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My technology author, Harry Roman, has been developing an interesting project that would help gifted students to ask effective and relevant questions to stimulate their creativity and production. Some of these questions can help to overturn the status quo. Others will improve the design of automobiles, electric power, economic systems, classroom organization for better learning, and the entrepreneurial spirit. The main idea behind Harry's work is that gifted students need formal instruction in asking good questions that make sense, and are backed up by their research and study. He is not writing about using brainstorming or its related concepts to train GT students to ask better questions. I also recommend that teachers and parents should be educated in effective question asking along with their students and children. For example, the Teacher Question Asker could address such questions as, "How can I be a more effective teacher?" "How can I teach gifted children more effectively?" "How can I educate students to be more analytical and independent thinkers?" "How can students become useful team members?" "How can I identify students' interests and motivations?" "What are some excellent educational resources that will help students to become highly motivated learners?" "What are some excellent educational resources that will help me to be a better teacher?" Etc.

Some questions for parents might be, "What can I do to make our home a more effective learning environment?" "What types of enrichment activities will help my child to be a better student?" "What activities will help my GT student to develop his/her knowledge and skills?" "What learning resources can I use in and outside of the home to improve my child's performance in school?" "How can I help my child's teacher to achieve more success in different subjects?" "When should homeschooling be used as an option for my child?" Etc.

During 2015 I read some excellent books which would be of interest to gifted students and their teachers:

1. ***All the Light We Cannot See*** (2014, Simon & Schuster) by Anthony Doerr. A beautifully written book of fiction by one of the nation's greatest authors. He was awarded a Pulitzer Prize in 2015 for this fascinating story about the life of a blind adolescent girl who lived in France during World War II.

2. ***Thunderstruck*** by Erik Larson (2007, Broadway Books). Historical fiction about the life and accomplishments of Guglielmo Marconi, the inventor of wireless communication from ship to ship and ship to shore. The author portrays Marconi as being a grand character of the emerging electronic communication age, and one of the first technology nerds. Gifted students who are interested in how radio waves were first applied to practical use will like this book.

3. ***The Ocean, the Bird, and the Scholar: Essays on Poets and Poetry*** (2015, Harvard University Press) by Helen Vendler. An outstanding poetry critic discusses her development as a professor of literature and poetry at Harvard University. Among her favorite poets are Wallace Stevens, Walt Whitman, Langston Hughes, and Emily Dickinson. She believes the humanities should be reconstituted around the intensive study of the arts.

4. ***Complete Poems*** (1951, Penguin Classics) by Marianne Moore, and ***Poems*** (1969, Macmillan) by Elizabeth Bishop. These outstanding American poets creatively used unique words and phrases to address numerous issues of 20th century America. Their poetry is clearly written, interesting, articulate, and humorous. Both received a Pulitzer Prize for their poetry.

5. ***Out of Our Minds: Learning to be Creative*** (2011, Capstone Publishing) by Ken Robinson. The author demonstrates through analysis of worldwide education results that entire educational systems are failing to help students achieve their maximum potential. He argues for a radical revision of programs that would emphasize each student's interests and creativity.

6. ***The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution*** (2014, Simon & Schuster) by Walter Isaacson. This is a detailed history of the individuals and events that shaped the computer and internet revolution. Isaacson is a major synthesizer of this area of technology.

7. ***The Story of Philosophy*** by Will Durant (1961, Simon & Schuster). This gem should be required reading for all gifted students. The author presents a fascinating discussion of the major ideas and individuals of Western philosophy including Plato, Aristotle, Francis Bacon, Spinoza, Kant, Schopenhauer, and Nietzsche. His favorite philosopher is Spinoza. By reading this book, gifted students will learn how important metaphysics is to the study of life and knowledge. Durant was one of the great synthesizers of intellectual ideas, and is particularly respected for his 11 volume work (written with his wife, Ariel) — ***The Story of Civilization*** (1935-75, Simon & Schuster).

Articles

1. **Atara Shriki and Nitsa Movshovitz-Hadar** discuss their research on teaching logical skills to gifted students. This is an outstanding paper (Part 1) on the problems and issues of teaching gifted students how to think analytically.

2. **Brittany N. Anderson, Tarek C. Grantham, and Margaret Easom Hines** present an interesting discussion of how a service-learning model between the university and schools can be used to improve the talent development of minority students. This is a very fine article on training student teachers to improve the education of gifted minority students.

3. **James Popoff** discusses ways of motivating gifted students to become involved in Mars exploration by using amateur radio. This is part 2 of his article; part 1 appeared in the Fall 2015 issue of ***GEPQ***.

4. **Michael Walters** concludes this issue with his essay on Ralph Waldo Emerson.

