



## ESTEAM:

# Empathy and Innovation Working Hand in Hand

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By Pat Fontana

First there was STEM – science, technology, engineering, and math. Then there was STEAM, which added the A of arts to the curriculum mix. Now there is ESTEAM. **The new E is for empathy, a concept that has become more and more important in the workforce and in education.**

What is empathy? Many people confuse it with sympathy. There is no explicit expression of sorrow or sadness in empathy. It is, quite simply, the ability to understand another person’s situation. When a person is empathetic, that person is able to connect with others on a deeper level, recognizing the impact that their feelings, emotions, and concerns have on challenges they may face.

Empathy has become a buzzword of sorts in the business world. Seasoned executives are learning how to incorporate the concept into workplace communications, human resources policies, and everyday operations. Empathy helps employees understand their customers and each other a little better.

What place does empathy have in education? Everything, according to Yorktown Central School District Superintendent Ron Hattar. When Dr. Hattar joined the district in 2017, STEAM was already well established in the schools there. Given his extensive experience in public schools, including six years as assistant superintendent for curriculum and instruction for the Eastchester Union Free School District, he recognized the need for students to think critically and analytically and to be problem solvers, in addition to the practical skills they were learning as part of their science, technology, engineering, arts, and math classes.

A former high school math teacher with a teaching certification in special education, Dr. Hattar has lived in Yorktown for 11 years and has two children who attend Yorktown schools. He understands that the world is changing at a rapid pace and says of his district, "We're preparing our students for careers that may not exist and to solve problems that we don't know are problems yet."

**A MAGICAL COALESCENCE**

ESTEAM is the focus for all 3,450 students in grades K-12 throughout the Yorktown Central School District. Dr. Hattar believes that empathy is a skill that can be taught, but states that "empathy already resides within our children." The district offers explicit instruction in empathy throughout its high school, middle school, and three elementary schools, tapping into the students' "intrinsic ability to empathize."

Empathy is a significant element in social emotional learning, as students learn how to understand others' emotions and more properly

manage their own. Empathy is key to the process of making better decisions and creating and maintaining positive relationships.

In a letter to parents in October 2017, shortly after taking over as superintendent, Dr. Hattar wrote: "This concept of ESTEAM is the magical coalescence of



kindness, sensitivity, empathy, creativity, innovation, imagination, science, technology, engineering, arts, mathematics, and fun! You will also notice that we have redesigned some of our facilities to be ESTEAM labs; places where children can use the skills they learn to solve authentic, real-world problems, both large and small."

Literature and the humanities are at the foundation of ESTEAM. Tying in all of the elements of STEAM, classroom ESTEAM projects start when students engage with literature. As Dr. Hattar describes it, "Children begin to understand the circumstances of the individual, the group, and the society, and empathize with those that are experiencing whatever the difficulty might be to create and innovate solutions to those problems."

The Yorktown Central team looks to the United Nations sustainable development goals as an example for their own goals, with a focus on other societies and a bigger world. They try to address those goals in their curriculum and in their ESTEAM work.

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In fact, Dr. Hattar points out, the UN sustainable development goals have ESTEAM at their core. Those UN goals "address the global challenges we face, including those related to poverty, inequality, climate, environmental degradation, prosperity, and peace and justice."

Keeping these goals in mind and developing empathy for the individuals in situations addressed by the UN goals are done in every grade level at this point, to varying extents. The teachers and administrators are still growing and learning, in terms of the ESTEAM concept. Defining the curriculum is a continuous process, particularly as the world and the challenges it faces continue to change.

**ESTEAM PROJECTS**

The ESTEAM experience begins in kindergarten. As part of their curriculum, kindergarten students read nursery rhymes, one of which is the story of Humpty Dumpty. Kindergarten students in the Yorktown Central School District read the story through a different lens, an empathetic lens.

They discussed how Humpty Dumpty feels after he falls off the wall. Then they talked about what good friends do when one of their friends falls down. The idea was to first empathize with the character and then to design a solution that will help that character.

One kindergarten class decided to design protective casings for Humpty Dumpty so he would not get hurt if he fell off the wall. With the guidance of their teacher and a group of local high school students who mentor the kindergarten students, the children designed casings that would protect a raw egg from damage when it fell. Their project was tested at an exciting

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outside event that involved a bucket truck raising the eggs high into the air and dropping them. The experiment was a success, as 24 out of the 25 casings designed by kindergarten students who experienced empathy for Humpty Dumpty protected the eggs.

At the middle school level, two projects significantly demonstrated the impact of empathy education within the Yorktown Central School District. One group of middle school students identified a problem among people who play video games. They realized that video games are typically designed for people who have full use of their hands, but that didn't reflect the real population.

Recognizing that many people are not able to use their hands or do not have hands, because of illness or birth defects, but that those people probably still want to play video games, the students decided to do something about the situation. They used Makey Makey and Scratch, coding software, to design video games specifically for people who do not have full use of their hands. The students used their ESTEAM education to first recognize the problem, understanding a segment of the population's situation, and then to come up with a creative and innovative solution.

