What Is STEM?
A Discussion About Conceptions of STEM in Education and Partnerships

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Educational reformation has proceeded slowly despite the many calls to improve science and mathematics for our students. The acronym STEM (science, technology, engineering, and mathematics) has been adopted by numerous programs as an important focus for renewed global competitiveness for the United States, but conceptions of what STEM entails often vary among stakeholders. This paper examines the conceptions of STEM held by faculty members from a public Research I institution in the middle of a regional "STEM movement." Faculty members responded to two open-ended questions: (1) What is STEM? and (2) How does STEM influence and/or impact your life? Although 72% of these faculty members possessed a relevant conception of STEM, the results suggest that they do not share a common conceptualization of STEM. Their conception is most likely based on their academic discipline or how STEM impacts their daily lives. STEM faculty members were likely to have a neutral or positive conception where non-STEM faculty members often had negative feelings about STEM.

In recent years, the use of the acronym STEM (science, technology, engineering, and mathematics) has become the buzzword among the many U.S. stakeholders who have heeded the call for creating better prepared high school and college graduates to compete globally. But what is STEM? Does this acronym say enough? It may appear that STEM is a simple acronym, but do all of the various partners with vested interests understand it in the same way? Generally speaking, most stakeholders who hold interests in promoting STEM would claim to understand the meaning, yet the finer points of this construct often cause confusion. Stakeholders may include government officials who are allocating billions of dollars into this enterprise, teachers in the K-12 system who are expected to teach STEM to their students, parents who may struggle to understand the need for different pedagogies and curricula, businesses that need to invest in their future employment pipeline, and of course the students who are ultimately the product of these efforts. Within such a varied group of stakeholders, "What does STEM look like?" can elicit multiple perspectives. From an educational perspective, the introduction to STEM can be a variety of activities, but generally speaking, it usually includes the replacement of traditional lecture-based teaching strategies with more inquiry and project-based approaches. To some, it only becomes STEM when integrating science, technology, engineering, and math curricula that more closely parallels the work of a real-life scientist or engineer. To others, STEM is the push for graduating more students in the science, technology, engineering, and mathematics fields so the United States can maintain its competitiveness and not fall behind emerging countries. The ultimate question remains: What is STEM?

This question exists because of the many different approaches of research and education initiatives that have recently been created to address the need for the United States to compete globally. As the federal government has made STEM a top priority in funding, multiple agencies have been vying for these dollars. Programs have been established as joint ventures between various agencies within government, business, institutions of higher education (IHE), parents, and existing K-12 school systems. Many of these programs involve funding from a governmental agency with IHE's playing a prominent role, and most often seemingly, a lead role. As the government has focused efforts to reform science and mathematics education, IHE's, K-12 districts, and regional education agencies, share the forefront of this endeavor. To accomplish these collaborations, centers and programs with emphasis on STEM have been formed to tackle this initiative of transforming the current educational paradigm toward a STEM education perspective. This study evolved from our own path at an IHE in exploring how our colleagues conceptualized the notion of STEM. In this manuscript, we will share our findings on how faculty members at our IHE conceptualized STEM, and how they perceived the impact that STEM had on them personally by investigating the following two research questions: What is STEM? How does STEM influence and/or impact your life? To provide greater context for their responses, we will first provide a brief summary of the STEM movement, its rationale, and various conceptualizations relating to STEM.

The Evolution of STEM Education Policy

Although the STEM movement has taken a momentum of urgency in recent years, the need to strengthen science and mathematics education in the United States has been emphasized in multiple education reports since the early 1980s (e.g., National Commission on Excellence in Education [NCEE], 1983; National Science Foundation [NSF] and U.S. Department of Education, 1980). For example, the American Association for the Advancement of Science (AAAS) created Project 2061 in 1985 in response to *A Nation at Risk* (NCEE, 1983) and proclaimed to help all Americans become literate in science, mathematics, and technology. The publication of *Science for All Americans* (AAAS, 1989) advocated the need for the U.S. citizenry to achieve scientific literacy. Throughout the 1990s, reports from national commissions, professional organizations such as the National Science Teachers Association (NSTA) and the National Council of Teachers of Mathematics along with researchers, employers, university faculty, and students consistently called for instructional innovations in science, mathematics, engineering, and technology (SMET) education (AAAS, 1989, 1993; Boyer Commission, 1998; NRC, 1996; NSF, 1996). Despite a long history of attempts to improve science and mathematics education, desired changes in the educational system have often failed to take place. Perhaps this lag in educational reform may be due, in part, to the lack of coordination and common focus that seem to be pervasive in the current STEM education movement (Committee on Prospering in the Global Economy of the 21st Century, 2007; National Science Board, 2006).