Maurice D. Fisher, Publisher

Quotations

"Learning is not attained by chance, it must be sought for with ardor and attended to with diligence." **Abigail Adams.**

"You cannot teach a man anything; you can only help him to find it within himself." **Galileo Galilei.**

"Life itself is a quotation." **Jorge Luis Borges.**

"Respect for the fragility and importance of an individual life is still the mark of the educated man." **Norman Cousins.**

Quote of the Day. "It is even harder for the average ape to believe that he has descended from man." **H.L. Mencken**

"I would rather be the offspring of two apes than be a man and afraid to raise the truth." **T.H. Huxley**

"The great end of life is not knowledge but action." **T.H. Huxley**

"Work is the only thing that gives substance to life." **Albert Einstein**

GIFTED AND TALENTED STUDENTS' WANDERING ABOUT "LOGIC IN WONDERLAND"

Part I

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When intuition and logic agree, you are always right. **Blaise Pascal**

1. INTRODUCTION

This paper presents insights gained while engaging gifted and talented students (abbr. GTSs) in *Logic in Wonderland*, a learning environment for an introductory course in logic, based upon reading Lewis Carroll's classic book (1865), *Alice's Adventures in Wonderland* (Movshovitz-Hadar & Shriki, 2009; Shriki & Movshovitz-Hadar, 2012_a; 2012_b). Following a request from the head of one of the GTSs Centers in Israel to teach their students logic, we adapted this environment, which was originally developed for prospective teachers, to 8^{th}-9^{th} grade GTSs. The head of this GTSs Center maintained that "*mastering mathematical logic is a prerequisite for success in mathematics as well as in all fields of science and helps students develop their reasoning ability.*" Hence, she believed that logic should be a part of the Center curriculum. Although the relationship between explicit teaching of logic and success in mathematics is quite controversial, as will be discussed below, we gladly agreed to assume this challenge, as we were curious about the suitability of our *Logic in Wonderland* to this population.

The paper consists of 2 parts. In part I, which appears below, we discuss the dispute about the benefit of learning formal logic and present briefly the special learning environment we generated and in which the GTSs were engaged. In Part II, to be published in the next issue of this journal, we describe partial results of a study that followed the gradual development of the participating GTSs' ability to draw logically valid conclusions. These results led us to some quite interesting conclusions about the GTSs' gains from our approach.

2. THE BENEFIT OF LEARNING FORMAL LOGIC – A DISPUTE

People's daily conduct depends on their ability to draw valid conclusions, although in daily life people usually do not support their assertions by presenting a sequence of deductive arguments. As individuals differ from one another in their deductive reasoning ability, those who are better at it appear to be more successful in life than others (Johnson-Laird, 1999). The prevalent belief that deductive reasoning is needed for success in daily life as well as in various professions, brought up a dispute about the role played by an explicit study of formal logic for these purposes. This dispute has been the focus of many studies in cognitive psychology and in education, particularly in mathematics education. School mathematics calls for solving problems that involve deduction, making explorations, formulating conjectures and verifying or refuting them, reaching conclusions, and more. Such processes necessitate the use of inference rules (Durand-Guerrier, Boero, Douek, Epp & Tanguay, 2012). Consequently, in the context of school mathematics, the discussion of whether students should be taught formal logic explicitly, is often related to its implication for improving students' problem solving skills and reasoning abilities.

Some fifty years ago, when researchers started to express interest in the study of logic, it was widely accepted that "*critical thinking requires the ability to make logically correct inferences, to recognize fallacies, and to identify inconsistencies among statements*" (Suppes & Binford, 1965, p. 188). Furthermore, in order to develop these skills "*instruction must deal specifically with the ability to derive logical conclusions from given sets of premises, evidence, or data*" (Suppes & Binford, ibid). Consequently, Suppes and Binford valued the study of formal mathematical logic for its own sake as it provides "*an opportunity to pay more than incidental attention to the development of the student's reasoning powers*" (ibid). Other studies carried out during that period showed that young students are capable of making valid inferences and avoid fallacious ones, provided that they are exposed to formal logic (e.g. Hadar, 1977; 1978; Hadar & Henkin, 1978; Hill, 1960).

