STEM Programs and their Importance in the Current Market

Dr Anil Kumar Palla. PhD
Assistant Professor
Campbellsville University
Louisville KY, USA.

Dr.Keith Spears
Vice President
Campbellsville University
Louisville KY, USA.

Eric S Harter PhD
Lead Professor
Campbellsville University
Louisville KY USA.

Kiran K Palla (PhD)
Adjunct Faculty
Campbellsville University
Louisville KY, USA.

Abstract

The science, technology, engineering, and mathematics (STEM) courses provide education and skill development in subjects that are critical for advancing society in many ways. Each plays an important role in generating breakthroughs in medicine, technology, and business that serve as drivers of industry change and can lead to entrepreneurship, small business development, and an influx of jobs for any society or culture in which there is the opportunity to learn these subjects. The purpose of this research paper was to discuss STEM programs and the importance of these programs to the current market. An overview of STEM programs was provided first, and a narrative review and research paper was then presented that discussed impacts of STEM programs to what was deemed to refer to the economic market, although the impacts of STEM programs on the job market in education were also considered in this research paper and critical discussion.

Keywords: science, engineering, mathematics, technology

Introduction

The purpose of this paper is to discuss the science, technology, engineering, and mathematics (STEM) programs and their importance to the current market. Specifically, consideration is given to the importance of STEM programs to the economic market, as well as the job market in education. An overview of STEM programs and a background of their development is first provided.

Discussion then focuses on the importance of these programs to the economic and job markets in education, citing recent and relevant literature where available. It is argued in this paper that STEM programs have direct and indirect impacts on students, educators, professionals and society at large, the majority of which are positive and will result in many positive social changes in the foreseeable future. This research paper concludes with a brief summary and outline of key points.

STEM Programs Overview and Background

The STEM subjects have been key focal points of education for many centuries, with historical roots dating back to the Grecian era in which modern scientific knowledge and discovery first began to flourish and be widely disseminated throughout the population (National Research Council, 2015). Prior to this era, knowledge and education in the STEM subjects was primarily for the elite and wealthy, and withheld from the commoner so that the latter would be assigned to menial labor-heavy professions (National Research Council, 2015). However, countless academic publications now exist pertaining to each of these subjects and knowledge and education in regards to science, technology, engineering, and mathematics is available globally and virtually universally accessible (National Research Council, 2015).

The term STEM was first used in the later 20th century as a means of emphasizing the criticality of these four subjects for driving societal success both for economic purposes and for fostering general education and professional proficiency (Graham, McIntee, Raigoza, Fazal, & Jakubowski, 2016). In nearly every career or profession, STEM subjects play important roles in shaping the availability and nature of that particular job or task (Honey, Pearson, & Schweingruber, 2014). The term STEM was first promoted to help design educational curriculums at the primary and secondary levels that encouraged proficiency in these industry driving subjects (Honey et al., 2014).

The first higher education setting that employed a department specifically based on the idea of STEM was the University of Massachusetts at Amherst just before the turn of the 20th century. Most major universities now have extensive and highly enrolled STEM programs that focus heavily on research and education in these core subjects (Kelley & Knowles, 2016). The incorporation of the term STEM into higher education settings has had many sociopolitical impacts that have affected the national and global economy, as well as the job market in education (Kelley & Knowles, 2016).

Perhaps most notably, STEM programs have led to liberation of immigration policies in many regards to allow students of STEM subjects from other countries to immigrate to educational institutions or professions in which knowledge and training in these subjects is in particularly high demand (Romar & Matthews, 2015). Most research suggests that this immigration has had a positive impact on economic and job related outcomes (Means, Wang, Young, Peters, & Lynch, 2016; Tofel-Grehl, Feldon & Callahan, 2018). However, some negative impacts of a focus on STEM subjects have occurred, such as an increase in the racial gap in careers defined by knowledge and education in STEM (Tofel-Grehl et al., 2018). The importance of STEM programs and their impacts on the current economic market and job market in education are discussed in greater detail below.

Importance of STEM Programs to the Current Economic Market

STEM programs have had a range of impacts on the economic market, both direct and indirect in nature (Li, 2018). There is considerable evidence to suggest that STEM programs have had numerous positive impacts on economic factors like job growth, employment, and gross domestic product (Freeman et al., 2014; Li, 2018). Additionally, jobs in STEM related disciplines have grown considerably in recent years, and there are many economic opportunities for students of these subjects (Freeman et al., 2014).

In the United States, STEM occupation growth has outpaced careers from other disciplines by nearly 10 percent annually, or about 17 percent each year (Hulten & Ramey, 2017). There is no question that workers in these fields have direct impacts on sustainable economic growth in the United States, as well as the nation's economic stability (Hulten & Ramey, 2017). Furthermore, STEM programs emphasize critical thinking and innovation, and many professionals educated in these subjects become innovators who develop entrepreneurships and small businesses that result in considerable job growth (Kennedy & Odell, 2014).