A review of the literature over the past 10 years revealed that STEM evolved out of government policy, specifically from within the NSF. NSF first used the acronym SMET for science, mathematics, engineering, and technology in the early 1990s, but determined that this acronym would cause issues of vulgarity, and SMET was changed to STEM (Sanders, 2009). The first use of the acronym STEM was introduced in 2001 when Judith A. Ramaley, a former director of the NSF's Education and Human-Resources Division, used STEM to refer to science, technology, engineering, and mathematics curriculum (Teaching Institute for Excellence in STEM, 2010). NSF defines STEM fields broadly, including not only the common categories of mathematics, natural sciences, engineering, and computer and information sciences, but also such social/behavioral sciences as psychology, economics, sociology, and political science (Green, 2007). The acronym STEM has since been adopted by numerous programs at national, state, and local levels, and within scientific communities as it is an important focus for educational reform and renewed global competitiveness for the United States.

The term STEM has gained considerable momentum since 2001. Some use the terms science, mathematics, and technology interchangeably with STEM. For example, the Committee on Prospering in the Global Economy of the 21st Century (2007) published *Rising Above the Gathering Storm* that used this acronym as the "charge to action" in response to the poor performance of students in science and mathematics. Many refer to this report as an indication of the need for more focus on STEM skills and as recommendations set forth by the Committee to ensure the "future prosperity of the United States." The recommendations include (1) increasing the talent pool through improving K-12 science and mathematics education; (2) sustaining and increasing long-term basic research related to the economy, security, and quality of life; (3) increasing the attractiveness of the United States to recruit and retain the best and brightest scientists and engineers in the world; and (4) increasing incentives for innovation (Committee on Prospering in the Global Economy of the 21st Century, 2007).

Since the 2007 *Rising Above the Gathering Storm* report, STEM skills have been further touted by professional organizations as well as state and federal legislators as the key to success for all students in the 21st century and for many jobs that have yet to be conceptualized (NSTA Reports, 2008; Sanders, 2009). Current data reveal projections that the majority of the highest paying jobs in the future will require a mastery of science and mathematics skills. In fact, it is anticipated that one of every three jobs by 2015 will be STEM-related (Government Accounting Office [GAO], 2000). Moreover, it is well documented that mastery of science and mathematics is correlated to college success and retention, economic growth and development, national security and innovation, and competitiveness in the global market (Business Roundtable, 2005; Committee on Science, Engineering, and Public Policy [CSEPP], 2007; Friedman, 2007; U.S. Commission on National Security/21st Century, 2001).

At the federal level, the increased focus on STEM performance and accountability has resulted in increased financial support and potential oversight. The 2011 federal budget for STEM includes $3.7 billion invested into STEM education. Additionally, $4.3 billion was earmarked for the *Race to the Top* competition that includes STEM as the sole competitive preference priority. The U.S. STEM Coordination Act, which was passed by the U.S. House in 2009 and currently under consideration with the U.S. Senate, will establish a council to oversee and coordinate the federal government's STEM education efforts. The growing focus on STEM has necessitated oversight and accountability for both expenditure of funds and academic progress and innovation (Uy, 2009). The Obama–Biden Plan (2009) promised STEM policy and resources for improvement in education as a response to the poor performance of U.S. students in mathematics and science. This Plan targets the failure of our educational system to prepare students for the current and future workforce and addresses the fact that the United States is lagging significantly behind other nations educationally. President Obama has support from the National Conference of State Legislatures (2010) whose website noted that Legislators are beginning to focus on policies related directly to STEM education and considering strategies that will improve the overall quality of education to prepare students for jobs in a 21st-century workforce.