Later, throughout the 1980s educators started to question the issue of including explicit instruction of formal logic as part of mathematics courses. Attention to this issue emerged as a result of university and college faculty's complaints about deficiencies in logical competence of tertiary students, which prevent them from learning advanced mathematics, particularly in cases where deductive reasoning, proof, and proving are required (Blossier, Barrier & Durand-Guerrier, 2009; Selden & Selden, 1995). In this regard, researchers (e.g. Dubinsky & Yiparaki, 2000) argued that it was not reasonable to expect undergraduate students to learn much mathematics, if they do not know how to read and interpret the language of mathematics. According to their opinion, in order to understand a complex statement there is a need to analyse the statement based upon the syntax of the language in which the statement is given. The obvious conclusion is therefore that enhancing students' abilities to understand, analyse, evaluate and determine the validity of arguments necessitates an explicit instruction in the fundamentals of formal logic (Hatcher, 1999). Furthermore, many prospective mathematics teachers arrive at universities with poor logical reasoning abilities, and the question is whether they will be able to support the development of their own students' reasoning ability without learning formally the basic principles of logic (Durand-Guerrier et al., 2012). Discussing the role of logic in teaching proof, Durand-Guerrier et al. concluded that interweaving the principles of logic in the instruction of mathematical argumentation and proof is valuable, and that logic should be viewed as dealing with both the syntactic and the semantic aspects of mathematical discourse. As noted by the authors, although not all mathematics educators agree with this view, there is a consensus that most students, including many students in relatively advanced university courses, have severe difficulties with the logical reasoning required for determining the truth or falsity of mathematical statements. In such cases, where students' mathematical knowledge is insufficient for evaluating the truth of a mathematical statement, familiarity with logical principles and their application is most beneficial. Indeed, several studies indicate that in order to avoid invalid deductions, students should understand the rules of propositional and predicate logic and be able to consider the syntactic aspects of proof (Barrier, Durand-Guerrier & Blossier, 2009; Durand-Guerrier et al., 2012). Evidently, as Epp (2003) suggests, insufficient knowledge in formal logic is the main cause for students' difficulties while attempting to generate mathematical proof, and even mathematically competent students may make mistakes while solving problems because of an inadequate background in formal logic. Furthermore,

> *Starting with logic makes the course seem coherent and provides students with a supportive framework, which they can lean on while the various aspects of proof and counterexample are falling into place. It builds students' confidence in the rationality of the mathematical enterprise and helps allay their fear of failure. Determining truth and falsity of mathematical statements is so complex that, even when they are motivated, students often fail to "get it" if they do not have some knowledge and experience with basic logical tools.* (p. 895).

Ayalon and Even (2008) interviewed 21 Israeli mathematics educators and research mathematicians and examined their views regarding the role played by learning mathematics in the development of general deductive-logical reasoning. The majority of their interviewees argued that in order that mathematics contributes to the development of deductive reasoning there is a need for a deliberate intervention and explicit teaching of formal logic. Most of them doubted that deductive reasoning ability could be improved *implicitly,* merely through learning mathematics, without *explicit* teaching of formal logic. To that end, they argued, logic should be introduced as a separate unit of study within the mathematics curriculum, or be presented explicitly in ordinary mathematics lessons wherever applicable. A further support to this view can be found in the literature review of Inglis and Simpson (2008) and the results of their own study. They compared the inferences drawn from abstract conditional statements by art students and advanced mathematics students who did not study formal logic, and found that there was hardly any connection between the level of studying mathematics and successful conditional inference behavior.

Does this suggest going back to the 1960's and re-consider the introduction of logic explicitly as a part of school mathematics? Not all scholars are in favor of this idea. In particular, considerable numbers of cognitive psychology researchers (e.g. Johnson-Laird, 1986; Wason, 1977), philosophers (e.g. Thagard, 2011), and mathematics educators (for comprehensive discussion see Durand-Guerrier et al., 2012) maintained that aspects of human reasoning cannot be explained in terms of logic, and that most humans reason by means of non-logic-based mental models in which the semantic point of view, namely, content-dependent perspective, as well as affective aspects predominate. Other opponents to explicit teaching of formal logic argue that such instruction has no value in itself (e.g. Larvor, 2004), has little effect on students' ability to deal with problem solving (e.g. Tomasi, 2004) and some (e.g. Beebee, 2003) even find the learning of formal logic as 'intimidating' students. Finally, in her literature review, Epp (2003) points to a number of studies that did not find any difference in performance between students who had taken an introductory logic course and a control group of students who had not.

It should be noted however that some scholars have criticized the interpretations given by psychologists and philosophers to the results obtained from studies in the field of cognitive psychology that dealt with the study of logic. For example, Stenning and Van Lambalgen (2008) uphold that results in this area, purportedly pointing to the irrelevance of formal logic to authentic human reasoning, have been commonly misinterpreted, mostly because the image of logic in psychology and cognitive science is completely incorrect. Mathematical logic, they argue, is essential to cognitive science, in particular semantics interpretation, as it underlies key processes in deductive reasoning. Durand-Guerrier et al. (2012) support this observation, and maintain that results of studies conducted in cognitive psychology led to devaluing the role of abstract logic in understanding human reasoning.

Now, what about teaching logic to GTSs? During the 1950s-1960s, due to the launch of Sputnik, the interest in strengthening mathematical and scientific abilities of the young generation increased significantly, with special attention given to the teaching of mathematically gifted students (Karp, 2009). This may be the reason for the widespread interest during that period in the development of logical thinking, in general, and in gifted and talented children, in particular (e.g. Beth & Piaget, 1966; Goldberg & Suppes, 1972). For example, Suppes and Binford (1965) found that young gifted children did almost as well as college students in a formal logic course. Nonetheless, although it is widely recognized that these students are expected to be experts in their field, still there is a need to nurture and fully develop their talents during their formal education years (Heller, Mönks, Sternberg & Subotnick, 2000; Straker, 1982).

