals and using STEM to close the gap is borrowed from the Cold War and is a poor fit for the Information Age. The quantitative and qualitative data gathered for this study demonstrate the strength of this message, and the effective results rhetoric of policy actors like Governor Scott display how difficult it will be to replace it with an alternative. With STEM tied to jobs and economic growth in a zero-sum competition with all other disciplines, winning that battle is unlikely, especially when zero-sum advocates can point at substantial employment figures.

Nonetheless, the data collected in this dissertation study presented a number of alternatives which are better fits for an Information Age economy and can also be tied to economic growth and technological advancement. Countless educators and researchers have touted a STEAM (Science, Technology, Engineering, Arts, and Mathematics) approach as an innovative variant of traditional STEM education, incorporating fine arts into the curriculum. This research demonstrates the value of expanding that model further, adding the liberal arts, which have the capacity to foster a capacity for critical thinking and reasoning-an essential element to making sense of the plethora of information available in the 21st century. I apply the label LA+STEAM to describe this idea.

As I began my research years ago, I believed that universities should start programs with divergent courses of study, in which STEM and business majors would choose a liberal or fine arts minor, and liberal and fine arts majors would choose a STEM or business minor (Lurz, 2012, March 7; Lurz, 2012, November 26). I still believe such programs would be helpful. However, the issues facing American education go deeper. Meeting those challenges means fundamentally rethinking how success in STEM, and education in general, is framed.

To thrive in the Information Age, students must learn to be strong consumers of information. One can develop the technical proficiency to access great stores of knowledge. Such proficiency is wasted if one cannot comprehend elements such as bias, obfuscation of data, historical background, or context. These are elements explored when studying the liberal arts. Participant P3, a university leader and professional development coordinator, touched on these themes often in his semi-structured interview. Likewise, policy actors as diverse as Rick Scott and Barack Obama are correct to express concern that under 20% of US college students graduate with degrees in STEM fields (National Science and Technology Council, 2013). Many of the jobs available to graduates in the 21st century require proficiency in STEM disciplines. Policy actors' focus on STEM disciplines is not illogical. Their rationale and linear thinking represent the disconnect between perception and reality. In order to focus on STEM, it is neither necessary nor beneficial to create competition with the liberal arts. Workers of the 21st century need both STEM proficiency as well as liberal arts skills, because they must have the scientific capacity to handle modern technology, combined with the critical thinking capacity to be savvy consumers of information.

For these reasons, I use the term *opportunistic communicators* to describe the optimal ideal for policy makers and academe alike. Graduates of universities should be able to recognize

opportunities in the global marketplace. They should also be able to communicate their message with potential employers, investors, and customers. Achieving that goal means focusing on the macro needs of American students and educators, rather than micromanaging every aspect of the economy and academy. On the other hand, that macro way of thinking should not be in the form of grandiose 5-year plans and quotas for STEM benchmarks. Policy makers like to take credit for success so they can spin their accomplishments indefinitely. They will have more success, as well as opportunities for spinning that success, if they learn to embrace the unpredictability of innovation and economic impact through education.

I use the novel, *Harry Potter*, as an example of what it means to be a successful opportunistic communicator in the 21st century economy. Universal Studios, a theme park in Orlando, FL, constructed Harry Potter World in 2010, at a reported cost of $265 million USD (MacDonald, 2016, January 14). At the time, unemployment in Florida was at 11.4% (Mullaney, 2014, May 26). Since the opening of Harry Potter World, almost 150,000 leisure and hospitality jobs have been added, including 3,500 at Universal Studios alone, and the construction industry experienced a 12% jump in employment (Mullaney, 2014, May 26). Economists and business executives credit Universal and *Harry Potter* for revitalizing the entire central Florida economy. Gopal (2015, April 9), interviewing a housing industry expert, writes,

> "When Harry Potter was a hit, the other theme parks all benefited," said Anthony Crocco, Central Florida director for Metrostudy, a firm that tracks home construction. "It's helped Orlando come out of the housing doldrums faster than other markets."
>
> Disney, which set an attendance record for its U.S. theme parks…finished doubling the size of Fantasyland last year, the biggest expansion in the Magic Kingdom's 43-year history. Walt Disney World Resort is the region's largest employer, with about 74,000 workers. (p.1)

The success of Harry Potter World at Universal Studios sparked other theme parks to expand, causing booms which resonated across multiple industries. Universal Studios in California constructed its own Harry Potter World in 2016 at a cost of over $500 million , and

another version is even planned for Beijing, China (MacDonald, 2016, January 14). As a series, the *Harry Potter* books have sold over 400 million copies and have been translated into 68 languages, and films based on the novels have generated more than $7.7 billion dollars (Acuna, 2014, August 15). J.K Rowling's novels have created an economic windfall and thousands of jobs for Florida.

