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Literature Review in Educational Leadership, Policy, and Law within STEM Education

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Abstract:- STEM is the acronym for the fields of study in science, technology, engineering, and mathematics. This manuscript is to highlight the need to increase the number of females pursuing education and future employment opportunities in careers that requires study in STEM. Regarding STEM programs, education leaders must provide advantages that bridge the academic achievement gaps for females and other underrepresented minoritized (URM) student groups. Parents, teachers, and school administrators must fill the gaps often found in the academic areas of mathematics and science. The resolution is to introduce students at an early age to the American workforce in STEM-related fields. Students' early interventions include businesses, industries, and community mentorship programs. These mentorship programs are central to meeting every capable STEM worker's need to keep America in a global leadership position. At the forefront, educationalists, policymakers, and legislators are taking the initiative to establish a firm educational foundation that will increase the roles of women and minorities in STEM-related fields. STEM education must break traditional ethnic and gender roles. America must ensure that every gender, race, or ethnicity has a seat at the economic table. Minorities having a seat at the trade and industry table is essential for the nation to compete in a global economy. The educational systems must spark an interest in students pursuing a career in the various fields of STEM. Nevertheless, more people of color must sit at the economic negotiation table to decide their future.

Keywords:- *STEM Career Programs, Female Students, Underrepresented Minoritized Student Groups, Policymakers' Directives, Educational Leadership and Law.*

I. INTRODUCTION

Educational leaders and policymakers are aware that there are limited resources allocated to the inclusion, development and responsiveness to the educational and job-readiness needs of females and minoritized person in the fields of science, technology, engineering, and mathematics (STEM); thus limiting their career opportunities, advancement and full participation in the global economy (Blair et al., 2017). Therefore, this literature review is necessary. To conduct this review, articles in the STEM domain will be used from peer-reviewed journals. The literature review will include empirical research, books, scholarly articles, and any other relevant sources that addressing inequalities of educational leadership policies and laws within STEM specialities that creates barriers for the female and minoritized student populations in the US. students. In particular, the literature review will report on female students' inequalities in STEM education, including both race and ethnicity data.

In the world of STEM, it has long be assumed that women are facing a different set of problems than men. This literature review will explore the various research areas that attempt to govern equity and equality for females in STEM education programs and the future of their ability to obtain global careers in these fields. This literature review will describe, summarize, and critically evaluate barriers and inequalitiesfound in STEM education concerning female students and specific STEM areas of study. The goal of this critical analysis of research is to demonstrate how inequalities of STEM education show up in educational leadership, policy and law fit within a larger field of study.

This literature review will address the STEM educational policy that promotes female student equity and inclusion in the STEM fields. The literature review will research STEM educational policies at the Federal, State, and local school districts levels. This body of work is important to the educational policy research community and it will demonstrate that there is a close connection between the current state of STEM education and the need for reformation and advocacy to women in the field of STEM education and work.

Also, the literature review aims to raise the overall expectations for high-quality STEM learning experiences for all genders and races (Diemer et al., 2016). The preparation for excellent STEM education will ensure that the future pathway of STEM talent is vibrant and will support continued global competitiveness within the United States of America (Zeng & Poelzer, 2016). STEM educational policies should promote equity, inclusion and equality for all minoritized students, especially for female students within the education departments at the Federal, State, and local government levels.

Nevertheless, the instructional core for STEM education policy involves instruction as an interaction among educators, students, and the curriculum. The general intent of this document is to focus on female gender equivalence and the analysis of STEM educational policies concerning instructional core for the improvement of teaching and learning in the classroom. However, the

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specific focus of this manuscript will examine the policy and practices of STEM education, the influences on STEM education policy, the analysis of STEM education policy, and the effectiveness of the STEM educational policy.

II. POLICY PRACTICES OF STEM EDUCATION

There is a demand for policymakers to examine educational policy practices related to having females in the academic fields of astronomy, biology, chemistry, computer information technology, aerospace/aeronautical engineering, combinatorics, mathematics, and the other vast fields of STEM. The educational policy must close the door to gender inequality. There is a great need for increased female representation in STEM. Despite the dim efforts by policymakers to increase female representation in STEM programs, the educational policy fails to meet the gender equality needs within these programs. Policymakers must motivate and ensure that female students have the same access to STEM programs and careers as their male colleagues enjoy.