To summarize, there is no definite answer to the question whether teaching logic explicitly supports the development of students' deductive reasoning ability, improves their problem solving skills, or strengthens their capability to prove theorems. On the other hand, many studies indicate that learning advanced mathematics has no meaningful impact on the development of logical reasoning abilities. This paper is not intended to substantiate either one of the positions. However, following Heller et al. (2000), who showed that GTSs should be provided with explicit instruction to exhaust their potential, we started this study believing that GTSs could benefit from explicit instruction of formal logic, and not be expected to "pick it up on the way" on their own. Thus, encouraged by the findings of Suppes and Binford (1965), albeit they are quite old, we curiously took up the challenge of employing *Logic in Wonderland* for teaching GTSs.

3. THE LEARNING ENVIRONMENT

In designing the learning environment and developing its contents, a concerted effort was made to pay a special attention to learners' difficulties in logical reasoning and their sources. In this section we present the main ones and the way our *Logic in Wonderland* learning environment addresses them. A full description of the process that guided the development of our learning environment, *Logic in Wonderland*, can be found in Movshovitz-Hadar and Shriki (2009). In this section we provide the main ideas and features.

3.1 Setting the stage for *Logic in Wonderland*

Since Inhelder and Piaget's (1958) studies of the development of logical reasoning from childhood to adolescence, there is a growing body of literature presenting various difficulties school and university students encounter in drawing valid conclusions. As pointed out by Dubinsky and Yiparaki (2000), Schoenfeld (1991), Selden and Selden (1995), and other researchers, many students are unable to reliably determine the logical structure of common mathematical statements, face difficulty in determining the correctness of their proofs, and have trouble in producing formal arguments. Students also find it confusing to manipulate symbols in order to transform verbally written mathematical statements into their equivalent formal symbolic versions, and to interpret mathematical statements that involve quantifiers. Such difficulties pose a barrier to success in advanced mathematics (Hoyles & Kuchemann, 2002).

Why is it that students, in all levels of education, have difficulties in logical reasoning? - It appears that the traditional approach to teaching the formal rules of logic, and the fact that most students had never learned what can actually be considered as a valid mathematical argument, might be the reasons for students' difficulties in deductive and logical reasoning (Dreyfus, 1999; Epp, 2003). Other difficulties might be attributed to the manner in which various aspects of logic are presented in textbooks, as in most of them statements appear in natural language rather than in a formal-symbolic one (Alibert & Thomas, 1991). Moreover, logic, by its very nature, is abstract, and the manner in which words are used in the conversational language is not always consistent with their meaning in the context of logic (Dubinsky & Yiparaki, 2000). Commonly, the language used in mathematics lessons, whether orally or in writing, and in common textbooks, is the natural language. This use of natural language often precludes explicit references to logical principles (Durand-Guerrier & Arsac, 2005). Additionally, the natural language does not always coincide with the logical structure of statements, and the lack of rigor in class discourse may inhibit students' ability to write accurate proofs (Boero, Douek & Ferrari, 2008). For example, "or" is used both exclusively and inclusively in ordinary language, while it is always used inclusively in mathematics; In the conversational language "if …, then …" statement may mean "only if…, then…" or even "if and only if…" in addition to the ordinary mathematical use of "if …, then…"; Also, the conventions of negating "if …, then…" statements in daily situations are often different from the convention of negating them in mathematics; Statements like "Some *A* are *B*" is often taken to imply that "obviously, Some *A* are not *B*," however such implication is invalid in mathematics (Shriki & Movshovitz-Hadar, 2012_a). Knowledge of the meaning of these connectives and quantifiers, and how to negate statements, have important and broad implications for how mathematical arguments are structured (Epp, 2003). Furthermore, in recent years, the regular mathematics school curriculum typically puts an emphasis on conjecturing and explorations, based upon induction and intuition, rather than employing deductive reasoning. As a result, it is only later in life that those who qualify to math-intensive professions appreciate the purity and logic of the formal approach (Tall, 2008). These findings and various others served as a starting point for the design of our *Logic in Wonderland* learning environment.

3.2 Logic in Wonderland

Our experience indicates that mathematical logic is considered by many prospective and in-service teachers as one of the least favorite topics. They tend to perceive it as 'dry', uninteresting and not applicable to school curriculum. However, although we do not ignore the controversy regarding the role of explicit learning of logic as part of learning mathematics, we do acknowledge the centrality of logical argumentation in the process of thinking mathematically. Therefore, considering the common reasoning failures that were described above, we decided to face the challenge of turning the teaching of logic into appealing, interesting, and meaningful (Movshovitz-Hadar & Shriki, 2009).

