STEM MAGAZINE

Astrosociology

Social and Emotional Learning

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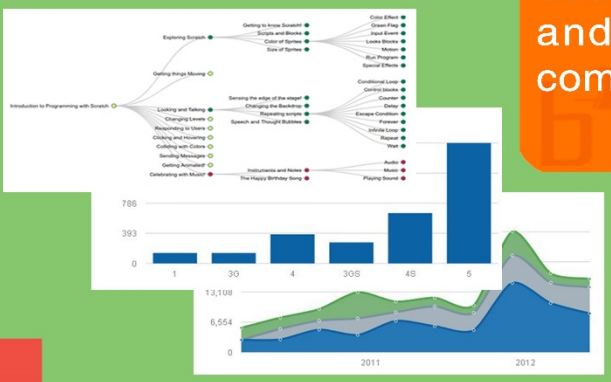

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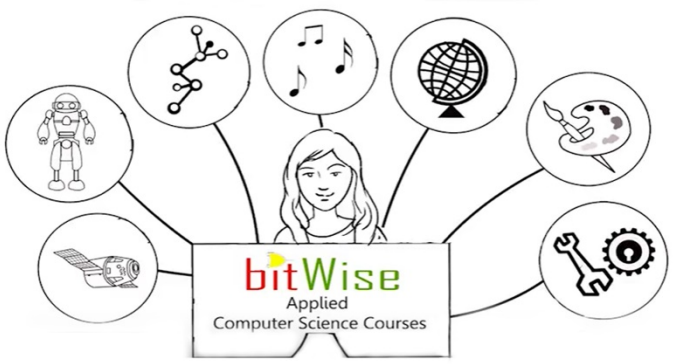

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To understand STEM...

...you must DEFINE STEM, but you cannot define an acronym using the words it stands for; you must define the words the acronym stands for.

Universities and organizations around the world continue to debate what a STEM career is. There is no doubt that "every career" uses STEM skills and this observation remains the focus of STEM Magazine.

Science: "The systematic accumulation of knowledge" (all subjects and careers)

Technology: "The practical application of science" (all subjects and careers)

Engineering: "The engineering method: a step by step process of solving problems and making decisions" (every subject and career)

Math: "The science of numbers and their operations, interrelations, combinations, generalizations, and abstractions" (every career will use some form[s])

For a moment, set aside any preconceived notions of what you think a STEM career is and use the above dictionary definitions to determine the skills used in any career field you choose.

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STEM Magazine Corporation
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STEM Magazine is a monthly subscription non-profit education publication for educators, students, their parents and industry professionals.

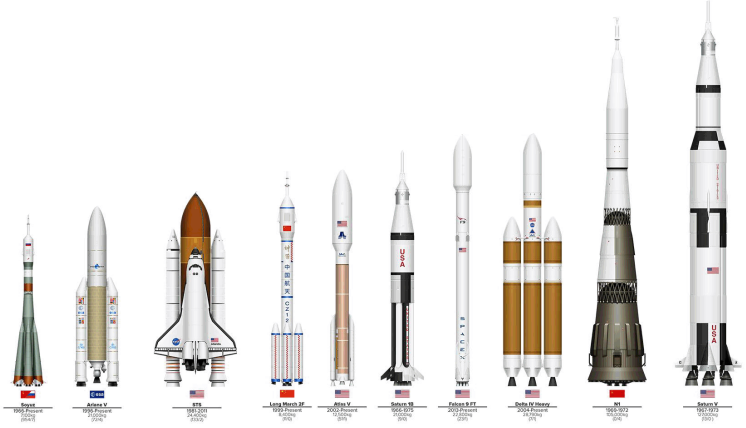
Read monthly in 67 countries, STEM Magazines strive to encourage the educator to better understand the importance of STEM skills, their use in every school subject, the need and ease of integration into curriculum and the urgency for students to embrace STEM.

STEM and SEL
Betsy HILL

Astrosociology
DR. Jim PASS

Mélanie Astles
Wayne CARLEY
Azam SHAGHAGHI

Credentialing Changes
Wayne SKIPPER



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- Breakfast? How long will that take?
- Last minute homework? How long will that take?
- Walk to bus stop? How long will that take?
- Walk to school? How long will that take?

- ***What time should you set your alarm for?***

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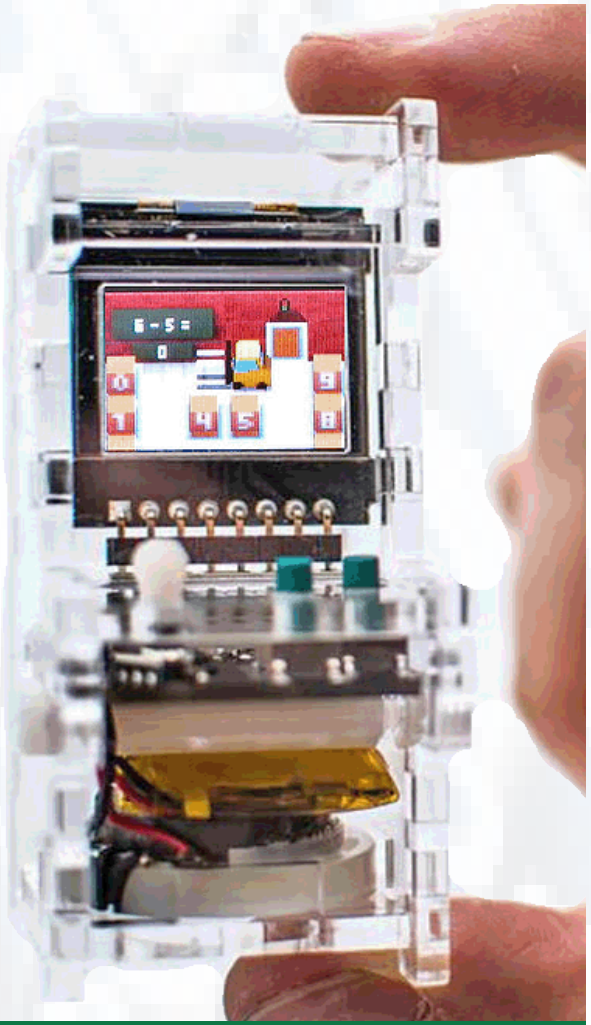