The policy solutions that include after-school STEM programs and well-trained teachers will provide students an excellent opportunity to advance to the next level. A robust pre-college education in STEM subjects is a prerequisite for students to do well in various STEM academic college courses. Therefore, thoroughly professionally developed teachers with expertise in the different subjects of science, chemistry, physics, engineering, technology, and mathematics are of paramount importance. Policymakers can help address the shortage of STEM teachers through training modules and teacher professional development programs. A policy that funds after-school programs and teacher training initiatives will increase student abilities and engagement without a punitive approach to raising academic standards (Israel, 2017). STEM education is an intervention that will build America's future.

Intervention for the future must include all genders, races, and ethnicities. Research points out a positive impact of gender-segregated schooling and classroom initiatives on academic attainment (Pennington & Heim, 2016). Research specifies that female students benefit more from a single-gender learning environment than male students (Pennington et al., 2018). Overall female students perform academically better than their male counterparts. Empirical research and evidence-based policy and practice proclaim that the STEM program must continue to improve and increase female perceptions and interest in STEM (Wang & Degol, 2017). As a result of the lack of interest in STEM, women and students of color are less aware of the breadth of STEM career choices available to them (Wang et al., 2017). STEM programs must engage all students, but especially the female acolyte.

Educators at every level must engage the female student. However, existing barriers discourage female participation in the STEM fields. Female students encounter obstacles of implicit stereotypes of gender associations with STEM fields, such as cultural biases and restrictions (Brown et al., 2017). Despite the female students' abilities in STEM, their self-perceptions can be the ultimate deciding factor regarding the coursework they pursue. Brown et al. (2017) state that female students encounter barriers that include negative perceptions of their abilities in STEM-related programs compared to male students. Weber (2012) confirms that males and females performed equally in STEM programs. Also, male and female students used STEM-based resources of the same magnitude. They both participated in after-school activities equally; however, male students perceived they had higher STEM capabilities than their female counterparts.

The complete inclusion of women into the STEM fields of academic success remains a daunting challenge within the various United States school systems. The situation is particularly acute within STEM fields, where the underrepresentation of women and their career disadvantages attract much attention (Su et al., 2015). The acute underrepresentation of women and other minorities in STEM programs is evidence of much-undeveloped talent in these populations (Andersen & Ward, 2014). Furthermore, the disproportionate representation is evidence that the potentialities of women and other minoritized students with high ability are not being developed educationally for STEM careers. The gender, race, and ethnicity of a student should not matter because future scientists, engineers, and mathematicians should come from the talent pool of all students with high academic abilities. Furthermore, this same pool of students must demonstrate superior performance in mathematics and science.

A continuing challenge for the United States Government and the Federal Department of Education is to produce America's future scientists, engineers, and mathematicians. The nation is becoming more dependent on earth science, chemistry, physics, space technology, engineering, and mathematics. America needs STEM graduates to support its technology-based economy, yet fewer college-bound female students enter the STEM fields of study in higher education (Moakler & Kim, 2014). Therefore, educators and policy leaders must support STEM education programs by empowering women at all levels of education, from primary school to higher education. Leaders in education and policymakers in government should be aware of the potential of all students. Educators and policymakers must develop strategies for gender diversity in academics by exploring the organizational determinants that keep female students from excelling in STEM fields.

III. INFLUENCES ON STEM POLICY

The current policy must address the significant causes of women's underrepresentation in STEM education. In addition, policymakers must provide practical procedures for influencing the pervasive gender imbalance in STEM fields. Wang and Degol (2017) state that practitioners and policymakers can develop new strategies for fairness in advancing STEM education as a point for change. For example, girls at an early age can meet the challenges of the STEM fields in areas such as computer science and

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engineering. Women, in general, are not drawn to science and engineering because these STEM fields are not highly people-oriented professions. Instead, female students are typically drawn to low-paying careers that are substantially people-centered. Nevertheless, STEM fields provide women with the opportunity of earning higher wages.