Conceptualizing Ideas About STEM

Educational Conceptualization

Depending on where you go to seek an answer to the question, "What is STEM?" responses may vary greatly. From a policy perspective, such as the view of STEM from the NSF and legislative organizations, or from an educational perspective like most K-12 agencies/school districts, STEM is often considered a traditional disciplinary coursework (science, mathematics, technology, and engineering) lacking an integrated approach. Thus, the most important modern conception of STEM education might be the notion of integration—meaning that STEM is the purposeful integration of the various disciplines as used in solving real-world problems (Labov, Reid, & Yamamoto, 2010; Sanders, 2009). This STEM education perspective involves viewing the separate disciplines of science, technology, engineering, and mathematics as one unit, thus teaching the integrated disciplines as one cohesive entity. STEM professionals naturally practice integrated STEM and are less likely to compartmentalize disciplines as seen in the typical school subjects of chemistry, physics, math, or English. For example, an engineer needs a well-developed understanding of the various science disciplines, math, and technology to support and provide context for their engineering designs and applications. A chemist is likely to self-identify as a chemist but will often need an in-depth understanding of other science disciplines, technology, and math to properly perform their duties (Bennett & O'Neale, 1998). Although this "real-life" application of STEM is naturally integrated, most K-12 classroom teachers do not teach the content in this fashion. Teaching STEM concepts in an integrated manner is not a new or novel approach. As Moore (1903) stated in his presidential address to the American Mathematical Society in 1902:

> Engineers tell us that in the schools algebra is taught in one water-tight component, geometry in another, and physics in another, and that the student to appreciate (if ever) only very late the absolutely close connection between these different subjects, and then, if he credits the fraternity of teachers with knowing the closeness of this relation, he blames them most heartily for their unaccountably stupid way of teaching him. (p. 415)

Political and Societal Conceptualization

Examination of the funding of STEM programs, such as the recent U.S. stimulus package or as part of economic reform initiatives through education–industry partnerships, reveal that there have been two major considerations when attempting to implement a STEM curriculum into K-12 classrooms: (1) instruction strategies in the typical classroom have not changed (Hiebert & Stigler, 2009), and (2) students have not gained more interest in STEM subjects (especially math; Wells, Sanchez, & Attridge, 2007). While each program may have enacted some type of positive change in the classroom (e.g., introducing more inquiry-based lessons in science classrooms), these programs typically involve teaching the traditional STEM disciplines in silos providing little integration with other disciplines and lacking a demonstration of how STEM is conducted in the "real world." Most importantly, this instruction does not reveal how STEM is relevant to students' lives. Similarly to the issues encountered in science education where the way science is taught is not the way science is done (Schwartz & Lederman, 2002), the way STEM is *taught* is often much different than the way STEM is *done*. To make matters more complicated, there appears to be a great uncertainty as to the level of understanding that many of our political leaders possess of STEM, and particularly integrated STEM education. For example, within the 111th Congress, only 74 members (14%) held a degree in a traditional STEM area, and 19 members (3.5%) had a background in education (Science and Engineers for America, 2010), yet Congress is responsible for the legislation providing all of the federal dollars that are spent on reform initiatives such as STEM.

Some proponents of STEM think that the problem is overblown and not as dire as previously stated. Lowell and Salzman (2007) concluded that the general call for more scientists and engineers is not supported by workforce and educational data but rather needs to be more focused in specific STEM areas of need or underrepresented student groups. In addition, they state that the current policy approach is misguided based on current data, and thus it is lowering the efficiencies of actions that would better target and help the actual areas of crisis in education. Incidentally, other countries have been criticized for similar misgivings as comparable reports have come out of the UK. Smith (2010) reviewed 90 years of data and suggested that the STEM crisis has not changed since the introduction of school science curricula, and he questioned the role of policy in influencing educational change.

Personal Conceptualizations

Even though this disagreement exists, most stakeholders would agree regarding the need to increase STEM literacy for all people. Defining what it means to be STEM literate differs among these important groups. Surveys of the general public support the notion that a typical citizen is usually confused about the messages regarding STEM. The Entertainment Industries Council polled 5,000 participants who were asked if they understood the term "STEM education." Eighty-six percent did not understand the reference, and many confused it with research related to STEM cells, flowers, and even broccoli stems (Angier, 2010). Thus, a main concern with regard to STEM is that there exists a knowledge and communication gap between policy makers, universities, K-12 school districts, and the general public, e.g., parents. It appears that people do not have an interdisciplinary understanding of STEM. "Everybody who knows what it means knows what it means, and everybody else doesn't" (Angier, 2010). This is particularly true when it comes to the parents' understanding of the need for STEM. A 2007 report by the Kaufman Foundation titled *Important, But Not For Me*, revealed that only 25% of the parents surveyed in Kansas and Missouri that thought their kids needed more science and math (Kadlec, Friedman, & Ott, 2007). This same report showed that 64% of the parents surveyed do not think that science and math education in their schools is a serious issue. A national report in 2010, *Are We Beginning to See the Light?* (Johnson, Rochkind, & Ott, 2010), revealed that slightly over half of the parents surveyed thought that the mathematics and science their kids received was fine as it is.