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"The tiny arcade game that helps teach math"

STEM & SEL: *Inseparable Partners*

by **Betsy Hill**
President of BrainWare Learning Company

A recent article in The Washington Post reported on two internal studies at Google. The studies involved masses of human resource data and extensive analysis to identify the skills and characteristics most important for success at Google. In one study, Project Oxygen, STEM skills were eighth on the list, behind seven other skills, which the article calls "soft skills." These "soft skills" included "possessing insights into others" and "having empathy," skills commonly considered the province of Social and Emotional Learning (SEL).

The important "soft skills" at Google also included critical thinking and problem-solving. These findings were surprising to the author because of the common belief that only technical STEM skills matter in getting a job with and succeeding at a technology company, while Google was finding that soft skills were actually more important.

Likewise, in a second study, Project Aristotle, Google found that the most successful teams exhibited well-developed "soft skills," many of which reflect the kind of social and emotional competence that is the goal of SEL, such as empathy, equality and emotional intelligence.

It may seem ironic that it was the application of "STEM Skills" (lots of data analysis) that led to these findings underscoring the importance of soft skills. However, Google's findings simply reinforce what the champions of "21st Century Skills" have been saying for years, based on reports from the Conference Board, the National Association of Colleges and Employers, and many others. Employers need employees with problem-solving and critical thinking skills, with creativity and flexibility (adaptability), and who can communicate. And social and emotional competence are essential in the workplace.

Nonetheless, the article prompted some heated debate. How can you say STEM skills aren't important for employees in highly technical jobs? After all, an employee needs computer programming skills do to computer programming. Is empathy really more important than calculation or coding skills?

Some people also objected to the author's implication that education in the humanities does a better job of developing these soft or social competence skills than STEM training. There were proponents on both sides of the question of whether humanities or math and science do a better job of readying students for STEM careers, at least insofar as "soft skills" are concerned.

The obvious answer to the debate would be to compromise and say that both STEM and soft skills are important. But that would require us to overlook the fundamental problem of trying to parse skills into two mutually exclusive categories. The problem, we believe, is fundamentally intractable because all of our skills and behaviors are embodied in our brains and each of us, STEM student or poet (or STEM student and poet – I know many who are both), has one brain that we use for everything we do. Maybe a better answer lies in finding the commonality among these skills.

Maybe, there are similar things going on in our brains. So let us dig a bit at the roots of this dilemma and see what we find to support the idea of shared cognitive processes between STEM and soft skills.

STEM Skills?

STEM stands of course for Science, Technology, Engineering and Math. Science is not a single skill; nor are any of the others. We have to look more deeply to discern skills and when we do, it is difficult to find agreement.

In Forbes Magazine, Anna Powers identifies three "skills" for success in STEM in 2018: Social Media, Data Analysis and Artificial Intelligence. Competencies in these areas may be in demand currently, but only Data Analysis corresponds to skills that typically appear on lists of STEM skills. If Social Media and Artificial Intelligence were actually skills in the same way as Data Analysis, we should be able to imagine how we would start to develop those skills in kindergarten (not instruct, but help students develop the skills). We do start teaching students about data at very early ages (how many boys are in the class and how many girls?). And Data Analysis or Analytical Skills certainly appear on many lists of STEM Skills, as do statistics and math calculations, inherent parts of analyzing data. Another set of skills that is frequently associated with STEM fields is Visual-Spatial Skills.

There is evidence that visual-spatial skills are correlated with success in engineering and other fields in science and technology. In fact, while I haven't been able to find a citation to support it, I have been told that underdeveloped visual-spatial skills are responsible for many students dropping out of engineering programs in their first year.