Therefore, the influence of early intervention concerning STEM educational policies and programs must emphasize the field of study in computer science and engineering. These policies and programs can improve the overall quality of life and require extensive collaboration with other researchers and colleagues (Wang & Degol, 2017). Wang and Degol (2017) hold that the optimal time for intervention for developing a new STEM education policy is during the middle school years. As a point of emphasis, the intervention should begin before the young student loses interest in the prerequisite coursework for a STEM vocation. The pupil at the adolescence phase of life must have the opportunity to enroll in advanced mathematics and science courses that will best prepare female students, in particular, for a significant career in STEM fields.

The influence of STEM education policy on female students is a prevalent topic across local, national, and global communities. As a result, prominence has been placed on exploring ways to increase the role of female candidates within STEM fields. For instance, President Obama launched a campaign for innovation to educate students in STEM programs. The movement strove to stimulate higher math and science achievement by producing 100,000 effective STEM educators (Dejarnette, 2018). In addition, Dejarnette (2018) confirms that the President's Council on Science and Technology (PCAST) issued a report highlighting the necessity to increase the number of STEM graduates at all grade levels of the educational spectrum.

Unquestionably, the influence of STEM education policy must meet the growing demand to fill an ever-developing STEM-related job pool for all genders, races, and ethnicities. With the help of the PCAST campaign, it became imperative that K–12 and higher education leaders be more effective in preparing and fostering success among racial and ethnic minoritized students in the STEM education circuit (Peters-Burton et al., 2014). The inauguration of the PCAST campaign has augmented the awareness of STEM education initiatives. As a result of the PCAST campaign, a new inventive STEM program policy has been developed for students. This policy was implemented to define the standard for recruiting and preparing students for the educational advancement of programs within the STEM disciplines (Lynch et al., 2014). Lyon et al. (2012) believe that the design of STEM educational policies must validate the efforts to motivate students to pursue STEM disciplines where academic channels and curricular pipelines are industrialized. Early advancements in STEM education will provide pathways for students interested in STEM-focused careers.

The influence of STEM education policy should also underscore the importance of maximizing human potential by cultivating success among racial and ethnic minoritized students in the STEM education circuit (Implications for Future Research, Policy, and Practice in STEM Education [IFRPP], 2011). Maximizing human potential will proliferate the number of qualified professionals in the STEM fields. Policymakers and practitioners need to foster tremendous success among leaders. These leaders can stabilize the nation's awareness, competitiveness, and knowledge of STEM education policy by introducing scientific and technological innovations to the education system and the world.

Another influence of STEM education policy involves implicating policy for advancing students in the STEM education circuit (Peters-Burton et al., 2014). The implication of policy is based on increasing the rates of student academic success among school districts that begin the education process starting at the preschool level through twelfth grade in scope. Achieving such an undertaking entails educational policy based on empirical evidence, scientific studies, and research design (Lynch et al., 2018). The research in STEM education policy aims to provide a transforming educational experience that will cultivate more significant levels of success among students in STEM programs (Zellmer & Sherman, 2017). Hence, school districts must ensure and accurately identify that students are tracked scholastically according to their academic potential.

Education leaders must work together as an integral component moving forward for change. Policymakers, researchers, and practitioners must form a conglomerate of partnerships to explore STEM education innovations (Smith, 2017). As a result of this conglomeration, educators need to develop learning methods, teaching, and preparing students for the world of work. In addition, educationalists must prepare students to be socially responsible learners in STEM. Moreover, being socially responsible means addressing the current State of poverty and inequality. However, only some policymakers have examined the development of STEM students' outcomes as critical to promoting a more equitable society (Garibay, 2018). Typically, the focus is on the impact of one program or course instead of the general study area.

Lastly, an additional influence of STEM education policy should concentrate on facilitating the collaboration of STEM program development within the community. The policy should allow for collaboration between academics and businesses as a community effect. The collaboration will build a seamless support system across the STEM fields (Ejiwale, 2014). Collaboration between the school and community will provide a relevant and cohesive program. Collaboration across the STEM fields will permit the pooling of ideas, resources, and commitment; thus, the exertions of the total sum are worth more than depending on the few preeminent individuals in program development. Ejiwale (2014) suggests that this synergism among STEM collaborators will create a shared understanding of

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contextual influences from various educational backgrounds. The collaborators can apply practical efforts that will eliminate redundancy and overlap. As a result of the collaboration, schools, communities, and businesses work together as a team, and there is an efficient use of resources and no duplication of services. STEM program development involves the analysis of STEM policy.