STEM jobs have also been credited for helping bridge many gaps that exist within the economic, including with regards to gender and racial gaps in socioeconomic status (Doerschuk et al., 2016). Though males still outnumber females in STEM educational programs and careers, and men still get paid approximately one third more than women for the same position and with the same educational background, there is promising evidence of an increased female contingent in STEM education programs at higher education institutions, as well as within the workforce (Doerschuk et al., 2016). Additionally, education and training in STEM programs offers an opportunity to overcome social disadvantages that lead to large gaps in socioeconomic status between ethnic minority and majority population members (Mann, Legewie & DiPrete, 2015).

Many public and private universities offer substantial financial assistance opportunities for students of minority racial backgrounds demonstrating competence in STEM fields (Kennedy & Odell, 2014). Because STEM careers are among the highest earning within the current economy, the increase in racial minorities within STEM related jobs will likely have a profound impact on racial socioeconomic differences that plague the current economic climate. Nearly everyone benefits from STEM careers, whether employed in these professions directly or through the technological advances that are generated from those who are (Mann et al., 2015).

A continued emphasis on STEM education, particularly for socially disadvantaged or minority groups, will have a profound impact on the economic future of the nation. Those nations that encourage STEM education and promote free enterprise in STEM related fields will likely reap considerable economic benefits. Those nations that stifle knowledge and discovery in these fields, or overregulate small business development, entrepreneurship, and enterprise in STEM related fields will almost surely suffer in comparison to other nations. The following section provides an overview of the importance of STEM programs to the job market in education.

Importance of STEM Programs to the Job Market in Education

STEM programs have benefits that extend beyond just economic factors. The importance of STEM programs can also be evidenced in education and job opportunities that will exist in the field of education now and in the foreseeable future (Corlu, Capraro & Capraro, 2014). The encouragement of STEM education within the United States, as well as the promotion of immigration from other nations for the purpose of education, will require many more higher education teachers to fulfill professional roles in STEM programs (Corlu et al., 2014).

Each year, there are more than two million jobs in STEM disciplines and in STEM education that remain unfulfilled (Gottfried, Bozick, Rose & Moore, 2016). The current problem in the job market in education within STEM subjects is that there is limited supply within the nation to fulfill the growing demand for educational development in these areas (Gottfried et al., 2016). To mitigate this problem, the United States government has implemented policy to allow many corporations and universities to fulfill these roles internationally (Romar & Matthews, 2015). However, there remain considerable opportunities for American students and teachers to gain proficiency in STEM subjects and almost immediately have a gainful employment opportunity.

Finally, STEM programs have a large social impact on the job market and within the field of education (Diekman, Steinberg, Brown, Belanger, & Clark, 2017). No better opportunity exists for women and minorities to combat the large socioeconomic gaps that exist than by gaining an education in STEM subjects and seeking professions and leadership roles in the STEM disciplines (Diekman et al., 2017). An immediate and financially rewarding opportunity exists for any woman or minority seeking to rectify a key source of social inequity that exists within the United States by gaining an education in these subjects and entering the field as an educator or practitioner (Garibay, 2015).

Because of the importance of STEM programs, many primary and secondary academic settings have begun to implement lifelong interventions to encourage women and minorities to enter STEM programs by tailoring educational curriculums and pedagogical models to be more gender and culturally sensitive at an early age (Garibay, 2015). Additionally, those academic settings that are recognized by the United States government as productive in developing proficient students and professionals in these areas are eligible for subsidies and grants that will ensure their stability as educational institutions for many years (Zeidler, 2016). This funding also provides job growth opportunities and stability in educational roles within the STEM subjects.

Based on this evidence, it is clear that STEM has a range of positive impacts that include, but are not limited to, economic growth, an increase in job opportunities in STEM fields and education, reductions in social inequalities, and the encouragement of cultural diversity and sensitivity (Zeidler, 2016). The increased immigration derived from policies that encourage foreign students seeking education or who are skilled in STEM subjects will also likely have a continual positive impact on job growth and innovation within the country (Zeidler, 2016). These benefits will be experienced by all facets of society and contribute to general social well being and social capital in the coming decades.

Conclusion

The purpose of this paper was to discuss STEM programs and their importance to the current market. Specifically, this research paper discussed research documenting the impacts of STEM programs on the economic market, as well as the job market within the field of education. An overview of STEM programs and their background and development were first considered.

Literature and data pertaining to the importance of STEM programs to each of these two outcomes was then presented and synthesized. Based on the evidence presented within this research paper, it is clear that STEM programs are critical drivers of economic and job growth in any culture or society in which there is contemporary and evidence based education for these disciplines and students are given the opportunity to utilize these skills within a relatively free market. STEM programs benefit those who enter educational programs and professions involving these subjects directly, as well as indirectly impact the health and social well being of society at large.

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