The jobs and economic impact resulting from *Harry Potter* did not occur because policy actors created a 5-year plan or STEM education quotas in Tallahassee, FL. They happened because a single mother in the United Kingdom wrote a book-a book that was rejected by dozens of publishers. The opportunistic communicators in this example include: the publisher who was able to see the potential benefit of the book and was willing to take a chance on a first-time author, the booksellers around the world that successfully marketed the novel, stirring up demand, the film companies which put it on the big screen, and the Universal Studios executives who recognized that millions of visitors would want to experience the magic and whimsy of *Harry Potter* first-hand at a theme park. Such events cannot be predicted by economists or projected by policy makers in official state reports.

To reap the benefits of opportunities like *Harry Potter*, policy actors must recognize that innovation is unpredictable, and embrace that uncertainty. They must also accept that the sources of such economic benefit are not confined to the state's borders. They could come from the next major breakthrough of the pharmaceutical industry or the typewriter of a single mother living an ocean away. Zero-sum games are a poor message and plan for a non-zero-sum world economy. JK Rowling did not only inspire millions across the globe with her writing, she provided STEM jobs in Orlando: building a 14-acre world which brought her novels to life. One of the most significant consequences of this dissertation research could be questioning the

dominant narrative of zero-sum STEM promotion and offering alternatives such as opportunistic communicators. These alternatives are a better fit for the economic realities of the world economy, and also provide policy actors with the economic impact, job growth, and innovation they seek for their states and districts. Instead of seeking to *control* innovation, policy actors should *unleash* it. They can accomplish this goal by embracing unpredictability and creating a new generation of opportunistic communicators.

4.4.4 Summary of data analysis

The data demonstrate tangible results that are connected to each other, the literature, and the strategies associated with policy formation described in this study's framework. The allure of zero-sum strategies which promote STEM at the expense of the liberal arts is rooted in preconceptions, fear of falling behind, and the ability to claim credit for success. Alternatives are available which provide the economic benefits promised by zero-sum STEM promotion, without needlessly creating opponents through unnecessary competitions. Psychology and anthropology are not the enemies of STEM disciplines. Florida and the country do not need to attack the liberal arts to close perceived gaps in STEM excellence with their economic rivals. By doing so, they might preclude future opportunities like *Harry Potter* bringing millions of dollars in economic impact and thousands of jobs to Central Florida. The pace of STEM progress, economic impact through higher education, and job growth cannot be predicted by five-year plans or quotas. To achieve the maximum benefit from higher education, policy actors must be willing to embrace a modicum of unpredictability. Abandoning the zero-sum model would help quicken the economic benefit the state could gain from STEM and non-STEM fields working to advance Capital K knowledge without competing amongst themselves. To achieve this goal,

university leaders and their allies must show policy actors more examples like Harry Potter World at Universal Studios. While Governor Scott can claim his strategies are working, the evidence gathered from this study shows that it could work better.

5.0 SYNTHESIS OF POLICY NARRATIVES, RECOMMENDATIONS, AND FUTURE DIRECTIONS

When I began this dissertation research, I sought the answers to two central research questions. What are key elements of the policy narratives of STEM and the liberal arts? How are these narratives utilized within the policy making process? This research has provided a few initial answers to those questions. Two policy narratives dominate most aspects of STEM and liberal arts policy. The first, which I label the **linear model**, is widely accepted among policy actors across the ideological spectrum. The United States is falling behind its rivals, and STEM investment is needed to close the gap. This investment will result in a direct and proportional economic benefit for state and national economies. From Eisenhower calling for STEM excellence in response to *Sputnik*, to Obama demanding an "army" of math and science teachers, this has been a consistent narrative in American education policy.

The problem space of this research is centered on the logical next step to this model. This is the second dominant policy narrative, which I label the **zero-sum model**. The fact that this model exists should surprise no one. The only surprise is that it took this long to emerge. This narrative has a simple, logical conclusion. If STEM investment creates direct economic benefit and is a necessary measure to keep pace with political rivals, then anything that is *not* STEM is a frivolous distraction. To zero-sum advocates, studying literature, psychology, or anthropology is not only wasteful, it is also dangerous. The time that college students spend reading *Madame*

Bovary or *Faust* is time that could have been spent studying mathematics or physics. STEM study becomes an opportunity cost of liberal arts study. Therefore, liberal arts programs are more than just silly, they are justifiable targets for policy makers to eliminate. Eliminating or drastically reducing liberal arts programs and giving their resources to STEM disciplines is a necessary measure for both economic and national security.

These dominant policy narratives have a predictable effect on education policy formation. The linear model of falling behind, needing to catch up, and direct, proportional ROI for state STEM funding creates a rare area of bipartisan agreement among American policy actors. The need for more STEM graduates, teachers, and businesses brings together politicians as ideologically diverse as President Obama, Chris Christie, Rick Scott, and recently, the new American President, Donald Trump. President Trump sent his daughter, Ivanka, and Education Secretary Betsy DeVos to the National Air and Space Museum to exhort more women to consider STEM fields (Associated Press, 2017, March 28). Any bipartisan agreement should be a welcome sight in an era of deep political discord.