IV. ANALYSIS OF STEM POLICY

The second central point in this body of work is analyzing new STEM education policies. STEM education programs require an enthusiastic policy analysis. Bell et al. (2017) recommend that analyzing policy design for STEM must be seen as an educational construct. The policy designers have to construct an investigation into STEM education policies. These policies will develop a proper curriculum position and pedagogical identity (Bell et al., 2017). The analysis of STEM education policy should employ advancing knowledge for contemporary policymaking. The Federal, State, and local governments are now in concert with analyzing current policies as a mandate for developing STEM education programs (Briggs, 2016). Following this mandate, the policy change will start at the highest level of the government and then move to the lowest; that is, from the federal government to the State government and from the State government to the local governments.

Recently, there has been a push to encourage STEM education by increasing the number of students in STEM programs in the United States. The federal government's role is to promote policies that will enhance the growth and development of STEM education. The government has enacted several policies designed to increase the number of students graduating from school in the various fields of STEM, especially among women and racial-ethnic minoritized students (Olitsky, 2014). In addition, STEM education policy has caused the federal government to initiate and expand the "Educate to Innovate" program.

The "Educate to Innovate" program has forecast new initiatives in STEM policy. According to Olitsky (2014), the "Educate to Innovate" program will develop partnerships between private industry and the federal government to promote interest in STEM education. These partnerships will improve the training of middle and high school STEM teachers and students. Furthermore, the policy was designed to encourage early STEM education to compete with the rising quality of comprehensive STEM education. The key is for the United States government to develop a strategic action plan.

There are interagency committees such as the Committee on STEM Education (CSE) and the National Science and Technology Council (NSTC) at the federal level. These interagency committees continue to work on strategic plans to consolidate and coordinate existing STEM education programs through policy assessment (Mervis, 2013; Malhotra et al., 2018). These committees are pursuing policy assessment through a significant objective. The objective is for more equity and inclusion for all genders, races, and ethnicities. Gough (2015) states that the strategic plan will better serve groups historically underrepresented in STEM fields. The educational crisis for underrepresented minorities must be solved through the encouragement and engagement of students and policy and practice in institutions (Long & Mejia, 2016). These policies and procedures will endeavor to remove barriers.

The interworking of the CSE committee and the NSTC council are attempting to remove the federal institutional barriers within the educational contexts. These committees contend that the institutional barriers of academic structure, rules, and culture are not gender or race-neutral; nonetheless, the problem is policy intervention. Policy interventions are imperative to level the playing fields in STEM education (Su & Bozeman, 2016). The federal government's strategic plan for STEM education programs is significant for leveling the field.

According to Gough (2015), the strategic plan for STEM education must improve STEM instruction at all grade levels and for all students. Educators must focus on STEM education at the primary and secondary echelons. These learning institutions serve as feeder schools for STEM programs for the various colleges and universities of higher education; hence, the K-12 STEM programs should be top-notch. The concentration for improving STEM education as a collegiate undergraduate must begin with the feeder schools. The plan is to increase and sustain student commitment by engaging the public sector in the STEM education process. The design of STEM programs is vital; consequently, there is a need to educate and graduate students ready for today's STEM workforce. The Federal and State governments must analyze STEM education policies to prepare students for the workforce.

State governments play an active role in the policy analysis of STEM education. Nevertheless, the Federal government uses different methods to influence the various states' STEM education policies through federal funding. State STEM programs have received federal funds to promote the effort of national growth and personal financial gain. State education policy demands that schools within their states encourage more students to take math and science courses. More states are requiring these advanced courses for graduation. State policymakers and educators should understand what the goal of STEM education is. It is the state government's job to meet the educational needs of each student. State policy is paramount to promoting and supporting the growth model for increasing the number of students in STEM education. State policymakers should affect STEM education to champion a competitive global marketplace. The results of the State policy must be productive as the education policy experts are developing these policies. Policymakers must have meaningful dialogue with national agencies and state departments of education. These organizations should consider STEM in the workforce and the education setting.