Inspired by Midkiff and Cramer (1993) who view the integration of children's literature in mathematics lessons as *"a natural way to connect language and mathematics*" (p. 303), we developed a learning environment that is based upon reading Lewis Carroll's *Alice's Adventures in Wonderland.* The use of children's literature in mathematics lessons enables students to be actively engaged with the learning materials (Conaway & Midkiff, 1994), and provides them a base for establishing understanding of concepts (Midkiff & Cramer, 1993). It can also serve as a vehicle for exploring mathematical ideas, since the natural context and the fact that mathematics is naturally embedded in familiar situations offer opportunities for discussing and highlighting mathematical ideas (Whitin, 1994). Additionally, it enables students to see mathematics *"not as a prescribed set of algorithms to master, but as a way of thinking about their world"* (Whitin & Gary, 1994, p. 394). This way, mathematics is no longer regarded as limited to textbooks, but becomes a purposeful tool for solving problems and making decisions.

Given the above, we thought that teaching the basic rules of logic through using children's literature could bridge the gap between the abstractness of logic and its expression in everyday life. In addition, it might also help to modify the perception of many mathematics educators according to which logic is too dry to capture students' interest (Epp, 2003). The choice of Carroll's *Alice in Wonderland* seemed to us as particularly suitable to that end due to two main reasons: (i) the book is full of imaginative fantasy and humor, and therefore could 'spice up' the teaching of logic; (ii) Carroll himself was a logician, and his 'logician fingerprints' often emerge naturally from his book.

Logic in Wonderland (Shriki & Movshovitz-Hadar, 2012_a; 2012_b) is based upon reading *Alice*, where each paragraph serves as a platform for introducing and discussing the following topics sequentially: Simple sentence and truth value; Negation; Compound sentence; Binary sentential connectives (conjunction and "and," disjunction and inclusive/exclusive "or") and their truth tables, and tautologies; De Morgan's laws; Elementary set theory; Binary relation and its properties; Logical Quantifier - Universal, Existential, Only; Implication and conditional sentences; Equivalence and bi-conditional sentences; Necessary condition, sufficient condition, necessary and sufficient condition. Other topics are interwoven in the ones mentioned above. For example, the four inference rules (Affirming the Antecedent-Modus Ponens; Denying the Consequent-Modus Tollendo Tollens; Affirming the

Consequent; and Denying the Antecedent); Types of proof (direct, indirect, by exhaustion, by counterexample); and more.

Inspired by the common approach to teaching logic in the 20th century, many of the activities in our learning environment are 'syllogisms-like' items as they were frequently used to introduce students to deductive reasoning and examine their deductive reasoning abilities (e.g. Chapman & Chapman 1959; Ennis & Paulus, 1965; Hadar, 1977; Hawkins, Pea, Glick & Scribner, 1984; Woodworth & Sells, 1935).

Moreover, logic should not be considered as strictly syntactic, but rather as a constant interplay between syntax and the interpretive role played by semantics (Lee & Smith, 2009). In other words, as a discipline logic "*deals with both the semantic and syntactic aspects of the organization of mathematical discourse with the aim of deducing results that follow necessarily from set of promises*" (Durand-Guerrier et al., 2012, p. 370). Therefore, one of the central focuses of our learning environment is making transitions between verbal information (the semantic) and its syntactic and symbolic form through using notations for sentential connectives and Venn diagrams, and presenting equivalency of representations. For example, using set theory terminology and Venn diagrams, relations among quantifiers, conditional statements, and necessary/sufficient conditions are presented, as shown in Figure 1.

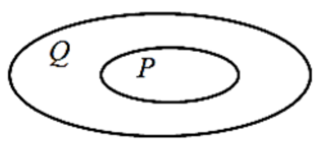
Formulation using quantifiers terminology	Formulation using conditional statements	Formulation using sufficient condition/necessary condition
All $x \in P$ is $x \in Q$	If $x \in P$, then $x \in Q$ ($x \in P \rightarrow x \in Q$);	$x \in P$ is a sufficient condition for $x \in Q$
Only $x \in Q$ is $x \in P$	If $x \notin Q$, then $x \notin P$ ($x \notin Q \rightarrow x \notin P$)	$x \in Q$ is a necessary condition for $x \in P$
Venn diagram		

Figure 1 – Equivalent formulations of statements and their representation using Venn diagram.

More details about the process that guided the development of our learning environment, *Logic in Wonderland*, and the features of the environment can be found in Movshovitz-Hadar and Shriki (2009).

4. THE STUDY

In the second part of this paper, (Shriki and Movshovitz-Hadar, 2016) we present an exploratory study that was intertwined in the aforementioned learning environment, and focused on the gradual development of the participating GTSs' ability to make valid inferences, namely to draw conclusions logically. We also share our deliberations regarding the GTSs' benefit and gains from our approach.