The zero-sum model creates division in a field that should be a paradigm of unity. Furthermore, if these zero-sum supporters continue to claim positive results, like Florida's economic boom, more policy actors are going to escalate the traditional linear model and advocate for zero-sum positions. It does not matter that Florida's job growth, reductions in unemployment, and augmented tax revenue had little to do with cutting writing labs or anthropology programs. Policy actors can claim that by taking the logical extra step from the linear model to its zero-sum alternative, economic growth is maximized. By politicizing STEM education and seeking enemies in other departments, policy actors create more opportunities to claim victory over political opponents and credit for economic growth. Start-ups, STEM

degrees, employment data, tax revenue, and the relocation of firms from other states are all used as the scoreboard to declare victory.

Advocates for *both/and* positions, which promote both liberal arts and STEM programs, must therefore either change the scoreboard or start scoring more points in the rhetorical arena of policy formation. Several participants in this study wanted to see things like civic engagement and critical thinking capacity become features on state performance matrices. The intent of these civic proponents is noble, but they face a few challenges. First of all, such aspects are difficult to quantify. How would one measure items like participation in a democratic society? Is it as simple as the number of times one goes to the polls or the total number of hours spent volunteering in the community? Can one quantify civic engagement by tracking how many times constituents contact their representatives through e-mail, telephone calls, and letters? Even if an algorithm were developed that could accurately measure these items, it would be difficult to change the opinion of intellectually entrenched policy actors using these new data. Zero-sum advocates have their data already, and those data are jobs, capital investment, and high-tech start-ups. Changing the scoreboard will not change their minds.

The more fruitful option for *both/and* proponents is scoring more points on the existing scoreboard. Thankfully, it is not necessary to produce success stories from scratch. To continue with this sports metaphor, advocates for balance between STEM and liberal arts fields do not have to actually score more points; they must simply show that points already exist. *Harry Potter* and Disney World have generated serious amounts of revenue and jobs for Florida. Instead of convincing policy actors to accept civic engagement as a success variable, it would be easier to show them that the *both/and* position can be just as lucrative as the zero-sum strategy with STEM education, or perhaps even more so. The alternatives of *opportunistic communicators*,

LA+STEAM, and embracing unpredictability in the name of innovation and economic impact are more compelling arguments to policy makers concerned with re-election and approval ratings. Furthermore, these strategies offer the bonus of civic engagement benefits, critical thinking capacity, and fostering the ability for students to be good consumers of information in the 21st century. By appealing to the pragmatic interests of policy makers instead of their hearts, *both/and* proponents could get balance in the higher education curriculum, respect for liberal arts fields, and the civic engagement and service outcomes that they have long advocated.

This research demonstrates the allure of both dominant narratives associated with STEM and liberal arts education policy. The appeal of the linear model is its simplicity. Even before the era of *Sputnik*, American policy actors have favored binary choices and straight-forward policy initiatives. Combining STEM investment with time to create jobs is an argument that is compelling to policy actors who want to both serve their constituents and get re-elected. The tendency to embrace competition, using rhetoric borrowed from the *Sputnik* era, leads many actors to the more adversarial position of zero-sum STEM promotion. Herman Göring once said that when he heard the word *culture*, he reached for his gun (Tucker, 2012, p. 108). Hardline zero-sum STEM proponents are reaching for the delete key on their budgetary spreadsheets whenever they see mention of the humanities. A zero-sum position which promotes STEM and makes a false adversary out of anthropology creates a competition that is neither beneficial nor necessary. An argument that portrays a degree program as dangerous is also dangerous.

My research shows a path that allows liberal arts and STEM fields to coexist for the mutual benefit of policy actors and the constituents they serve. A *both/and* position that embraces the unpredictability of innovation will, in turn, produce more innovation than a rigidly constructed system which attempts to implement state control over university management. It is

ironic that many lawmakers who are proponents of small government and free market capitalism seem eager to create more government control over universities, using terminology like 5-year plans and setting quotas for degree programs. At the very least, a return to the linear model, which promotes STEM while leaving the liberal arts alone, would be a more beneficial outcome than the continued advance of zero-sum competition in the curriculum. Zero-sum games make little sense in a non-zero-sum world economy, and even less sense in university management. A *both/and* model promotes STEM excellence while simultaneously fostering critical thought on campus. An *LA+STEAM* approach would give graduates the technical skills needed to fuel the innovation of the 21st century, the creativity to express it, and the critical thinking capacity to live as engaged citizens in a democratic society.