Another middle school group was inspired by the book, *A Long Walk to Water*, by Linda Sue Parker. The book tells the stories of two children in Sudan, one of whom has to walk two hours to gather fresh water from a pond for her family. The middle schoolers learned that clean water is not abundantly available across the world, and they began to empathize with the girl in the story and with others who face similar challenges.

As the students read more about clean water and about countries that do not have ready access, they realized the impact that lack of available clean water can have on a society. Then they began to question how they could help with that situation and resolved to come up with a solution. The opportunity, as it turns out, was just outside their classroom.

A pond outside their school contained numerous grass clippings, twigs, and mud, a condition that made the water undrinkable. The students extracted water from that pond for their project. They then built a filter using sand, wood charcoal, and cloth, and poured the dirty water through the filter. Again, the experiment was a tremendous success, as clean water streamed through the other side. The water was so clean, in fact, that middle school principal Marie Horowitz actually drank the clean water after it was filtered. Dr. Hattar points out that these students were creating and innovating with a real sense of purpose, to make the world a better place in a very practical sense, because of their sense of empathy.

ESTEAM-focused projects are initiated, for the most part, by the students. Ideas are grounded in the literature and then augmented by technology, often suggested and guided by the teacher. Dr. Hattar emphasizes that “to take information, synthesize it and be able to communicate that information are all skills our children will need regardless of what jobs they pursue, regardless of problems they're trying to solve in life.”

### OPENING NEW DOORS

Careers for the younger students, and perhaps even some of the high schoolers, may well be in jobs and fields that don't yet exist, but the idea behind the ESTEAM concept is that the demands that will be placed on them will be consistent. They will need the ability that they are developing now to problem solve, to think critically, and to think logically.

ESTEAM “does a wonderful job

in building capacity in those skill areas,” Dr. Hattar stresses. He also sees empathy impacting the students' potential success in higher education and in future careers. Combined with the STEAM basics, empathy plays a significant role in new programs that are creating new opportunities for the district's students.

Those students participate in a successful robotics team, a science Olympiad team, a science research team, as well as a middle school FIRST® LEGO® League team, activities that challenge students to think like engineers and scientists, with the added element of empathy. Future plans include an engineering course and app development course next year at the high school level.

Dr. Hattar says his own greatest strength lies in the STEAM areas, given his background and experience, and as a district they are progressing in those areas. He adds that it is “really powerful for our students to take those two components and put those together for a meaningful and powerful educational experience.” Students throughout the district, immersed in the ESTEAM concept, “will be creating and innovating – for a purpose – to make our world better.”

### REACTIONS TO THE ESTEAM CONCEPT

Dr. Hattar coined the term ESTEAM shortly after his arrival as superintendent of the Yorktown Central School District in 2017. The A for arts had previously been added to the popular STEM program because “arts are inherently a part of the creativity and innovation necessary” for student success. He added the E for empathy to “continue the great work happening in character education” in the district. In fact, the Yorktown Central district has been recognized as a national school district of character.

Overall, the reaction to the new ESTEAM concept has been positive. Dr. Hattar says he has a “wonderful administrative team that has worked tirelessly to advance the vision” of the concept and adds that the coherence of the vision is so powerful that “every single employee and every single

student knows what ESTEAM is" throughout the district.

Teachers in the elementary, middle, and high schools have embraced the idea of ESTEAM and have developed their curriculum in a way that furthers the idea of including empathy in their science, technology, engineering, arts, and math lessons. Their work is backed by district leaders. Dr. Hattar emphasizes that "as the superintendent, I could not be more proud of the work our students and teachers are doing with ESTEAM."

Students and parents also embrace the ESTEAM approach, receiving the idea favorably and understanding the necessity of the thinking skills that the concept promotes. ESTEAM has been part of the Yorktown Central School District curriculum for just two years, so there are no measurable results available from graduates. However, that will change as the concept continues to be an integral part of students' education within the district and as the team continues to assess and evaluate the ESTEAM approach.

**PIONEERS**

The Yorktown Central School District is a pioneer in the ESTEAM concept. They are considering copyrighting the unique new term. Dr. Hattar and his team have presented their ESTEAM work at several conferences across the state and they have had several districts visit them to see firsthand how the concept works, to gain a better understanding of ESTEAM and its impact. The ESTEAM logo was designed by a student who won a contest held last year and will be used as part of the presentations and promotional activities planned by the district team.

Understanding another person's situation - their challenges, their emotions, and their needs - is the main element of empathy. Using creative and innovative problem-solving skills to design solutions to another person's challenges is the main focus of ESTEAM. Dr. Hattar and his team in the Yorktown Central School District are fostering that focus

Students who are "willing to dust themselves off after falling down... are being successful."

in their students, preparing them with the skills they need to solve problems that may not even exist yet and to be successful in an ever-changing world.

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