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Lessons Learned from Teaching a Service-Learning Course on Minority Student Talent Development

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Abstract

School improvement initiatives that involve partnerships between universities and local schools can make a difference in how teachers view students and how students view their potential. The purpose of this article is to share lessons learned from the establishment of university-school partnerships focused on talent development. The article focuses on gaining access and establishing trust, setting a positive tone for teacher interactions, helping university students to understand the school landscape, and how this partnership requires those involved to move beyond deficit thinking.

Keywords: university-school partnerships, talent development, minority students, low-income schools, teacher training, service-learning

Introduction

The purpose of this article is to share lessons learned about the establishment of university-school partnerships focused on talent development. School improvement initiatives that involve partnerships between universities and local schools can make a difference in how teachers view students and how students view their potential. Over the past two years, I have worked with faculty members in the University of Georgia Gifted and Creative Education Program on nurturing a university-school partnership by leading and facilitating groups of freshman students enrolled in a First-Year Odyssey Seminar (FYOS) program. UGA freshmen are required to enroll in a one-credit course from a plethora of interdisciplinary options designed by professors and graduate students. The First-Year

Odyssey seminars are designed to introduce freshmen to the academic life of the University, as well as provide spaces for students to engage with faculty in an intimate environment, to learn about the engagement opportunities of the University. Our FYO class, University and Community Engagement in Minority Student Talent Development provides:

> An overview of research and practice related to proactive engagement by university students, organizations, and departments with local schools, community groups and organizations to develop talent among ethnic minority youth and close the achievement gap. Strategies introduced in the seminar aim to increase undergraduate students' knowledge and skills to engage in university-community partnerships and in efforts that support underserved ethnic minority students' school and community achievement. Students examine historical and contemporary views of outreach by the university and community that enhance talent development and civic engagement. Overall, this seminar is designed to enhance undergraduate students' proactive engagement in closing the achievement gap and to promote their positive identification with all members of the university and community.

As a part of a team of UGA faculty members, graduate students, and local school educators, the FYO experience was new for me, transitioning from an elementary education teacher to a graduate student engaged with undergraduate students and partnerships focused on talent development. For the past five years, I served as an elementary education teacher, and I had no prior experience working with undergraduate students, nor did I have experience with service-learning courses. New experiences for me tend to bring about feelings of trepidation, anxiety, and excitement. However, there was a silver lining: our potential school partner was an elementary school, my area of experience and expertise. Although the course targeted college freshman, many of the lessons learned from this experience can be beneficial for K-12 teachers desiring to establish a partnership with a university, and for university personnel wanting to partner with a school.

Gaining Access, Establishing Trust

After our initial meeting with the school administrator, it became apparent, rather quickly, that establishing a partnership and building trust would not be a seamless process. Understanding the needs and climate of the school was absolutely necessary in order for us to gain access to the students and teachers. The administrator was hesitant in establishing a formal partnership due to previous tenuous experiences with university-school participation. It was imperative that both my advisor and I tread lightly and understand the lay of the land. It was critical that we understand the needs of the teachers, students, and administrators (Grantham, 2003). It was also vital that all parties were able to see the benefit of the partnership; therefore, we had to package our engagement with the campus in such a way where everyone could see the advantages of our partnership. In order to create the package, observations, along with group and individual interviews, were conducted. After an informal needs-assessment was conducted, we had a better idea of curricular approaches, levels of engagement that were needed, and ways that *trust* could be built with not only the administrator, but the teachers and students. We understood that flexibility and consistency would be the key, in order for this trust to be established.

Establishing and building trust is by far the most critical component of establishing a university-community partnership. It was absolutely necessary for us to "prove" that we were sincere in our approach of supporting the school's initiatives. Sincerity combined with consistency over time, formed what Forsyth, Adams, and Hoy (2011) identify as attributes to form collective trust. Collective trust was formed once the teachers, students, and administrators found that we did not plan on being a "fly-by-night" university program. One of the most critical lessons learned by our partnership is trust does not happen overnight, nor does trust build independently; there is a high level of interdependence. The intentions and initiatives of one faction of individuals within the university-community partners cannot be achieved without reliance upon another (Overton & Burkhardt, 1999). Consequently, having a strong presence and continuing to meet the needs of the campus helped us make strides in establishing that trust.

Not only was trust necessary for the campus professionals and students, but trust needed to be established with the First Year Odyssey university students. It was of great importance to me, that I form a relationship with our freshman students, and help guide them through the process in the most efficient manner possible. Establishing structures where they could observe the community, critically reflect on their experiences with school partners, and participate in enrichment experiences with elementary students was not an easy task. The students learned about their personal strengths in the process, as well as learned of the strengths of the community, elementary students, and strengths of their peers. During this process, I learned that they needed to be involved in conversations on cultural sensitivity and underlying assumptions/stereotypes of groups unfamiliar to them. In order for “real” conversations like these to transpire, trust must be established. Similar to the relationships on the elementary campus, collective trust with the students takes time and consistency. With the university students, they began to feel comfortable with us at about the midpoint of the semester. They were then more open to having conversations regarding diversity, socioeconomic status, and cultural sensitivity.