So what about other stakeholders, such as university faculty, who are charged with training students for careers in STEM and STEM education? How do these participants conceptualize STEM? Do they share an operational definition?

Context of Study

This qualitative study was conceived through multiple discussions related to STEM education at a university-based STEM Research Center. At the Center, faculty members held a variety of conceptions related to the notion of STEM; what is it, what it is not, and how can it be fashioned into education at the K-16 level? A group of STEM education faculty in the College of Education, Criminal Justice and Human Services (CECH) at the University of Cincinnati (UC) designed this qualitative study by asking two questions of the university faculty members at UC: (1) "What is STEM?" and (2) "How does STEM influence and/or impact your life?" These questions were emailed to faculty members from the various colleges across UC to explore their conceptions of STEM.

The UC has a student body of more than 41,000 students. During the year of this study (2009), CECH embarked upon a STEM movement by engaging in several initiatives: (1) leading a regional STEM partnership; (2) creating two STEM public schools, one elementary (K-8), and one high school (9–12); and (3) starting a STEM education center within the college. Therefore, the context for this study was literally in the middle of a STEM movement.

Methodology

The two open-ended research questions were emailed to all full-time faculty members through the faculty email listserv. The survey questions were intentionally ambiguous to not lead participants and to determine if the STEM acronym was confusing among those perceived to understand it. Participants were directed by a link to SurveyMonkey where they entered their open-ended responses to the two questions: (1) *What is STEM?* and (2) *How does STEM influence and/or impact your life*? A total of 222 (n = 222) responses were collected. The information regarding the resident college of the faculty member was also included with their responses. Two authors of this paper focused on an inductive analysis and immersed themselves in the details of the data to get a sense of the whole and to find the themes reported here (Fraenkel & Wallen, 2000; Patton, 2002).

To begin the analysis, each researcher independently reads the responses and coded them according to their own schematic. Discussions about the codes followed this independent analysis. Constant comparative analysis was used to avoid research bias (Patton, 2002). The responses for research question #1, *What is STEM?* were straightforward and easy to code. Respondents either defined their notion of STEM, or this question was left blank.

For research question #2, *How does STEM influence and/or impact your life?* again, the two researchers independently read the responses and looked for themes or broadly defined categories that were woven throughout all of the responses. After initially coding the responses, they met to discuss the themes that emerged from the data. After lengthy discussions, consensus was reached, and three broad themes were agreed upon: (1) null relationship to STEM, (2) personal reasons, and (3) societal issues. All authors then met as a group to discuss where the data aligned within each category and where it did not. After several meetings, consensus was reached for coding research question #2. It is important to note that some responses were coded in more than one category (e.g., fell into the personal and societal categories), and thus the total responses did not align perfectly. These procedures corresponded to a "grounded theory" approach to data analysis (Glaser & Strauss, 1967; Patton, 2002).

Survey Results and Findings

In response to research question #1, *What is STEM?* 72.5% (161 of 222) of the respondents described STEM as it related to science, technology, engineering, or mathematics, yet the remaining 27.5% responded that they did not know or understand what STEM was (Table 1). Within the informed respondents, 57% (*n* = 92) used the acronym: science, technology, engineering, and mathematics; 9% (*n* = 14) wrote a description about science, technology, engineering, and medicine; and 4% (*n* = 7) noted that the acronym stood for science, technology, engineering, and mathematics and/or medicine. Some were creative with their definitions responding that the "E" stood for electronics (*n* = 1), and the "M" indicated management (*n* = 1). Most of the respondents described the acronym with no emotional stigma, but 7% (*n* = 11) responded with an emotional negativity as described below:

> A push toward once again privileging the Science, Technology, Engineering and Math fields.

Table 1
Responses to Research Questions #1: What is STEM?

