Libraries and STEM Information Literacy Analysis

Posted on March 2, 2018

View this essay online:
https://academic-master.com/libraries-and-stem-information-literacy-analysis/

Introduction

From climate change to dangers to human health and access to clean and drinkable water, most of the challenges facing society nowadays and their solutions are rooted in STEM (science, technology, engineering, and mathematics). Effectively addressing these challenges requires highly capable STEM experts; scholars who are engaged with and capable in STEM content and procedures; and a public that is sufficiently STEM-literate to evaluate the choices before them. In the 21st century, an elementary understanding of STEM is part of being a knowledgeable citizen. There is substantial research on the role that Out-of-School Time (OST) involvement can play in scholarly accomplishment (Subramaniam, Ahn, Fleischmann, & Druin, 2012).

As places that offer their facilities for free, public libraries have become public squares by providing areas where members of a community can meet for information, learning, programming, and policy debates. Libraries serve as public leaders and principal points for 21st-century education by promoting talents comprising critical thinking, discernment, innovation, and originality. Progressively, libraries' tasks, enterprises, and facilities reflect their role in refining scientific literacy and supporting STEM education and learning values, particularly for those underrepresented in STEM fields (Fox & Sornil, 2003).

STEM (Science, Technology, Engineering, and Math) has now become one of the predominant initiatives being pursued by schools and colleges throughout the United States; because of this change, school librarians are trying to determine how their public libraries can make modifications to include STEM in their spaces and programs. The research in this essay assists in examining the implications of STEM in public libraries and the ways through which school libraries can adapt to make STEM an essential part of their day-to-day activities (Baek, 2013).

These practices could prove to be inspiring tasks because STEM integration is a comparatively new development in librarianship. The examples provided of the STEM implementation approach, consequently, specify practices that can be replicated in other school and college libraries.

Aims for an Increased Emphasis on STEM in Libraries:

The necessity for a prolonged emphasis on STEM in libraries has been examined in numerous papers and scholarly courses. It has been indicated that in STEM-centered libraries, learners gain deeper knowledge and understanding of STEM-associated issues. In STEM programs, learners also make an effort to explore their expertise more efficiently to prepare themselves for global citizenship. To support them in this process, librarians make efforts to stay up to date on technology- and curriculum-associated trends. The foundation for this STEM modification is recognized through previously established educational concepts. These comprise constructivism, inquiry, and active engagement. In these public libraries, learners attain the chance to take charge of their education and learning. Learners also take on the role of creators of novel information and innovations in a variety of forms. There has been a decline in learner interest in STEM areas and a concurrent increase in the need for employees in associated occupations, which has helped to stimulate the importance of these opportunities (Hopwood, 2012).

In schools and colleges, scholars and students are making efforts to gain a better understanding of all curricular areas that are linked with STEM. Non-STEM scholars say that their understanding is only at a surface level, leading to incomplete knowledge of the ideas that are being discussed and difficulty learning what is being taught. An increase in direct, hands-on preparation, laboratory education, and organic usage of technical information in context, it was said, was related to better attainment in understanding STEM content. An alternative method through which this is attained is through students' continuing contribution to digital media, which opens new opportunities for linking them to the sphere of information in ever-changing ways (Thorhauge, 1988).

Learners will become more prepared for their roles as global citizens by understanding how to use skills and technologies effectively, which is an additional part of education usually discussed in school and college libraries. Libraries' STEM emphasis, it is postulated, can be improved through the library's promotion of learners' participation in skills and working resources, for example, a mixture of cultural knowledge spaces, simulated worlds, and online educational societies. Students' readiness to be involved in education, become STEM-literate, and appreciate associated matters helps them become more thoughtful, productive, and interested residents by connecting them to a global community of digital information. Furthermore, in working to attain confident usage of knowledge, technology, and evidence in numerous ways, they will adopt a reliable 21st-century educational and learning setting in their libraries in which librarians integrate these skills in more active ways. In this technique, actual hybrid educational spaces are created in which learners' usage of technology is prepared to further relate to and meaningfully connect these resources and ideas and their applications to the world outside the classroom (Subramaniam et al., 2012).