Setting a Positive Tone for Teacher Interactions

As a means of building trust and establishing “buy-in,” interest and engagement is a must. In order for the teachers to be engaged with us, we offered our assistance and support according to their *School Improvement Plan*. Along with FYO students serving as enrichment assistants, the university “team” was able to provide engaging enrichment lessons focused on creativity and crafted to fit teachers’ learning objectives and Common Core Standards and state standards. These lessons provided a framework for teachers to see that teaching the standards and teaching creativity did not have to be delivered separately. Often, we find that many educators deem creativity as fluff, but in reality, creativity is a way to ratchet up the engagement, motivation and achievement in content areas. Once teachers observed the shift in their students, there was increased interest on their behalf. I distinctly remember when this shift occurred. The students were immersed in learning about the phases of the moon. I created a simple lesson that had them use these same objectives, but brainstorm and substitute the original phases for an object of their choice. Metamorphical thinking was the creative strategy used to guide the students’ phases activity. The teachers then began to seek out my advice on ways to alter their own lessons to include a creative component. It was truly the beginning of something wonderful. I sat in on many of their planning meetings and frequently checked in with the teachers to ensure that I was being supportive and helpful in teaching their standards. An extensive bank of lessons was created, and my role evolved into supporting teachers in implementing these creativity lessons on a regular basis.

Helping University Students to Understand the School Landscape

This particular FYO service-learning course requires undergraduate students to engage with local elementary students in a predominantly African American community on a weekly basis. The elementary school campus partner is a Title I campus- a school with high numbers or high percentages of children from low-income families. The school is located in a community that sits in the shadow of UGA. The local school is comprised of approximately 400 students, with 77% of the students African American, 16% Hispanic, and 5% Caucasian, compared to the district which is 53% African American, 22% Hispanic, and 19% Caucasian. Of the 400 students, 98% of students qualify for free/reduced lunch, and only four students were identified as gifted/advanced.

When we initially approached the administrator for this campus, we were met with reservation. Therefore, when we approached the administrator about a possible partnership, it was made clear, on our end, that this was a two-way partnership, and FYO students would act as support to the elementary students and teachers. Our purpose was to: (1) support initiatives to enrich the curriculum with creative and critical thinking/problem solving; (2) assist with identifying more students for the gifted program; and (3) expose our undergraduate students to service learning, as well as instructing them in various methods to nurture talent in minority students in low-income areas.

Once our partnership was established, it was important for us to create a network within each grade-level. The FYO service-learning instructors and undergraduate students were instructed and evaluated on meeting the following objectives in order to promote talent development:

- Use effective techniques to meet the needs of students such as modeling of instructional delivery in culturally responsive ways
- Develop meaningful creativity lessons and aligning them with standards, maintaining a culturally relevant collaboration with teachers and administrators
- Take into account cultural background and knowledge of university students and conscientiously placing them with teachers/classes/students
- Infuse teachers' perspective regarding the community culture within planning
- Proactively encourage sensitivity to university and community dynamics impacting partnership development
- Help university students to set appropriate boundaries given the cultural context

Partnering Requires Moving Beyond Deficit Thinking

The cultural and educational differences represented in Title I school settings offers a plethora of possibilities to engage higher institutions in civic outreach and service learning; yet, there are tremendous challenges in changing attitudes. Unfortunately, diversity is all too often framed as a “problem” to be solved or an “obstacle” to be overcome (Borrero & Yeh, 2010). Deficit thinking occurs among many educators and administrators; it is associated with a climate lacking cultural awareness and understanding of community needs (Ford & Grantham, 2003). We observed that due to a lack of community input or affirmation of their cultural beliefs, many students in our Title I partner school may have been overlooked. Much of a deficit approach to student needs stems from a hyper-focus on standardized testing, and teacher accountability in public education. In the US academic achievement scores are not improving, and students in the US are falling behind students from other counties (Darling-Hammond, 2007). We had multiple instances where we observed the deficit shift to dynamic thinking on behalf of the teachers. Teachers commented on the creative potential of their students and ways they demonstrated strengths in writing and problem-solving activities. In many of our classrooms, we began to notice the shift in students’ critical thinking and problem-sensing skills.

This partnership has changed with the way I view engagement from the university-school perspective. The knowledge exchange between the teachers and our team have been immense, and many lessons have been learned. We highly encourage both university professionals/faculty and teachers to seek partnerships that can be mutually beneficial in promoting talent development. To ensure the integrity of the partnership, seek partnerships that support and meet the objectives of your school and community.