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The Race to the Top (RTTT) and the Statewide Longitudinal Data Systems (SLDS) show initiative for a meaningful dialogue in STEM education policy. The RTTT grant and the SLDS grant are federal grants given to States so that these States can help students compete within a global workforce. The RTTT and the SLDS aim to help states prepare students academically for college or career and global competitiveness. In order for the states to earn these grants, States must enforce rigorous and challenging standards and assessments for student achievement. These grants are identified as a competitive funding priority that States must compete to obtain Federal funds. Horsford et al. (2019) imply that the RTTT and the SLDS grants have sparked the formation of State-level task forces. As a part of the task force, State officials are actively collecting school accountability data, revising State policies, and sometimes amending their State constitutions to meet the federal government eligibility requirements for funding. Carmichael (2017) specifies that with federal monies supporting the STEM initiatives, it is the responsibility of the individual States to develop policies that will address the STEM funding priority in their grant request applications to the United States Department of Education.

Another initiative for a meaningful dialogue in STEM education policy between the Federal and State government is the balance between Federal and State responsibility for school improvement. In the United States, there is a clear division of responsibility for education between the States and the Federal government. Therefore, every State Department of Education has an inter-working of State Education Agencies (SEAs). The SEAs are responsible for teacher certification, school accreditation, statewide curriculum, education policies, and student outcomes such as graduation rates and academic achievement (Gottfried et al., 2011). In addition, SEAs are in place to influence education's capacity by delivering high-quality educational programs by improving existing programs such as STEM.

Gottfried et al. (2011) uphold that there are three broad components of capacity: (1) infrastructure, including financial resources, the number of staff, and technology to support schools; (2) professional resources, including leadership, communication skills, and access to expertise; and (3) political resources, which include support from the executive branch and legislative branch of government as well as from labor unions. When considering the role of States in school improvement, one needs to keep in mind all three of these elements of capacity. Capacity-building policies are designed to enhance the material, intellectual, or human resources of the SEAs so they, in turn, can improve the education of students. For example, staff might develop valuable expertise; agencies might institute more-effective practices; individuals might learn skills that help them solve immediate problems, and systems might be reconstituted to operate more effectively.

Lastly, the role of the State Department of Education involves establishing state policy. The education process's primary function is a state and local school system obligation within the United States. The various State Departments of Education and their local school systems are responsible for determining their education requirements. The State's role is to establish schools and colleges, develop curricula, and determine requirements for enrollment and graduation. The State Department of Education's chief objective has always been to educate the State's children and adults. However, various state governments are considering other methods for educating people. One such method is the use of State Education Agencies (SEAs). States are discussing strategies for using SEAs.

State Education Agencies and their staff operate under the authority granted by a State's Constitution. The State's Constitution enables legislation and regulations. Nevertheless, the roles and responsibilities of the States' Departments of Education are shifting toward SEAs. The role of SEAs is at a crossroads regarding K–12 public education. SEAs were initially designed to administer State and Federal education programs. The role of SEAs has recently shifted from the original design. SEAs now serve as State and Federal architects and implementers of key STEM education policy (Aspen Institute, 2015). The various SEAs will help State policymakers articulate a vision that shows the priorities and goals for K-12 education within the State.

The role of State policymakers is essential. State policymakers must collaborate with the state board to develop the State's content standards for STEM education. State policymakers must select and administer statewide assessments aligned with state standards for STEM education. State policymakers must develop regulations, rules, and guidance to clarify STEM education for all students. State policymakers must enforce STEM education policy by providing funding and technical assistance to help local school districts. Local schools should understand the various State Departments of Education's intent for applying the STEM education policy. Therefore, State policymakers must build ongoing relationships by engaging with the critical stakeholders of the different school districts. The key stakeholders include the governor's office, the State legislature, the State Board of Education, the various higher education institutions, school district leaders, and school-based educators and principals, teachers, and parents.