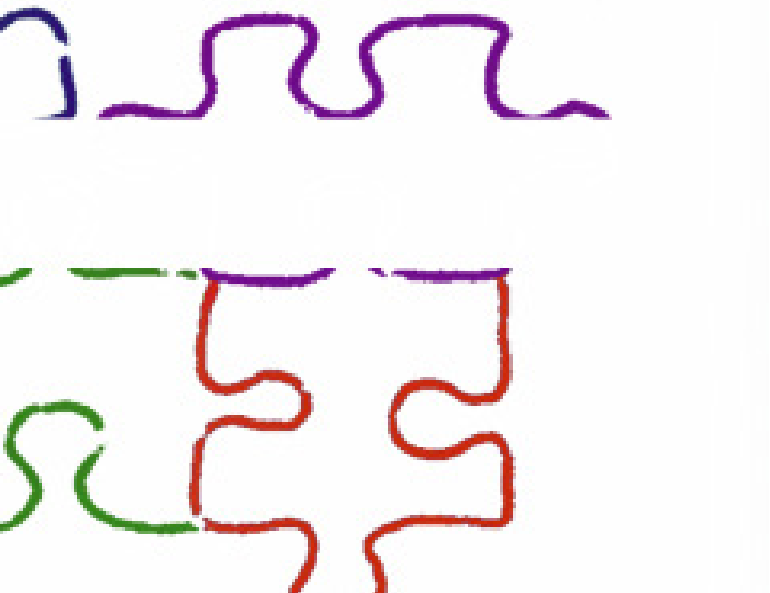
However, as useful as visual-spatial skills are in "technical occupations," such skills would also seem to be important in "nontechnical occupations," like Artist or Interior Design. The distinction between technical (architecture) and non-technical (art) occupations becomes problematic when one considers the similarities between an architect's process of scaling from a drawing/rendering and a sculptor scaling from a small model to a large statue.

Looking further for guidance as to what we should consider to be STEM skills, we encounter lists that include problem-solving, critical thinking, flexibility, creativity, intellectual curiosity and communication. But aren't these the same skills that Google studies characterized as "soft skills?" Yes, and that once again reinforces the difficulty of separating these skills into discrete buckets. Could it be that these skills that are both "STEM Skills" and "soft skills?"

Soft Skills?

For the last few decades, the term "21st Century Skills" has been used to refer to what are otherwise called soft skills and typically refer to problem-solving, critical thinking, creativity, communication and collaboration. As we noted above, these skills are also considered essential STEM Skills.

Soft skills are also frequently characterized as emotional intelligence, typically encompassing skills such as initiative and self-direction, self-management and self-control, relationship management, leadership, the ability to coach, empathize and understand different points of view. Here again, the Google research, as well as ample data from other research from organizations such as NACE, makes it clear that success at Google, and, indeed, most other employers these days, requires good "soft skills."



The need for good "soft skills" is one of the driving factors behind the fact that Social and Emotional Learning (SEL) is an active topic of discussion in schools these days. The interest in SEL is likely being driven by a variety of factors, including federal policy (the Every Student Succeeds Act) which adds social, emotional and behavioral factors to academic measures. Another factor is the growing evidence of the positive impact on student learning of anti-bullying, trauma-informed care, and other similar initiatives.

The types of skills included in SEL programs vary widely and there is no common understanding or consensus on which skills should be the focus of school-based or out-of-school programs. As a recent Wallace Foundation report says, "Researchers, educators and policy-makers alike are beset by dilemmas about what exactly is included in this broad domain."

To address the dilemma, the Wallace report introduces a useful framework for categorizing social and emotional skills, organizing them which can be useful in understanding the relationship between STEM and soft skills. ***The five categories in the framework are:***

1. Cognitive Regulation. In essence, these are the skills now commonly referred to as executive functions. They include attention control, inhibitory control, working memory and cognitive flexibility.

2. Emotional Processes. These skills involve self-awareness of emotions, emotional regulation, and empathy.

3. Social/Interpersonal Skills. These include understanding social cues, conflict resolution, and pro-social skills.

4. Character. Character is generally seen as a complex and multi-faceted concept and can range from respect to justice, and from dealing with personal challenges to tolerance.

5. Mindset. The concept of mindset deals with an individual's beliefs about their own ability to develop intelligence and talents.

It is this first category of skills, Cognitive Regulation, where the common threads emerge. There is now broad consensus regarding three core executive functions: working memory, inhibitory control and cognitive flexibility.

These skills are critical processes in the brain that are applied to a variety of situations to yield emotional intelligence. But they are also critical to academic performance, to problem-solving, critical thinking, and even creativity.

From the point of view of SEL, emotional regulation involves inhibitory control. Conflict resolution is enabled by cognitive flexibility. Understanding others' points of view and holding them in one's mind as one compares and contrasts them requires working memory.

From the STEM perspective, these same skills are recruited in our brains when we solve problems, or think critically, or think creatively. In math, for example, working memory is what enables us to hold multiple aspects of a problem in mind and to track where we are in solving a multi-step process. Inhibitory control is what enables us not to leap to the first possible solution in an engineering challenge but to question our assumptions and consider alternatives.

There is now a strong body of evidence that executive functions are highly predictive of school success, including both academic and social-emotional facets, and for reading and math and other STEM subjects.

So, if we now return to the question of whether these skills are both STEM skills and soft skills, the similarity is compelling, especially considering their common cognitive grounding in executive functions. The skills are the same, from the brain's point of view, whether they are applied to STEM or something else.

We should acknowledge that the degree to which emotion is involved and the presence or absence of social relationships will certainly alter important aspects of the task of applying executive functions – neuroscientists speak of hot cognition (executive functions in an emotional state) and cold cognition (executive functions operating in a non-emotional, "rational" state). At the same time, the areas of the brain activated to perform core executive functions are the same.

It can be tempting to separate "rational" STEM skills from "emotional" self-management and interpersonal skills. But even then, the distinction starts to crumble. Whatever we believe about the relative importance of technical and non-technical or soft skills, we must recognize that STEM disciplines are inherently social in nature.