5.1 LIMITATIONS

As an exploratory dissertation study, there were numerous limiting factors. Chief among them was a low response rate. Only 69 out of 377 recruitment targets responded to my survey instrument, representing a response rate of just 18.3%. Among members of the Governor's executive staff and education reporters for major newspapers across the state, the response rate was 0%. When these members are removed from the sample, the response rate rises to 19.4%. That rate is still low, and represents a significant limitation to this research. Most respondents across demographic categories listed state legislators as the major power players in Florida's education policy. Only 6.9% of legislators responded to my survey. This means that my results cannot be generalized to the larger population of policy actors and members of advocacy coalitions. The study would have been considerably strengthened with participation from more

legislators and members of the Governor's executive staff. A study exploring the nature of policy formation should have more policy actors' voices represented within it.

Additionally, although seven participants volunteered for follow-up interviews, only three completed them. The qualitative free-response items on the survey helped fill the gaps in the data. These gaps that were created as a result of a limited number of interviews. One of those cancelled interviews was with a state legislator. That legislator's insight would have been a powerful addition to this dissertation data.

With the absence of policy actors in this study, cynics could say these results are meaningless. I disagree with such condemnations. Despite having my results limited to my sample alone, intriguing data emerged from my participants, and helped inform promising alternatives to the dominant narrative of zero-sum STEM promotion at the expense of liberal arts disciplines. The press release sample provided some of the more robust data analyzed in this study. With these press releases, I did not have to navigate the busy schedules of Governor Scott and his staff to evaluate their opinions; their voices were already on the record and readily available. Nevertheless, I must concede that the study would have been stronger with more policy actors. Future research, with improved methods and response rates, could help ameliorate these setbacks and produce more significant results that can be generalized to a statewide population.

Additionally, some complicated labeling of demographic options led to difficulties cleaning quantitative data. My survey instrument offered numerous choices for *role* within the policy formation framework in the state. It offered the option for participants to check all that applied. That led to some challenges in categorizing participants, as many respondents chose two or three roles. Because some of the options had only one or two respondents, I had to place

many in the same category. This was especially prevalent among lawmakers. Because only 13 lawmakers responded to my survey, I could not analyze their results with the levels of nuance I anticipated. A few lawmakers listed themselves as business owners or university faculty members as well as legislators. I hoped for a robust response rate which would allow me to differentiate opinions within that group of lawmakers, and perhaps analyze the differences among subgroups (lawmakers/business owners vs. lawmakers/university leaders, for example). The root cause of many limitations, the low response rate, forced me to simplify my categories. A better study, with a stronger response rate, could explore these differences among subgroups further.

Finally, I had many interview volunteers back out of their commitments due to conflicts. The interviews produced some of the most important insights gathered during the course of this research. More interviews, especially with lawmakers, could have spoken to some of the key conflicts produced in this research. While many of my respondents, including interview participants, theorized about the motivations of lawmakers, a bona fide legislator would have provided direct insight on the motivations and thought processes which went into policy formation. Any future research based on the model of this study should secure interviews with at least two legislators, one state and one federal, and preferably at least one member of the Governor's staff.

5.2 FUTURE DIRECTIONS

Camouflage, penicillin, and smart phone glass are all major innovations which originated from unexpected sources. They were not created as a result of planning committees or quotas. Innovation occurs with the free flow of thought and exchange of ideas. That should be a self-evident and natural conclusion in an Information Age economy. However, despite the wealth of information available at the stroke of a few keys on a laptop, policy actors continue to attempt to control and plan for new breakthroughs. The first policy recommendation from this study would be to abandon attempts at controlling innovation and embrace its unpredictability. Policy actors should be the strongest advocates for creating a new generation of opportunistic communicators. They will achieve more innovation and economic impact if they put down their pens, disband their committees, and instruct their staff members to find opportunities both inside and outside their state borders.

This policy recommendation is somewhat hypocritical. After all, much of the literature I gathered for this dissertation came from policy papers written by state and federal committees on STEM education. It is my belief that while these papers produced interesting data, these committees were looking for the wrong things. They were focused on performance gaps in STEM education and meeting quotas of STEM graduates and STEM business start-ups. They were concerned with decreasing disparities with economic rivals. While these are valuable datasets, they should not be the focus of investigation. Such explorations view STEM as a zero-sum competition. China, India, and Germany are not only rivals in the global marketplace, they are also potential partners. Cold War rhetoric from the age of *Sputnik* is a poor fit for discussions about STEM and innovation. Were there tangible geopolitical consequences for the United States if the Soviet Union won the race to the moon? Most likely, yes. The United States'

standing in the world would have been diminished. Countries around the world that the U.S. counted as allies could have aligned more closely with the Soviets. Are such consequences likely if China, India, or Germany outpace the United States in STEM education? That answer is not as certain. There are American firms which likely would be interested in doing business with the Chinese, Indian, or German STEM start-ups which arise as a result of these gains. States could experience economic benefits if German or Chinese companies open new branches within their borders. Policy actors could claim credit for these successes, scoring points according to the conceptual framework used for this study. Victories like these would almost certainly be mentioned in press releases by Governor Scott.