Category	Percent of Respondents (*n* = 222)
Knew what STEM stood for	72.5% (*n* = 161)
Science, technology, engineering, mathematics	57% of 72.5% (*n* = 92)
Science, technology, engineering, medicine	9% of 72.5% (*n* = 14)
Science, technology, engineering, mathematics and/or medicine	4% of 72.5% (*n* = 7)
Do not know/understand what STEM is	27.5% (*n* = 61)

> A group of disciplines that have been privileged over all others here in [state], in the odd faith that only they can create jobs, Science-Technology-Engineering-Math. Or was it Sociology-Theater-English-Music?

> Science Technology Engineering Medicine. Typically viewed as hard science, I think that there are roles for the social sciences that have been ignored.

One informed participant inquired about the intent of the research question:

> Science, Technology, Engineering & Mathematics. This seems like an odd Question . . . what might you *really* be asking? What "content" we think belongs? What "courses"? What "objectives"? Since I can't guess I just provided the "terms-for-each-letter." If you were looking for something else, I regret that I am unable to ferret that out of the question provided.

In response to research question #2, *How does STEM influence and/or impact your life?* themes emerged from the survey responses that were coded into three broadly defined categories: (1) null relationship to STEM, (2) personal reasons, and (3) societal issues. Some responses fit into more than one category. Table 2 describes the breakdown of data into these three broad categories.

Category #1: Null Relationship to STEM

As noted in Table 2, 36% of the respondents (*n* = 84) indicated that they did not know "*What is STEM?*" or indicated that STEM did not impact their lives when

Table 2
Examples of Codes and Responses to Research Question #2

Emerging Codes	% of Respondents*	Responses to Research Question #2: How Does STEM Influence and/or Impact Your Life??
Null relationship to STEM	36% (*n* = 84)	None that I am aware of Unknown
		N/A
Personal reasons	50% (*n* = 113)	It further marginalizes my field since I am in the Humanities. It makes my field seem irrelevant, which STEM programs do already. It furthers narrow-minded thinking.
		I teach mathematics.
		I teach it in everyday courses.
		I work with students who have expertise at the intersection of STEM.
		I use a bit of technology and I truly enjoy reading about science. The math in my daily life and even in my career is so elementary that I wonder why I had to study the math I was forced to.
Societal issues	21% (*n* = 45)	Develops competencies about basic skills used in life.
		It is life.

* Total responses are greater than 222 because of coding of some responses in multiple categories.

asked, "*How does STEM influence and/or impact your life?*" Interestingly, 23% (*n* = 19) felt that STEM did not impact their life, yet they were able to articulate a relevant conceptualization of it. Some typical responses in this category included the following:

> Unknown.
>
> Not at all.
>
> Right now I have no direct contact with STEM, but would like to learn more about it.
>
> I haven't thought about it much. I'm in the social sciences.

Other responses included those who were confused about STEM or indicated that it involved STEM cell research:

> It could be extremely pivotal [sic] in addressing terminal illness. AIDS/HIV, certain strains of the flu, & cancer.
>
> The stem cell part keeps me interested in the development for curing diseases'

Category #2: Personal Reasons

Of the respondents who described personal reasons as the way STEM impacted their lives, many described their own careers or discussed their children.

> Not much, though the department I'm in (Quantitative Analysis and Operations Management, in the College of Business) and all of our programs, faculty, and students *SHOULD* be under the STEM umbrella, but my understanding was that there is some question about that. Our area is definitely applied math, and many of our faculty and students have degrees in math or engineering (rather than business), so just because we're organizationally located in a business college should not keep us out of STEM.
>
> My son is a high school senior and a probable math major. Some of the state universities we have been looking at are offering STEM-funded scholarships.
>
> Since I teach Computer Science and Math, two of the four disciplines are areas I teach.
>
> It further marginalizes my field since I am in the Humanities. It makes my field seem irrelevant, which

> STEM programs do already. It furthers narrow-minded thinking.
>
> Makes my work unimportant in the eyes of the university.

Category #3: Societal Issues

Responses in this category fit into loosely framed, broad descriptions that included (1) the university community, (2) the state in which the university is located, (3) the U.S. government, and (4) the global issues. Exemplars from these themes include statement like:

> The initiative insures educating American youth in an attempt to offset the need for persons in this field to run American science enterprises
>
> If we do not get some math-oriented US citizens in the pipeline, we might as well give up.
>
> Any time there is a partnership between [the university] and [local public school district], the city and region are strengthened.
>
> As a member of the university? As a person? These are increasingly important fields of study, in my opinion, and certainly have many real-world applications.
>
> All citizens need to be informed on these subject in this complex global world.