Science advances by testing hypotheses and communicating the results so that others can build on our findings. Few scientific papers today have a single author. Most research requires the efforts of a team. Technology is driven by human needs and wants. Engineering involves solving a problem with the end-user in mind. And math. Well, if math is a language, then communication about STEM matters makes fluency in the language of math indispensable, and communication happens between people.

All of this discussion leads to consideration of the possibility that strengthening executive functions can enhance both STEM capacities and social and emotional competence. Rather than saying that success in STEM fields require two independent types of skills, perhaps there is value at looking at the common cognitive process involved and helping students develop those.

Developing STEM and SEL

As an April 4 blog from Mindprint Learning points out, executive functions, whatever the context (computer coding or interpersonal relationships), "really are not skills that can be explicitly

taught like a lesson in physics or statistics." They are skills that can be trained through awareness, nurturing over time and/or through cognitive training, and preferably a combination of all of those.

STEM and SEL are not in competition. They are not even separate but equal. They don't sit side by side. They are built on a common set of cognitive processes. And those processes can be and must developed and nurtured in students for them to be successful in the STEM careers that await them. As Earl Hunt and Tara Madhyastha wrote in an article in the Journal of Neuroscience, "The modern workplace runs very largely on the cognitive abilities of its workforce." That is true, whether we consider them STEM skills, Social and Emotional Learning.

Betsy Hill is President of BrainWare Learning Company, a company that fosters the practical application of neuroscience in the teaching and learning process.

She is an experienced educator and has studied the connection between neuroscience and education with Dr. Patricia Wolfe (author of Brain Matters) and other experts. She is a former chair of the board of trustees at Chicago State University and teaches strategic thinking in the MBA program at Lake Forest Graduate School of Management. She holds a Master of Arts in Teaching and an MBA from Northwestern University.

STEM, STEAM, ar

nd Astrosociology

by **Jim Pass**, Ph.D.
CEO, Astrosociology Research Institute

Defining Astrosociology

What is astrosociology, and what does it have to do with STEM? After all, astrosociology is a multidisciplinary social science field that focuses on the human dimension of space exploration and settlement.

More precisely, it is defined as the study of astrosocial phenomena (that is, the social, cultural, and behavioral patterns related to outer space). It includes the social and behavioral sciences, the humanities, and the arts (all of which are termed "social sciences" for brevity). The arts were formally included in 2006.

The focus of astrosociology is not just on aspects of human spaceflight, either. It covers everything that humans do regarding space. In fact, most of the astrosocial phenomena that occur today do so firmly on the Earth's surface, whether it involves an astronomer studying black holes through a telescope or an engineer working on a future Martian rover. Even those who do the bookkeeping for aerospace companies or communicate space science to the public are examples of astrosocial phenomena because their behaviors involve outer space in some capacity.

Thus, the human dimension of space exploration involves human beings in space, of course, but it also includes those on Earth who study and participate in research and preparing others to explore space while they remain on Earth.

Filling a Void

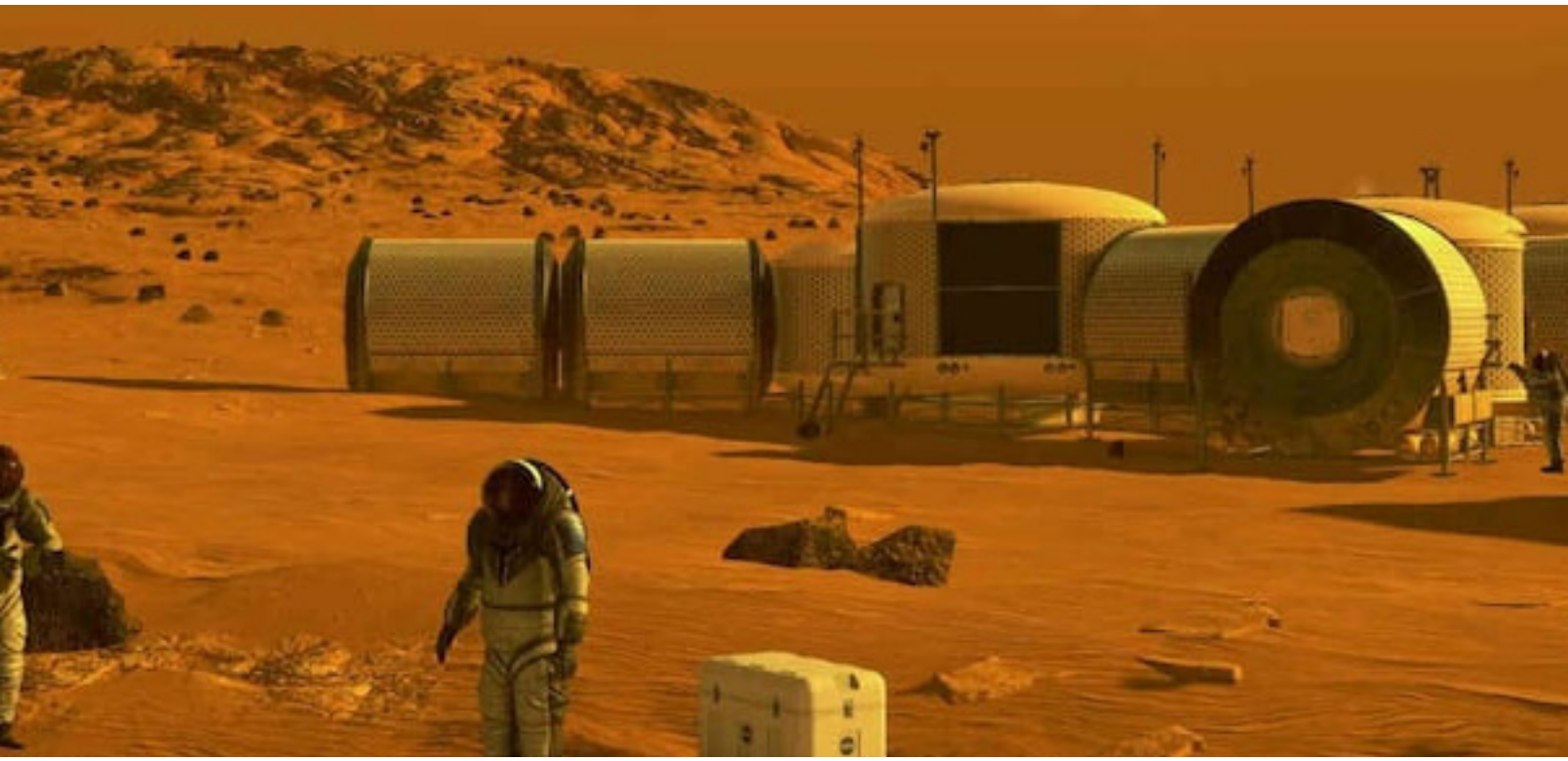
Before responding to the second part of the question posed above, it is important to point out that I founded this field in 2004 to fill a void. What was missing included the so-called "soft" disciplines such as mainstream sociology, political science, anthropology, and psychology. The void in question relates to the absence of the social sciences to any significant extent even as humanity reached for the Moon and beyond. Filling the void meant founding a new field that expressly focused on the human dimension of space exploration.