Programming and Collection Development in STEM

Even though the aims were previously recognized for increasing the presence of STEM programming and collection development in school and college libraries, the literature has identified numerous challenges and obstacles to making these developments a reality. Certain school librarians lack confidence in programming and collection development and in this part of the curriculum. Several also lack proper education in STEM collections. Several educators resist STEM-associated suggestions due to the lack of time to cover the essential syllabus and develop programming collections, the increased importance of high-stakes challenges, and the lack of confidence among STEM educators in librarians' capability to take part in teaching and developing programming and collections. Furthermore, several students might initially be unwilling to take part in STEM activities in libraries because of unfamiliarity with the approaches that are being used in collection development and programming. Gender, ethnic, and socio-economic gaps in STEM participation were also cited as challenges. One last matter debated is that collection resources in school and college libraries can quickly become outdated in STEM areas because of the rapid growth of technical information and innovation (Wang, 2013).

Another common problem affecting STEM curricula in libraries could be the librarian's lack of confidence in effectively teaching the materials being offered. This could result in librarians becoming less likely to try to form networks with educators in STEM content areas for programming and collection development. In response, this could be further compounded by the inability to acquire all of the resources librarians may wish to use to improve these networks, particularly if they do not feel as comfortable proposing these content areas in the first place. This lack of perceived skill might be viewed by certain librarians as challenging, but it is surely not the only difficulty that they might face in this integration process (Edelson, 2001).

The resulting shortfall in abilities might be directly related to a lack of formal education in STEM disciplines on the part of the school librarian. Instead, librarians frequently have undergraduate degrees in language, art, and social science, which is identified as a contributing factor to their discomfort in teaching in these content areas. Consequently, STEM educators themselves sometimes do not interpret their school or college librarians as legitimate associates in teaching in these content areas. Without a broad level of knowledge and experience in STEM disciplines, it may be more challenging for librarians to make judgments about how to better build the science and technology components of their collections (Fox & Sornil, 2003).

The library's collection of books itself could also be a barrier because resources can become quickly obsolete due to the growth and development of scientific education and knowledge. These resources should frequently be studied to determine which must be rejected to guarantee the collection's currency. Books about technology that were printed in the previous decade could be outdated, as important changes may have occurred in those areas of development in a fairly short period of time. Books related to science normally remain valuable for only 3 to 5 years, and computer-related

resources become outdated even more rapidly. Adding e-books, online tools, links to associated websites, and applications on tablets and e-readers could improve the collection without requiring physical development (Borgman, 1999).

Implementation of STEM in the Library (Programming and Collection Development)

Librarians help in the execution of STEM curricula and education in a variety of ways in the public library environment. One way in which this could be accomplished is through the delivery of collections, resources, and materials linked to STEM, which can include changes in library resource organization. Librarians make efforts to create cooperative partnerships with STEM teachers. They also create connections between the components of STEM and the resources used in integrative elements of education. Events in STEM-focused libraries include those that challenge learners to update and create. Makerspaces offer one specific opportunity for such innovations to take shape. Technology is used to connect learners to both the real and virtual environments. The flipped-classroom technique provides additional opportunities. Grants and outside resources are available to develop STEM contributions and bring in the outside world, not only through financial improvements but also through expanded resources and improved educational capabilities. In most of these examples, the librarian serves as a counselor and guide to associates and scholars alike (Thong, Hong, & Tam, 2002).

Another way librarians bring STEM into their libraries is by providing printed and digital materials and collection resources associated with these content areas. STEM must be an organic part of the whole library collection, and promoting non-fiction resources is a plan that introduces book lovers to the resources available in this category. Careful study of one's collection lets the librarian determine which parts can be strengthened with further resources (Braun 60). Electronic and digital STEM materials also need to be up to date. It is postulated that librarians who work closely with STEM educators improve the value of the public library's STEM collection in all forms and draw educators' attention to what is available.