After evaluating the data, I created a list of policy recommendations and logical next steps for future research in this field. This compilation is by no means exhaustive. I am open to ideas, excited about opportunities to collaborate, and willing to discuss any potential research options or policy initiatives. As a researcher who has been looking at the literature of this subject for over six years, here are what I see as future directions in this field of *both/and,* STEM and liberal arts cooperation.

1.) <u>Allow highly-qualified K-12 STEM teachers with vast experience in their fields to start on higher steps on salary scales, and provide streamlined pathways to certification.</u>

District superintendents were strongly in favor of this idea. It makes sense. There is a shortage of math and science teachers in the U.S. That fact has been addressed by local superintendents as well as major policy actors such as President Obama. Salaries have a lot to do with that. As one district superintendent notes, "If Florida's serious about STEM, and if the nation is serious about STEM, those people…you can't pay them $34,000 starting salary. We need the flexibility with our union to say, "Hey, this person worked 10 years with NASA on the shuttle…we should

be able to give them that kind of experience" (P1, p. 2). This should be a common-sense measure that both zero-sum as well as *both/and* proponents of STEM education can support.

2.) Create Divergent Study STEM/Liberal/Fine Arts Programs at State Universities

Encouraging state universities to create living/learning communities in which STEM majors take a liberal or fine arts minor, and liberal and fine arts majors take a STEM minor, could create some of the cross-curricular thinking to spur a new generation of opportunistic communicators. Most universities have major courses of study in STEM, liberal arts, and fine arts fields. Rather than focusing on one specific type of major (usually STEM), universities should create opportunities for academic and professional flexibility. I advocated for this measure earlier in my doctoral program (Lurz 2012, March 7; Lurz, 2012, November 26). After completing this dissertation research, I believe that such ideas are practical programs which universities could create with little capital cost using existing academic resources.

3.) Study the Press Releases of Other States Using the Methodology of this Dissertation

I envision a more expansive document analysis using this dissertation's revised conceptual framework. By focusing on press releases, one could avoid the challenges of recruitment and data collection that I encountered in this study. Evaluating documents from the Governor's Office answered many of the "why" questions associated with zero-sum messaging strategies. These data produced some of the most important conclusions of my study. Instead of evaluating just a six-month sample as a partial focus of a multi-faceted study, a pure document analysis could explore the issues and messaging strategies of an entire year. Even a full four-year term of a major policy actor would be a possibility. Alternatively, a researcher could compare the press releases of the smaller 6-month sample between a Governor, a Senator, and a U.S.

Representative. That could produce interesting conclusions-especially if the policy actors were from different political parties.

My personal next step using this research methodology is examining press releases from Georgia and/or West Virginia, which I identified as peers to Florida in relation to state funding mechanisms and merit-based scholarship programs. I invite any scholars with background or interest in those states to join me in this endeavor.

4.) Conduct an interview-based study focused on the aides of major policy actors

I served as a legislative intern in the Pennsylvania State Senate. That experience helped me approach a 20% response rate of a difficult sample to reach in this dissertation. I knew that the aides to the Senator I served were required to open hand-written envelopes with an address in the Senator's district. I opened many of these envelopes myself.

Correspondence from outside the district was allowed to be discarded. However, I knew that aides often opened interesting mail, such as hand-written envelopes from out-of-state. I knew that letters from my University of Pittsburgh address were in danger of being discarded, but if they were hand-written, they were more likely to be opened, especially if they reached the desk of an intrigued aide. That aide was more likely to place the survey on his boss's desk once the envelope was opened and they saw my University of Pittsburgh cover letter, hard copy survey, and a stamped return envelope. My thought was proven correct when the return envelopes began arriving in my mailbox. The vast majority (61/69) of responses came that way. It is a lot easier to delete an email than physically throw a hand-written envelope into a trash can.

While I received surveys back from State Senators and U.S. Congressmen, I did not have the opportunity to conduct any interviews with them. Those required a phone call or meeting instead of a few minutes filling out a survey at one's desk. Although I did not talk with any

major lawmakers, I did communicate with a few aides. That gave me an interesting thought. Instead of focusing on lawmakers, it could be more fruitful to obtain data directly from staff members. It is often the staff members who inform their bosses with the information they need to formulate policy initiatives. A study which focused on interviews with aides could provide further insights into the gritty mechanisms of policy formation. The difficulties with this measure would be identifying the aides that would be recruited for the study. An embedded, anthropological approach, in which the researcher would become an aide and write about her experiences, could be an option. That might create ethical dilemmas. IRB boards might be reluctant to approve a study that would involve turning a primary investigator into a de facto mole on a policy actor's staff. Despite the tricky nature of setting up a study of aides, the data would be incredibly valuable.