Campaigns from various circles called for the need to train students in the space-based STEM fields and disciplines, but there was no such drive to recruit students for the study of space issues from a social-scientific perspective. Space historians and psychologists did do important work and a few intrepid individuals with social scientific backgrounds have independently focused on space issues, but the mainstreams of the most prominent disciplines generally failed to seriously view space as an important area of study. They looked down at Earthly concerns while failing to look up at the heavens.

Things began changing more significantly as this century has progressed,

and I like to believe that the development of astrosociology has contributed to this trend during the past fourteen years. Nevertheless, there is still a long road ahead to reach a point at which social science disciplines incorporate space as mainstream subfields, if this is in fact the ultimate goal.

Astrosociology was created to fill this void, which does not necessarily depend on social science disciplines to participate on a formal basis. However, astrosociology also exists to foster collaboration with them should they or individuals within them decide to work on space-related issues. The key is to legitimize the critical importance of outer space to humanity in the eyes of social scientists in the mainstream despite the politics of their disciplines.



Bridging Two Traditionally Separate Cultures

What does astrosociology have to do with STEM? The answer to this part of the question relates to the collaborative nature of the field, not just among the social sciences for example, but also across the Great Divide that has strongly tended to keep the two branches, and cultures, of science separated on opposite sides of a formidable chasm. With regard to space, astrosociology acts like a bridge that spans across the abyss to allow members of the two cultures, each on opposite sides, to communicate and actually work together.

Metaphorically, the bridge is astrosociology itself. It acts to bring the social sciences to the STEM disciplines so that both can attack problems and reach understandings together that would be impossible for each alone to achieve. While such a reality is still in its infancy, incorporating the human dimension into hard science breakthroughs, technological advancements, engineering efforts, and mathematical equations represents the next basic step forward to maximizing the success of space exploration, settlement, resource mining, and advanced cosmic knowledge.

Exploring the Relationship to STEM and STEAM

Moreover, the importance of STEM (i.e., science, technology, engineering, and mathematics) was important to astrosociology from the beginning. When considering space-related issues, the "S" in both STEM and STEAM

focus on the so-called "hard" sciences and devalue or ignore the social and behavioral sciences as well as the humanities. For example, while astrobiologists may focus on the discovery of exoplanets, astrosociologists may instead focus on the behavioral aspects of how the search is conducted.

Connecting STEM and STEAM with astrosociology means bringing together the two cultures that traditionally remained separated, as discussed above. In the area of space, scientists, technologists, engineers, and mathematicians have trudged forward into the space age with relatively little input from social and behavioral scientists or humanists. Except for a few individual social scientists and humanists, the major disciplines developed subfields that failed to specially include outer space even though, for example, the sociology of science and technology did gain traction.

Contemplating the Future of Astrosociology

In 2008, the progress in the development of astrosociology gained enough traction to establish the Astrosociology Research Institute (ARI), which is a public benefit nonprofit organization incorporated in California. This year and this month, May of 2018, marks the tenth anniversary of ARI's founding. ARI currently encourages others to help develop astrosociology through their submissions of articles to its Astrosociological Insights edited newsletter and Journal of Astrosociology peer-reviewed journal. The back issues of both publications are available at no cost in addition to other publications, papers, and references on the Virtual Library page at www.astrosociology.org.