STEM is a Rising Area of Importance in Libraries

Scholars in today's educational environment, it is recommended, are going to need a better understanding of STEM subject areas to be ready for their future careers and to be digitally literate in a world where competence in a variety of technical abilities and mathematics- and science-related ideas is significant. There will be a continuously rising need for occupations that require a higher level of skill in mathematics and sciences, in addition to the use of technology, which has led schools to pursue approaches through which scholars can attain increased mastery of these curricula.

The public librarian can form a setting where this expertise is taught and applied in a reliable,

meaningful way in a situation where countless resources exist that can provide direct connections to the areas of STEM subjects under study. In this way, students could also achieve a deeper and broader understanding of the technical tools that are used to stimulate this development in attainment and understanding (Gonçalves, Fox, Watson, & Kipp, 2004).

Conclusion

Librarians all over the country are beginning to partner with educators and learners to bring STEM curricula into their libraries. Due to the growing importance of STEM ideas in numerous career-related fields, and the need for students to understand these topics, librarians have begun to take on this challenge to prepare their learners for the world they will encounter outside their school or college experience. In this process, librarians might encounter problems, whether barriers to teamwork due to educators' apparent lack of time to discuss matters, a lack of confidence on librarians' and teachers' parts regarding librarians' grasp of STEM ideas, racial, gender, and socio-economic differences among learner sub-populations, or even shortfalls within the library's collection of books and other materials. In spite of these problems, librarians are finding ways to integrate STEM into what they teach and how they teach it. Through the creation of learning settings that offer inquiry-based activities that permit learners to research and innovate, the creation of continuously updated collections of current printed and online STEM resources, and the refinement of cooperative teamwork with associated educators, librarians can alter the library into an area where STEM knowledge is empowered in new and meaningful ways. In this way, librarians are helping learners become self-assured, talented, and helpful innovators who will gain subject knowledge, perseverance, problem-solving skills, and a general appreciation that enables them to take what they have learned and apply it to their lives for years to come.

References

Baek, J. Y. (2013). Public libraries as places for STEM learning: An exploratory interview study with eight librarians. *National Center for Interactive Learning Education/Research Report (Boulder, CO: Space Science Institute, 2013)*, *7*.

Borgman, C. L. (1999). What are digital libraries? Competing visions. *Inf. Process. Manage.*, *35*(3), 227–243.

Edelson, D. C. (2001). Learning-for-use: A framework for the design of technology-supported inquiry activities. *Journal of Research in Science Teaching*, *38*(3), 355–385.

Fox, E. A., & Sornil, O. (2003). Digital libraries.

Gonçalves, M. A., Fox, E. A., Watson, L. T., & Kipp, N. A. (2004). Streams, structures, spaces, scenarios, societies (5s): A formal model for digital libraries. *ACM Transactions on Information*

Systems (TOIS), *22*(2), 270–312.

Hopwood, J. (2012). Initiating STEM learning in libraries. *Children & Libraries: The Journal of the Association for Library Service to Children*, *10*(2), 53–55.

Subramaniam, M. M., Ahn, J., Fleischmann, K. R., & Druin, A. (2012). Reimagining the role of school libraries in STEM education: Creating hybrid spaces for exploration. *The Library Quarterly*, *82*(2), 161–182.

Thong, J. Y., Hong, W., & Tam, K.-Y. (2002). Understanding user acceptance of digital libraries: what are the roles of interface characteristics, organizational context, and individual differences? *International Journal of Human-Computer Studies*, *57*(3), 215–242.

Thorhauge, J. (1988). *New trends in Scandinavian public libraries*. Bibliotekscentralens forlag.

Wang, X. (2013). Why students choose STEM majors: Motivation, high school learning, and postsecondary context of support. *American Educational Research Journal*, *50*(5), 1081–1121.