State policymakers must establish a leader's learning agenda for the State Department of Education. A leader's learning agenda will model examples of adult learning by operating the State Department of Education as a learning organization that prioritizes continuous improvements in STEM education at the local level. State policymakers must connect and coordinate with other STEM programs throughout the State within the public education system. Connection and coordination are needed to include STEM education for early learning and postsecondary learning. The connection and coordination of STEM education policy will generate a workforce for economic development within the educational system, health care, social service agencies, and the world. State policy can only be carried out if the State's local school systems uphold the federal and State guidelines. The State Department of Education is the main stakeholder and mediator between the federal and local boards of

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education. Therefore, the local school districts are responsible for following the educational policy and laws as regulated by the State.

Local school districts receive their education policy guidance and governance from the State Board of Education. Nevertheless, the local school boards have a central position in the educational government of their schools. The local school boards have to guarantee the quality of education, monitor the educational process results, and intervene if any problems arise (Honingh et al., 2018). School systems are attempting to intervene when it comes to the problem of diversifying STEM programs at the local level. However, many school systems are not serving the needs of many students interested in STEM programs. Regarding STEM education, the school systems do not actively recruit females, African Americans, Hispanics, and low socioeconomic status students.

Nonetheless, school STEM programs can help increase the measure of an individual's social standing or condition in society. A career in the STEM field can change a person's outlook on life by the factors intensifying an individual's income, education, and occupation. Local school districts are implementing STEM education policies (English, 2017). These districts are launching the initiative to start inclusive STEM programs. Local schools, STEM education policy, is in response to closing the gap and changing the demographics that dictate the need to prepare a more diverse set of students for STEM jobs and careers (Lynch et al., 2018). Local STEM programs should never misplace their emphasis on educating all students from various backgrounds, yet STEM programs are losing emphasis on STEM educational policy, curriculum, and student outcomes.

The emphasis must be on STEM educational policy, curriculum, and student outcomes. In the face of growing consideration of STEM education globally, there is considerable improbability as to what constitutes a good STEM education program and what that educational program means regarding the policy, curriculum, and student outcomes (Holmlund et al., 2018). Holmlund et al. (2018) imply that the National Science Foundation (NSF) has played a significant part in improving STEM education policy and curriculum development by calling for consolidated research related to science, mathematics, engineering, and technology. As a result, the NSF is placing STEM at the center of education for school districts nationwide. Subsequently, STEM educational policy, curriculum, and student outcomes have increased the number of local school districts now designated STEM-focused schools.

Public policymakers, business industries, educators, parents, and other community groups call for STEM education across all grade levels. These groups call for STEM literacy at the local level to stay essential and competitive universally. STEM literacy is regarded as vital for individuals' and nations' economic attainment and vigor (National Science Board 2015; STEM Education Coalition 2014). It is imperative to deliberate the varied connotations these diverse groups may have for STEM and STEM education. Therefore, with the Federal and State Department of Education's help, the local school district must design and implement curriculum and instruction to promote successful STEM education.

The technique for designing and implementing curriculum and instruction to promote successful STEM education must consist of an interdisciplinary approach. STEM education must be considered in various fields of study with no apparent harmony for the consensus of the subject content and scholastic interaction among the STEM fields (English, 2017). Thus, an interdisciplinary approach is the best concept or method for operating a STEM education program. In order for STEM education programs to be successful, they should use an interdisciplinary approach to learning.

The interdisciplinary approach allows for rigorous academic concepts combined with real-world experiences. Students can apply science, technology, engineering, and mathematics in contexts to any real-world occurrences. The interdisciplinary approach lets the student see the connections between school, community, work, and the global enterprise enabling the development of STEM literacy (Holmlund et al., 2018). As a result of changes in the local school district's policy and the interdisciplinary approach, students can now compete in the new global economy. As a result, STEM policy affects education in many different ways.

V. EFFECTIVE STEM EDUCATION POLICY

The actual effectiveness of a successful STEM education policy is having a positive impact on STEM programs. Researchers recognize attentiveness and inspiration as effective mechanisms in motivating students to pursue STEM education because STEM learning contributes to students' knowledge and success in retaining STEM content (Roberts et al., 2018). The efficiency of an excellent STEM education policy will increase STEM educators' focus, improving students' motivation and interest in STEM programs. Students' attitudes and perceptions toward STEM are affected by their motivation, experience, and self-efficacy.