Of critical importance to the future is the establishment of astrosociology in academia and the ability to allow students to study astrosociological issues by bringing in all of the powerful history of social scientific tradition and knowledge. ARI's Astrosociology in the Classroom program is geared toward introducing astrosociology-based materials into classrooms at all levels, perhaps targeted most strongly at this point at the undergraduate university level.

The future of astrosociology can continue to become an important vehicle for bringing the social sciences into the space age; and beyond that, the so-called "NewSpace" age that is characterized by the entry of private space corporations that operate in conjunction with traditional government space agencies. The future benefits most if the social sciences focus on space issues – astrosocial phenomena – in an

organized manner in which they work together across disciplines. Collaboration is the key for the future and that includes creating a single literature. Moreover, astrosociology involves the encouragement of interdisciplinary efforts among those in the "soft" and "hard" sciences.

Concluding Thoughts

Connecting STEM and STEAM with astrosociology is slowly taking place. It involves an increase in collaboration between the two branches of science related to outer space. This trend is occurring inside and outside of the efforts of astrosociologists, as an increasing number of independent social scientists are becoming involved in the

study of space issues.

A significant concluding issue is to consider why the development of astrosociology is important for the future of space exploration and settlement. Equally important, or perhaps more so, is the question concerning why it is important for society, and beyond that, humanity itself. This is not to state that astrosociology is more important than other disciplines and fields. Rather, two additional questions come to mind. What would be missing if astrosociology failed to develop? What if astrosociology was not part of the future of scientific inquiry?

Answering these two related questions involves considering what the future would be like if the void that astrosociology was initially created to fill reestablished itself; that is, if this field failed to develop over the next decade and beyond. Even fourteen years following its inception, the successful development of the field of astrosociology is not a guaranteed outcome. Much progress has occurred though many important objectives remain.

On a more positive note, many people are working hard to demonstrate the legitimacy of astrosociology to STEM and STEAM supporters – and more importantly, to social scientists – including the importance of filling the void for the benefit of both branches of science. Interestingly, social scientists as a whole seem less open to the study of astrosocial phenomena than space-oriented physical and natural scientists. The work continues…

Dr. Jim Pass earned a Ph.D. in sociology from the University of Southern California (USC) in 1991. He taught sociology courses at USC, Long Beach State, and Long Beach City College before leaving teaching to take on a new challenge. He recognized that the sociology discipline did not focus much on space issues, which were of personal interest to him. He later noticed that the other social science and humanities disciplines also largely ignored the impact of outer space on society.

Dr. Pass founded of the multidisciplinary field of astrosociology in 2004, which is the study of astrosocial phenomena (i.e., social, cultural, and behavioral patterns related to outer space) and takes a multidisciplinary social scientific approach. He has worked on developing the field with others since that time. The focus is on the human dimension of space exploration.

In 2008, Dr. Pass was instrumental in creating the Astrosociology Research Institute (ARI), a 501(c)(3) nonprofit organization that serves to facilitate and support astrosociological education and research, and he serves as the CEO. ARI now publishes a newsletter called "Astrosociological Insights" and The Journal of Astrosociology. Dr. Pass has written several papers, articles, and chapters about various astrosociological topics to demonstrate its importance to both the space and social science communities. His latest chapter, entitled "Astrosociology: Social Problems on Earth and in Outer Space" in The Cambridge Handbook of Social Problems just came out in March 2018.

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Wings

# of Passion

by Wayne Carley and Azam Shaghaghi

is five times aerobatics French champion and finished several times in the top ten World and European championships. Now, as a pilot in the Red Bull Air Race Challenger Cup, she writes a page in history of aviation by being the first woman to ever compete in the RBAR.

Mélanie's story is one of passion, perseverance and overcoming the odds. Nobody believed that she could fulfill her childhood dream to become a pilot when she quit school at 18 to enter active life. When she took a job in a petrol station in Roquebrune Cap Martin, in the South of France, where she lived, the dream seemed far away.

But thanks to her relentless work, she became manager of several petrol stations. She was then able to save money to pay for flying lessons, which she started at age 21. In her very first year in aerobatics competition, she snatched victory at the French Cup in the "Espoir" category.

With a steady and constant progression, she worked her way up the categories, winning national championships and her place in the prestigious Aerobatics French Team. In 2014, she was seventh overall at the Aerobatics World Championships, "Advanced "level and first at the female ranking. In 2015, she ranked world fifth best female pilot in the highest category "Unlimited", and was a member of the French team which won the world title.

The following is candid interview with Mélanie about her flying career and STEM applications.

- How old were you when you started flying?

My love for planes dates from my very early childhood as far as I can remember. As young as 7 or 8, I wanted to become a fighter plane pilot. However, it is only after I quit school on impulse at 18 to start earning money, that I finally had the opportunity to take my first flying lesson only at 21.

- How important is understanding aerodynamics as a racing pilot?

On the circuit, we are subjected to aerodynamic forces. Our task is to understand them in order to counteract them. For example if I take a turn, I put my ailerons to the left, therefore creating a differential drag, this will have to be counteracted.

Another example: the stall, when we pass a certain angle of attack, there will be no more wing lift. To go fast, we need to stay close to this limit, showing how important it is to understand it.

- Were there any special education requirements to enter this career?