5.) Conduct a quantitative, random-sample study using the survey instrument developed for this dissertation

Policy actors will often tie their own positions to the majority opinion of their districts. It would be difficult for a far-left progressive lawmaker to win election in a district that leaned heavily to the right. Instead of trying to reach individual policy actors, it would be beneficial to know the views of the entire district regarding STEM and liberal arts education.

My own quantitative data analysis lacked the ability to be generalized to the larger population. A two-tailed, random sample survey could provide results that had power and the ability to make more statistically significant conclusions from the data. A single doctoral candidate without external funding has the ability to undertake this study, as long as they were looking at a single state house district or smaller U.S. congressional district. A team of researchers might be able to handle an entire state. Whether its focus is local, regional, or

national, this study would likely receive more interest than my dissertation from policy actors, because it would be a valuable resource that provided direct insight into the perceptions of their constituents. I would be interested in collaborating with a scholar with more quantitative expertise than I possess, perhaps even combining the press release analysis with a random-sample survey. At the very least, this is a study that I would read, and I would likely not be alone in that impression.

6. Become Opportunistic Advocates

Supporters of *both/and* STEM and liberal arts balance face pressure from both linear model and zero-sum proponents. As more policy actors favor zero-sum STEM strategies, supporters of humanities and fine arts will likely encounter hostility rather than indifference when they seek funding.

It is important that humanities and fine arts proponents recognize their place in the policy making process and step up as vocal members of advocacy coalitions. They must sell their ideas successfully in the process illustrated by this study's conceptual framework, and appeal to the personal interests of policy actors they encounter. They must find allies from other advocacy coalitions and seek friends in the legislature who are sympathetic to their causes. The Pennsylvania Council for International Education (PaCIE) has provided bullet points to their allies on how to successfully advocate for their causes in their strategic plan (Pennsylvania Council for International Education, 2016). This is a necessary step in an increasingly competitive academic funding climate.

Faculty members in the humanities and the fine arts are used to encountering indifference when they look for funding from state government sources. As zero-sum STEM proponents seek to eliminate their departments entirely, they can either lament the status of STEM-centric

promotion, or they can successfully advocate for the economic and civic utility of their disciplines. To be an opportunistic communicator, one must recognize the realities of one's field, and pull the levers of policy formation mechanisms that are within reach. Advocacy measures that include economic arguments are both necessary and beneficial to *both/and* proponents, especially since they have become targets of zero-sum policy actors.

5.3 FINAL THOUGHTS

In closing, this dissertation is one of the first forays into an important area of study. I am certain it will not be the last. Perception of a subject area dictates policy initiatives. Ideology can influence how these initiatives are viewed. It is important to evaluate the items and viewpoints which influence how policy is conceived, formulated, and evaluated.

When I first began this research, over six years ago, my professors in my doctoral program noted that I was critiquing an area of consensus. They did not say I was wrong for doing that, but they wanted me to be aware that changing entrenched intellectual positions was an uphill battle, and complicating rare issues of bipartisan agreement could be even more challenging.

Policy actors are criticized for turning arithmetic problems into calculus equations. It is perhaps even more dangerous to transform calculus equations into simple arithmetic. Just because an answer is simple does not make it correct. The oversimplification of STEM and liberal arts policy into the dominant narratives of the linear and zero-sum models has consequences that impact citizens beyond classics and anthropology departments at state universities. The ability and mission of universities to produce an informed and enlightened

citizenry is threatened by state governments that seek to use the academy as a utilitarian device used exclusively for technical job training. To produce the innovation of the future, universities cannot be forced to function as mere training sites for STEM workers. That is the inevitable consequence of shifting from STEM promotion to STEM obsession.

STEM education is important. However, it is not necessary to denigrate the liberal arts to improve the sciences. The university in the 21st century is not a zero-sum space, and should not be treated as such. The economic and political rivals of the United States are not the Soviet Union of the 1950s. China and India's gains in STEM are not the equivalent of *Sputnik* looming over the American education landscape. The STEM advances of other nations should be viewed as opportunities, rather than threats to American prosperity. Likewise, STEM should be promoted, but not at the expense of liberal arts fields. Anthropology is not a threat to state and national economies. Neither are China's PISA scores in math and science.

Innovation is complicated, and should be treated that way. The pursuit of knowledge in any capacity should not be criticized for being in the wrong field or not possessing worth in the marketplace. The capacity to *think* will always be valued in the free market, along with public service. The ability to understand, and be understood, is treasured by CEOs and civic advocates alike. The traditional mission of the liberal arts, which is based on expanding one's understanding of the world, is a natural fit for the complicated geopolitical environment of the 21st century. Instead of creating training sites for the STEM jobs of the present century, academe would benefit from preparing students to *create* the jobs that do not presently exist. A new version of the *1828 Yale Report*- one which defends the utility of the liberal arts in the Information Age-would be a great step for university leaders to take as opportunistic advocates in a challenging academic climate.

