

# “Blue-Sky”

Learning with STEAM Tentacles

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Today authentic and real-world academic success may be attained by focusing student efforts on solving the impossible, e.g. by tackling a “blue-sky” problem. Removing plastic waste from our oceans, decreasing global warming, removing orbital debris, or terraforming Mars are examples of these stretch projects. The educator specific “blue-sky” effort of this author is the formation of an engineering team comprised of 10-13-year-old students who have designed, tested, and will soon fly a spacecraft with a biotechnology experiment.

To coalesce student efforts around “doing the impossible” is both rewarding and challenging from the educator’s perspective; additionally, the involved students often find it efficacious and inspirational. One of the more valuable lessons learned by students engaged in a “blue-sky project” is that of embracing failure. Missing the mark on a task is inevitable, occurs often, and is expected. Failing serves as the basis for promoting improvements on both an individual and team basis.

When tackling a problem seemingly beyond the reach of a group of students, an educator’s

secret weapon is both the confidence the students have in the educator’s ability, and the sometimes naïve mindset of infinite possibility. In the case of the author’s satellite program, the middle school students simply did not understand why a middle school should not be able to fly a spacecraft. They had no initial understanding of the complexity of the problem. But they were willing to work and enthusiastic to succeed.

“Blue-sky” project success may be best achieved through sequential, modular, short term goals. In doing so, individual students and smaller teams gain confidence while making progress towards the overall goal. It is vital that the educator carefully plan these short term and intermediate goals, but at the same time allow for flexibility to allow the team to grow and learn from their mistakes.

Allowing progress tempo to vary allows the educator to emphasize various learning moments as they happen. Strong student engagement and modest success often leads to an improved sense of belonging and student enthusiasm. Infectious student enthusiasm for the project represents tentacles which will infiltrate other areas of the school.



In the specific case of the author, the science, mathematics, and engineering personnel often partner with foreign language, art, and public speaking faculty. No educator could achieve a “blue-sky” goal without the assistance of peers.

What essential traits must be employed by the educator to accomplish “blue-sky” projects? Tackling an out-of-the-world STEAM project requires the educator to act as an intrapreneur. A term often unfamiliar with educators, an intrapreneur is an entrepreneur who often takes risks to improve the organization from within. It is crucial that the educator form strong working relationships with colleagues.

Additionally, the educator needs an internal champion who embraces the educator’s “blue-sky” vision and a substantive external network capable of providing technical or financial support.

Today adults and even the parents of younger students grapple with the incoming tsunami of societal and technological change, while elementary and secondary students simply ride that same wave – which they see as ‘normal.’ Often with great frustration and futility, educators fight against the

inevitable wave of change versus simply riding the wave with the students. Adaptability is a key for both educators and students as it allows educators increased impact and relevance in the classroom.

The increasing tempo of technological progress makes the mission of preparing students a daunting task for 21st century educators. Students today must be prepared for an occupation that may not yet exist. It is not enough to introduce students to the emerging fields of artificial intelligence, body-machine-interfaces, cybersecurity, data analytics, nanotechnology, etc. Familiarity with manipulating large data sets by itself will not insure eventual student success.

However, adaptability allows the intelligent child to become a productive professional in a field which may not yet exist. Many important life lessons are ingrained in students through collaborating on a “blue-sky” project. Students are forced to think critically, to arrive at creative solutions, all while learning through failures and successes.