My own path is not the typical one. I lacked the maths and science background demanded of pilots.

So I studied privately to obtain the academic diploma necessary to reach the level. At the same time, I was working in gas stations, and saved money from my salary to pay for enough lessons to obtain my Private Pilot License, with the minimum number of hours. I studied to enter the prestigious ENAC School (Ecole Nationale de l'Aviation Civile), where I finally obtained my Professional License.

Parallel to studying I developed my passion for aerobatics, and I very quickly won titles, national, European and world. I reached the Unlimited

level in Aerobatics (the highest) in 2015, which opened the door to applying to compete in the RBAR.

- Air racing has been male dominated. Do you have any comments on gender acceptance and competition?

Even today, it is still not easy for women to succeed in air racing. You need a strong and determined personality to fit in. Aviation in France is a strongly male dominated activity and only 7% of women hold a pilot's license. It would be wrong not to say that discrimination is latent in male dominated sports, like in any type of activity or trade. Things can sometimes be difficult, but women have to keep a positive attitude at all times, and just concentrate on their objective. If we complain, it will be shrugged off as being a "woman thing".

Of course, as women, our sports career is sometimes shorter if we decide to start a family; pregnancy and having children is quite often the reason why some of us quit the sport. So female pilots probably will face sexism, but you just have to believe in yourself and focus on your project. At the Red Bull Air Race, I am treated not as a woman pilot but just as a pilot. Everybody is equal in the cockpit in competition.

- Tell us about the physical effects and demands of your sport.

Physically, of course, we need to be able to pull up to 10 G's, and you can only achieve that by serious constant physical training. Unlike fighter plane pilots, we do not wear G-suits, the difference being that they have to bear g-forces over a long period of time. In aerobatics we also have to sustain high g's, but on short successive laps of time. So of course, physical breath control exercises are essential. We also do a straining maneuver, when you tense everything up, hold your breath in short bursts and pull against it.

You make your head feel a little buzzy, and it forces the blood back into your brain, and clears your vision.

To build up my physical endurance, I train six days a week; I run for an hour and bike for two hours, twice a week.

Then I punch and run intervals for an hour or two, once a week. I do body-building two or three times a week. At RBAR, my main challenge has been to learn to fly at low attitude, and master the speed. In aerobatics, we are judged on the quality of the figures, at RBAR, we fly low against the clock.

- Since engineering is really about decision making and problem solving, how frequently before and during an event do you find yourself using the engineering method of decision making?

Before each flight or event, it is important to raise the problems, the possible errors, what we call the threats. The mnemonic way for me is P.A.I.M.E.

P. for Pilot, - am I in good shape, did I have a good sleep etc.-->. find a solution, e.g. be even more attentive.

A. for Avion (Plane) – in good order, checked

I. for Infrastructure – e.g. last weekend Porto track- in case of threat what decision to avoid crowd = land on water.

M. for Meteo – e.g. threat = clouds above the bridge to enter the track at Porto last week - decision = annul flight or plunge deeper through the clouds.

E. for Environment. E.g. Porto = water ; Spielberg = mountains – decision taken according to the elements around.

We need to scan all the possible threats in all aspects. And for each threat, find a solution to counteract it upstream, not waiting for the threat to become reality.

I guess this is the similarity with engineering, before building a bridge, a railway… an engineer must be going through a similar process of thinking.

- Science by definition is the systematic accumulation of knowledge. Tell us about the knowledge you've had to gain to be an air racer.

When I entered the RBAR in 2016, I had experience in aerobatics competitions, where we are judged on the quality of the figures performed. But I lacked the racing knowledge, I had everything to learn. Luckily at RBAR, we are surrounded by very competent pilots; in particular Paul Bonhomme (three times RBAR world champion, captain of 747 on British Airways).

He has shared with us his knowledge as an engineer, airline pilot, air race pilot, his maturity, and made us aware of the importance of security. He taught me step building, step by step first, and now putting all this together I am able to produce nice results.

- What do you enjoy most about flying and racing?

I love the feeling of escape. It's like there are two different worlds; one on the ground and one in the sky. Having the power to live in both gives you freedom. When in the sky, negative thoughts and problems disappear and I become completely focused on flying. I also love the action part of it: I'm very much into speed, precision and adrenaline rush, be it in training or competition. At RBAR my main challenge has been to learn to fly at low altitude and I love it. And of course, I love the positive reaction of the public, it really lifts me.

- Do you have any comments for young women that may be interested in a flying career?

I get a lot of feedback from young girls writing to me or meeting me at the races. I am happy if I motivate them by my experience. I will just say to them, if you have determination, "Go for it", if it is your dream, and never ever give up.

Failure can and probably will happen, but success will follow if you believe in your project strongly enough. Be proud to be a woman, and stay feminine.

You don't envisage a flying career, but rather you have a need to live a passion. And you owe it to yourself to do everything possible to fulfill that passion. And then, as someone said once, "If you do what you love, you'll never work a day in your life".

- Is there anything else you would like to add for our readers in 67 countries?

My unusual career path has not been easy. But it has helped in building my determination and my strong mental state, while conveying a feminine image. My passion for sport is strong and I always want to go further. I aim at improving all the time as a Challenger pilot to reach one day the Master Class. I invite you to look at my Internet site melanieastles.com , where you will learn more about my life, my sport, my association, and sponsorship opportunities, an innovating communication solution, to take part in this special adventure.