Disaggregating the data by college at UC, interesting trends emerged. Of the faculty members in the College of Engineering, who responded to the survey, 96% (22 of 23) had some relevant conceptualization of STEM, whereas over half of the respondents, 53% (20 of 38) from the Colleges of Medicine, Nursing, and Pharmacy indicated that they either did not know what STEM was or did not think it impacted their lives.

Among the faculty who had a relevant conceptualization of STEM, 70% (113 of 161) viewed it from a personal perspective. While this is perhaps not surprising, it demonstrates that faculty members are likely to identify STEM and STEM initiatives based on their line of work and how it directly affects them. Similar trends are also seen among non-STEM faculty members who had negative perceptions of STEM. These faculty members, often resided in arts and humanities departments, perceived that STEM was encroaching on their financial support and importance within the university community.

Personal Reasons and Societal Issues

Some responses touched on ideas that could fit into both personal reasons and societal issues categories and were coded into both categories. Typical multi-category responses include the following:

> As an instructor in a technical field, I know that students who have a strong background in STEM will be successful. Many students struggle with math because they have a poor understanding of basic principles. This deficiency causes them to struggle with the science and technical courses they are required to take here at Clermont.
>
> Indirectly, probably improves quality of life through brighter minds in these areas. Directly, it may divert bright people who would have chosen my profession.
>
> My position is partly in a technology program, and I suppose the emphasis is such that one's personal life could be improved through discoveries made through these emphases.

Conclusions and Implications

The survey results from faculty members in both STEM and non-STEM disciplines at UC suggest that even within an IHE where faculty members are extensively involved in multiple STEM projects and centers, there is no common operational definition or conceptualization of STEM. While much larger percentages of faculty members seemed to possess a relevant conception of STEM when compared with average citizens' conception (Angier, 2010), faculty members tended to view the notion of STEM from their perception of how it impacted them in their daily lives. In our findings, most of the faculty members who articulated a conceptualization related STEM to individual STEM disciplines, thus following the notion that there are silos in the disciplines. Some discussed the integrated nature of STEM, while many others failed to demonstrate an understanding in either of these areas, sometimes even if they held academic appointments in STEM colleges and/or programs.

Given the nature of this survey, it was not surprising that there appeared to be a challenge in changing the paradigm from compartmentalizing academic disciplines to the integration of these disciplines as advocated by many through the STEM movement. Because Congress, IHE's, and other stakeholders all have varying conceptions of STEM, can we address education and work force issues in STEM without operationally defining it?

Operationally, defining a common conceptualization of STEM for all stakeholders may provide language that fosters a clearer understanding, but the results of this study suggest that an operational definition would be at best difficult to achieve. Comparably, operationally, defining STEM for a large number of initiatives could result in compartmentalization, further adding to the exclusion of some groups that could add to and enhance the current trends in STEM. Therefore, it is probably best to focus on shared outcomes of STEM as most stakeholders seem to agree that STEM is about creating better teachers, students, and workforce in order for the United States to better compete globally. This would enhance the notion among stakeholders that STEM education can be successful in K-16 education and thus prepare students at all levels with the skills necessary to compete in our rapidly advancing technical society. However, while it is probably necessary for stakeholders within a certain STEM initiative to have a common conceptualization, caution should be paid as the many initiatives across the nation are probably too varied to be placed into too narrow a framework. It is important for best practices to be shared, but a one-size-fits-all approach is not likely to work with each STEM initiative's strengths.

Whatever the solution is to this dilemma, time is rapidly progressing, and we, as a nation, are falling behind our global counterparts so all discussions among stakeholders related to STEM are worthwhile. As Moore (1903) implied over 100 years ago, students need to see the connections between "different subjects," thus teachers at all levels need to be intimately familiar with the interrelationships within the STEM disciplines. Legislators need to understand the necessity of STEM independent of the next election. Parents need to understand how society has changed creating different academic needs for their children. When groups come together within a STEM initiative, it is best to work around common outcomes and then to develop a conceptualization of STEM that will move the stakeholders more quickly toward these shared outcomes. There has not been a time in the past 50+ years since Sputnik where there appears to be a greater willingness and support to achieve these recommended changes, but each effort should clearly outline the objectives, and that starts with "What is STEM?"

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