Brown et al. (2016) confirm that a successful STEM education policy that centers on student attitudes and perceptions toward STEM programs affects their motivation, experience, and self-efficacy. Honey et al. (2014) establish a relationship between STEM educational policy, curriculum, and student attitudes; also, these researchers found that student interest played a more critical role in the intention to persist in STEM when compared with self-efficacy. Positive teacher perceptions of these discrepancies may be a remedy for exposing students to greater longevity of experience with activities that foster self-determination and interest-led, inquiry-based projects.

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Also, a successful, effective STEM education policy considers the perception of teachers at the grassroots level. For schools to consider the eminence quality of STEM education, it is imperative to understand teacher beliefs and philosophies as these perceptions relate to STEM aptitude for student growth and development (Margot & Kettler, 2019). Teachers' attitudes towards STEM education play an essential role in a student's aptitude development (Smith et al., 2015); teachers hold prior views and experiences that will influence their teaching methods of STEM instruction as they interact with students on a daily basis. Teachers' perceptions of STEM policy should address the teachers' attitudes toward interdisciplinary STEM teaching.

Effective STEM educational policy cogitates teachers' perceptions of interdisciplinary STEM teaching. Effective STEM policy can help teachers meet the significant challenge of a shift to interdisciplinary teaching; teachers can meet the challenge by using and integrating new instructional methods (Smith et al., 2015). STEM education policy must integrate engineering and technology concepts into K-12 science and math curricula through engineering design project-based learning; interdisciplinary teaching will increase students' interest in science, technology, engineering, and mathematics (McMullin & Reeve, 2014; Allina, 2017). Primarily, an effective STEM policy will help teachers to develop both skills and attitudes toward interdisciplinary teaching (Al-Salami et al., 2017); thus, an adequate STEM education policy will allow for teacher professional development (Nadelson & Seifert, 2013; Herro & Quigley, 2017). Teaching professional development is critical in helping teachers expand new policy and practice through this interdisciplinary transformational process.

Effective STEM educational policy can promote teacher professional development and change in policy and practice. Changes in policy and practice can remove barriers that STEM teachers encounter, yet these changes in policy and practice can implement reformation in STEM education (Johnson, 2010; McMullin & Reeve, 2014). Implementing the reformation for policy and practice in STEM education must emphasize scientific inquiry, engineering design, technological literacy, mathematical thinking, and situated learning in a community of practice as an integrated educational approach (Knowles et al., 2018). The integrated instructive method combines various pedagogical and educational approaches rather than a single learning approach. This model of integrated STEM education benefits multiple learning styles by providing meaningful contexts to students and removing barriers teachers encounter.

VI. CONCLUSION

Within the United States Department of Education, the Federal, State, and local governments, policymakers lead the way toward a STEM education for all students regardless of gender, race, and ethnicity. Educators, community leaders, businesses, and parents are at the forefront of this reformation. These reformers must ensure that students can meet the demands of the academic challenges of a STEM program. The context of a career in the STEM fields constitutes an increased politicization led by corporate reformers and for-profit educational organizations (Horsford et al., 2019). Thus, policymakers must continue to eliminate inequality found in STEM education programs. Leaders from various walks of life must tackle the origins and implications of growing accountability for educational leaders in the STEM field. Policymakers should explore a new vision for leading schools grounded in culturally relevant advocacy and social justice for all.

Advocates for STEM education should reconsider educational leaders' role in STEM education policy and the political process. A STEM education leader must provide a critical perspective and analysis of today's STEM education policy landscape and leadership practice. The Department of Education needs to explore the challenges and opportunities associated with teaching and leading in our schools. Policymakers must continue to examine the structural, political, and cultural interactions among school principals, district leaders, and state and federal policy actors (Horsford et al., 2019). Therefore, policymakers must disband inequality at every level of education, from kindergarten to college. STEM education policy must be essential for educational practice and inspiring future leaders. In an era of inequality, STEM education policy must share theoretical frameworks and strategies for building bridges between education researchers, practitioners, and policymakers.

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