This research has limitations, but also promises exciting possibilities for future directions. It is my hope that others will pick up the torch and carry these methods, frameworks, and ideas and conduct some of the studies and policy initiatives I suggested. I am already designing new studies to explore these areas further, using the methods and insights I gained from these years of research. The work in this field is in its nascent stages. I look forward to contributing to future research, and meeting others who are working on their own frameworks and theories. No matter what direction this future research takes, it is unlikely to be zero-sum in nature. Collaboration and mutually beneficial projects are the pathway to policy narratives that are better suited for the present age. I am excited to participate in new studies in this field that will challenge existing paradigms and offer innovative solutions to contemporary problems.

APPENDIX A:

FRAMEWORKS

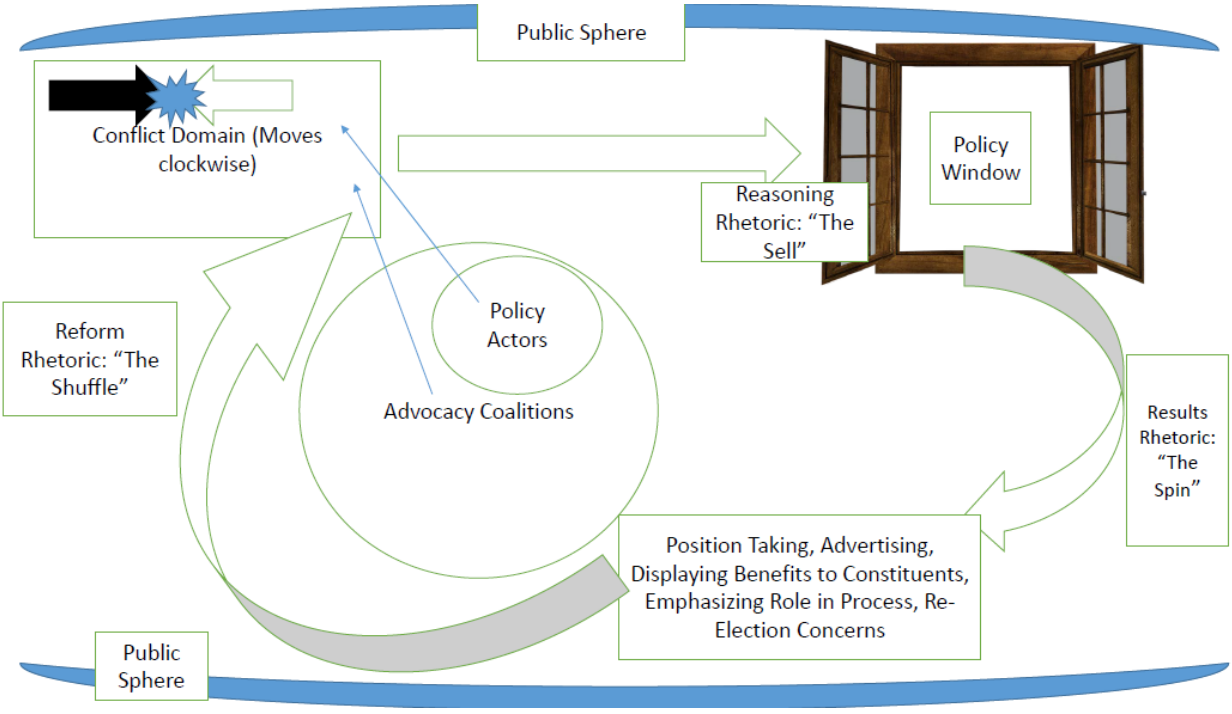


Figure 7. Initial Dissertation Framework

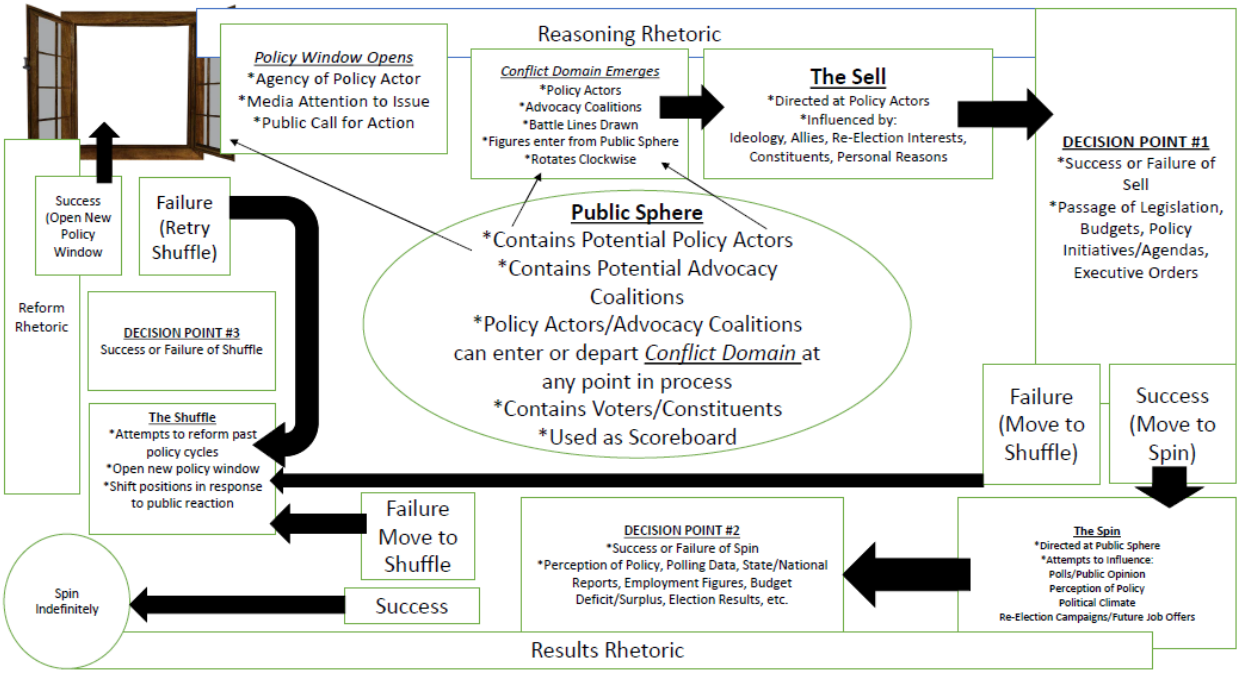


Figure 8. Final Conceptual Framework

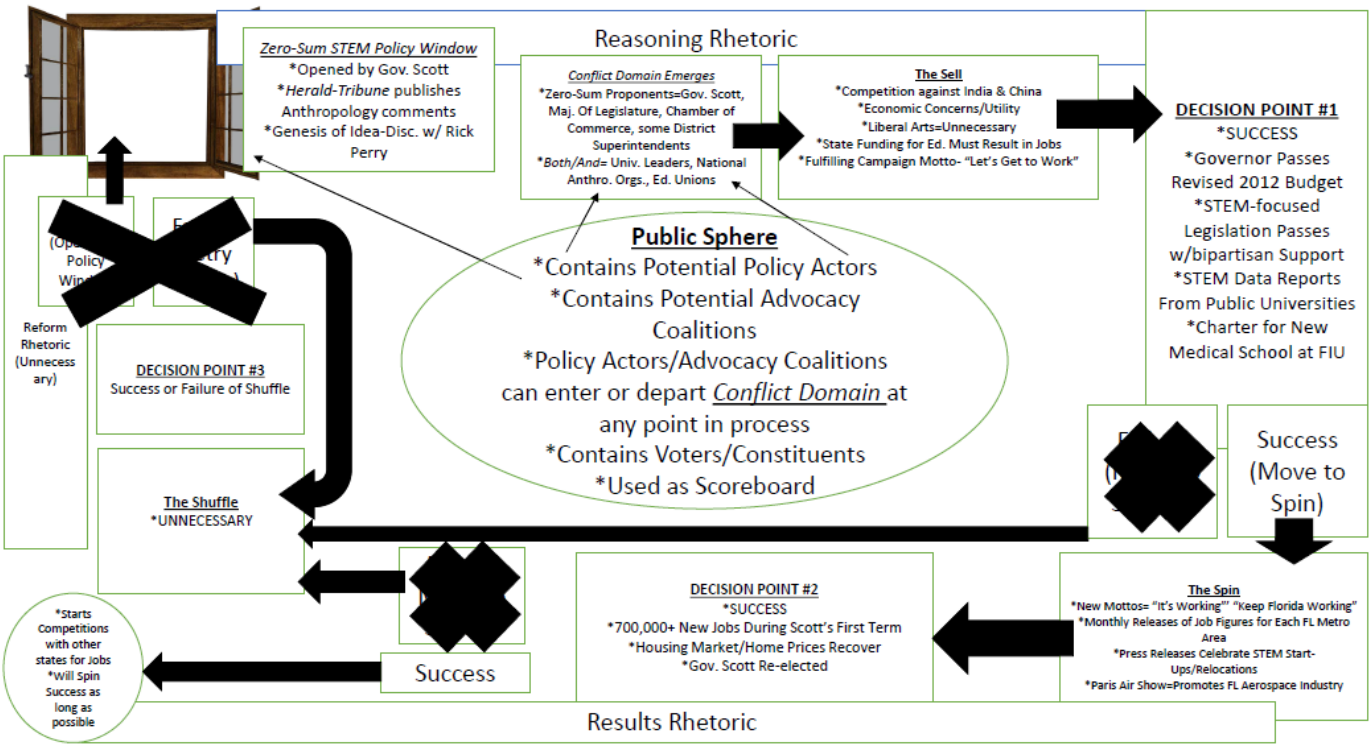


Figure 9. Governor Scott & Zero-Sum STEM Promotion

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