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The Changing Landscape of Credentialing in Education

By Wayne Skipper

Wayne Skipper is the Founder and CEO of Concentric Sky (on the web at www.concentricsky.com). His background spans the technology gamut, from hardware design to software architecture. He's passionate about education and emerging technologies. Wayne loves Art and Science - and enjoys building bridges between them. He is always looking for fresh perspectives and new ways to look at data.

Wayne devotes much of his time to the realms of digital micro-credentials. His team leads the development of the Open Badges standard, helping to create an open standards ecosystem focused on catalyzing significant advancements in education. He works with organizations to help them understand and engage with badging technology and leads the open source project Badgr at badgr.io

The way that we assess learning achievements is changing. Our current system of grouping learners into age-banded classes and ranking their performance using broad, letter-grade categories is becoming increasingly outdated. Letter grades have little value to learners, who can still fail to master key learning objectives despite getting good grades. Letter grades also have little or no meaning to employers, who are looking for a more granular understanding of a candidate's mastery of specific skills. In order to better serve learners, we need to not only help them master necessary concepts, but also to demonstrate that mastery in the context of a shared system of skills and competencies.

With this in mind, forward-looking institutions are beginning to explore Competency-Based Education, based on open standards which allow us to create a shared, universal language to allow virtually any learning achievement to be understood by other organizations. Using these open standards, the achievements of learners will soon be transferable between institutions and understandable in the context of employment and lifelong learning opportunities.

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The work on this new digital environment for learning began about seven years ago and is proceeding quite quickly.

A Very Brief History

In early 2011, the white paper "Open Badges for Lifelong Learning" attracted significant attention as part of the Digital Media and Learning Competition. Soon thereafter, Arne Duncan, then U.S. Secretary of Education, launched the Digital Badges for Learning Competition. This competition resulted in an estimated 300+ non-profit organizations, government agencies, and informal learning entities getting involved in digital badging.

The momentum continued. In 2012, The Mozilla Foundation released an open-source Open Badging Infrastructure which served as the seed for numerous projects. The next year, over 100,000 badges were issued as part of the Chicago Summer of Learning. During the Summit to Reconnect Learning in 2014, a non-profit organization called the Badge Alliance was launched to help coordinate the work of the rapidly growing Open Badge ecosystem.

Fast Forward a Few Years

To date, nearly 15 million badges have been issued worldwide. Issuing organizations can be large or small. Even school systems and individual teachers have begun issuing digital badges across a host of platforms. Schools and organizations have found that they can now issue digitally verifiable credentials to their students, staff, and users to represent learning achievements of many kinds. Teacher professional development is a common use case, as well as preparing young people to enter the workforce.

The Open Badges standard allows learners to understand and share their learning achievements from formal, informal, and self-directed settings across multiple platforms using a common language. Open Badges allow almost any learning experience to become valuable in the right situation. Everything that a person learns can be used to create a rich portrait of them as a learner, a portrait that the learner controls.

Benefits of an Open System of Credentialing

Even if teachers are working with younger children, there are still benefits to creating a digital portrait of their learners. Take, for example, a student who plays video games. This example

learner has earned in-game achievement badges for flight simulator games and goes to air shows where he or she gets digital badges for participation.

While on the surface these badges might been seen to have little relevance to their education, they can in fact be quite meaningful. The average high school student gets less than an hour of face time with a school counselor. What are the chances that our example youth's interest in aircraft is going to surface in that meeting where it might be used to help motivate the learner?

With this data in hand, a counselor could have this type of discussion: "Did you know you could work on airplanes for a living? Did you know you could fly airplanes for a living? Or even design them?

Let me show you how." So, we can see that this seemingly trivial information can be made useful to a learner during the most impressionable part of that young person's life. We can now use a learner's own interests for their benefit, which is something we couldn't do before. We didn't have the information or a way to understand different kinds of learning. Badges can help solve one of the most fundamental challenges of education – how do we identify the interests of students and motivate them to learn?

The important thing to understand about badges is that they might be analyzed in contexts that are not immediately apparent to the issuer. Together, a collection of badges paints a rich portrait of a learner. This portrait can help educators understand the learning progress of students in an immediate and granular way. And it can help a student track his or her own learning achievements in school and life - and share those achievements with colleges and potential employers.

Future Benefits

As colleges and universities are redefining their value in a global marketplace, badges will allow them to award more granular credentials that are of value to both students and employers. Currently, students who do not complete their programs have little to show for their

work, even if they completed 99% of their requirements. There's also currently no way to describe informal learning achievements alongside those that arise from more formal environments. Badges not only benefit learners as they enter the workforce but will also enhance the value of higher education institutions that may be struggling to show value in a world of increasing tuition and rising student debt.

In coming years, companies will hire employees globally, using verifiable skill sets to identify their remote workforces. Learners will take advantage of new learning pathways, helping them aggregate skills from many learning sources and allowing them to build a complete profile of the skills and achievements. This is an exciting time for education. We're seeing a transformation from a successful but antiquated

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letter-grade system to a modern credentialing system that better serves learners and their future needs. Learners, schools, and businesses will all enjoy the benefits of an open system that more accurately describes learning achievements and matches them to the skills needed in the workforce.


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