Distance Learning and STEM Education

Organization: Asserted Knowledge

Author: Giannopoulou Katerina

Distance Learning and STEM Education

Can we encourage students to study STEM courses through distance learning? In this situation, how do we continue to provide everyone with a high-quality education? View the main ideas of this subject from the perspective of a STEM educator.

Distance learning in all subject areas, including science, technology, engineering, and mathematics (STEM) education, is unavoidable given the COVID-19 pandemic's consequences. Due to the necessity of closing schools, kids are learning through interacting online, whether it be through a Zoom conference facilitated by their homeroom teacher or by taking quizzes on internet resources. In the middle of the historic COVID-19 outbreak, this is a crucial measure to take in order to protect students, teachers, and the numerous workers that support a school. However, it comes at the expense of in-person instruction, which not only allows students to socialize with one another and frees up their parents to attend work, but also allows students to engage in hands-on learning, an essential step for cognitive development, particularly in subjects like science.

any **M**kids are drawn to STEM fields because of the "awe" they experience when they successfully complete an experiment while learning a new and fascinating subject.*

STEM educators are merely surviving in their teaching style rather than flourishing, even though e-learning may temporarily benefit our pupils. I can best explain this through the widespread phenomenon that we enjoy teaching to our students because I am a STEM instructor and program director. STEM hands-on learning includes testing of complex theories. Additionally, it enables challenging pupils to receive more individualized guidance from an experienced teacher. Last but not least, the pure thrill of discovering a fascinating new subject through a successful experiment or the creation of a practical instrument attracts many students to STEM fields (and careers).

Students are frequently drawn to topics they find intriguing; thus, the experimental STEM education modules offer a special chance to engage students who are daunted by topics that are primarily theoretical. Students who participate in hands-on learning can really observe how the concepts they have learned in class are put into practice, whether it be by creating a piece of furniture or by being able to extract DNA from a piece of fruit. These observations can elicit a significant reaction in the viewer, especially when a physical and rapid reaction happens, like in the more renowned scientific experiments for children (I'm looking at you, slime).

E*veryone can (arguably) receive the same education online, but can they have the same quality of experience if they do not have access to the same resources, lab space, and time?*

But what can we do if students are stranded at home, teachers are also isolated from one another, and all of the classroom materials are locked up at the school because of the COVID-19 outbreak? Classes have changed because of the nearly complete closure of schools from kindergarten through high school since March 2020 in an effort to stem the unique COVID-19 virus's spread. Teachers increasingly instruct and mentor their students using online tools, frequently making changes on the advice of the various school systems.

The biggest challenge in teaching STEM is ensuring fairness in science education, particularly because many school districts have decided to keep using social-distance education in response to COVID-19's consequences. For those who support fairness in science education, the necessity for social distance learning, which mandates that students connect with their schools and teachers via the internet, digital media, and computers or tablets, is a wake-up call. If everyone does not have equal access to the internet, materials, lab space, and time to explore, practice, and repeat, can they still have the same level of education even though everyone can (supposedly) obtain the same education online?

The major issue facing everyone currently debating equity and distant learning, as articulated in groups like the American Education Research Association, is this. To stop the spread of COVID-19, many organizations, such as the Boys and Girls Club and the Boy Scouts of America, have swiftly relocated their day camps and meetings online. These programs also carried on teaching STEM courses (including chemistry and astronomy) over the summer, a time when schools and conventional learning are typically closed. Youth participants in these settings received the materials they needed to follow the teacher around in their classroom, and they could carry out the experiment themselves, practice it, and repeat it to keep up this effective teaching method. Using an application to keep staff, instructors, and kids safe while the pandemic progresses is one step that schools are also discussing.

But in order to keep this up, a number of equity measures must continue to be in place to guarantee that all students can still receive the same level of STEM education as their classmates. Students must be able to use the internet safely from their typical shelter-in-place and have access to their own personal tablets or PCs. Some school districts have made care to give pupils laptops or tablets in addition to the supplies they need to bring home. However, how about internet access options like Wi-Fi hotspots? or the pricier STEM tools like 3D printers or robots? These components, which cover several disciplines at once, are among the most enjoyable and interesting STEM learning activities.

As the 2020–21 school year progresses, schools almost uniformly have chosen to remain online, and as a result, STEM topics are also being taught online. However, it is still necessary to take these safety measures to maintain fairness at the level of internet and material accessibility. Different virtual hands-on learning methods have been investigated, including animation and video production, as well as the digital resources made available by various institutions (such as virtual tours and online STEAM lessons by the Pacific Science Center). Through this challenging period in educational history, let's hope we can continue to offer high-quality STEM and STEAM education to all students, regardless of their financial circumstances.

References:

- https://link.springer.com/article/10.1007/s10639-021-10682-1
- https://link.springer.com/article/10.1007/s10758-021-09564-9