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A Strategy for Enlisting Gifted Students as Scientist-Participants in Mars Exploration Using Amateur Radio: Mmars and Gaia Dot Org (Mars Mission Amateur Radio System and Global Amateur Interferometer Array)

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ABSTRACT – PART TWO

This paper addresses three themes: the history and operational profile of school children communicating with astronauts using amateur (ham) radio; the differing educational tastes addressed by American education and other modes such as the Asian model that may prepare young people for challenging activities, and the combination of educational mode choices and ham radio to enable a new paradigm that is immersive and contextual for gifted education called the MMARS and GAIA project.

The MMARS and GAIA project was first introduced in my book "The Young Amateur's Guide To Radio Physics" as a means of combining a multitude of small, cheap, and weak amateur radio stations, which the book guides the reader in constructing, together into a single, powerful virtual transceiver and antenna in order to communicate, using multimedia, with interplanetary explorers.

This is *telepresence*, with perhaps tens of thousands of young amateurs worldwide participating in the breathtaking excitement of being there while real exploration is carried out, having earned the "right" to do so by actively producing the GAIA signal. "Communicating" is just saying "hi" and the novelty soon wears off; but the project (via the book) provides solid training in electronics, elementary through advanced mathematics, and the physics of electromagnetic energy to enable gifted students and interested others to be relevant, credible, interplanetary scientific explorers in their own right, and contribute ideas and analysis to the mission on an *ad hoc* basis or otherwise.

INTRODUCTION

In Part One of this paper, I developed the rationale for a partnership between gifted students and institutional gifted education and the amateur radio community. I began by describing the history of ham-astronauts aboard various space vehicles communicating with Earth-bound hams for recreation, and described how this morphed into an organized educational outreach by the space program to schoolchildren worldwide, mediated by volunteer hams who construct and supervise the classroom amateur station. However, as our activities have extended further into interplanetary space, the existing educational paradigm I described is being confronted with severe challenges as well as profound opportunities.

I have tackled the challenges in Part One, and using the agency of the MMARS and GAIA project have illustrated the opportunities available for gifted-ed teachers and parents to inspire and guide their students. However, the educational requirements for significant *telepresence* via multimedia are profound, not to mention that original and authentic *participation* by gifted students as scientific workers dictates an altogether-different state of mind from that of the uncritical "tourist" mode of even well-educated consumers of managed information.

The focus of Part Two of this paper is twofold; first, we want to review the evidence available of the performance outcomes of several different educational strategies. Secondly, we want to ignite a desire within the amateur radio community to partner with our gifted students in the demanding MMARS and GAIA project that is based on their own educated self-interest, and I argue the point by tracing the likely demise of amateur radio if limited to a terrestrial role in the coming Interplanetary Age. So, let us begin by examining the educational contexts available to us *in situ*.

THE "ASIAN MODEL"

This research describes a potential surrogate for American gifted-ed for using the concepts I'm developing in the MMARS and GAIA project. But it also applies more broadly; for example, gifted-ed teachers and parents can benefit from the insights described below to bring their students into contact with ARISS-astronauts, and embrace amateur radio training and STEM-enhancements to curricula at their desired pace. Or, they can embrace the MMARS and GAIA idea fully and even participate in teams, locally, over the Internet, and even internationally to advance its research and development. This partnership with amateur radio and space exploration opens a multitude of new dimensions for gifted education that can release it from its economic and policy-constrained bonds and allow gifted students to flourish instead of, perhaps, just marking time.

Statistical research from the early 1990s and 2000s indicates that the scholastic performance of the children and grandchildren of Indochinese refugees to the U.S. has been extraordinary despite various impediments, including lack of familiarity with the language or culture, and/or lack of resources such as disposable income to support children with learning aids such as personal computers, or to be able to send them to the best schools. In the past, for example in 1961, similar performance peaks were observed by researchers among the children of Jewish refugees to the U.S. after World War II, and in 1948 among the children of formerly-interned Japanese Americans, as well as more recently among African American children in places where the parents strongly supported local schools and inculcated respect for learning and practiced learning activities at home [8].

The key element in common among those groups identified by cited research has been the emphasis on <u>family</u> resources in support of education, which is considered by the family as a whole to be an intrinsic "Good." This is especially evident in terms of time spent by students on homework (3 hours and 10 minutes on average spent each evening for Indochinese-American high school students, versus about 1.5 hours for comparable American-style acculturated students), and the manner in which educational activities are incorporated in normal family life.

For example, in Indochinese families other family members carry out household chores to free up students' time for homework. Older students are expected to tutor their younger siblings. After the evening meal, the family table is cleared for homework, which occurs in a matrix of typical family activities with input to the students coming from multiple family members. Students report pleasure in intellectual activity from mastering new concepts and skills, and in their role as teachers assisting siblings with learning new material with about equal intensity.

In addition, parental engagement includes reading to their children, which also correlates strongly with higher GPA scores more generally, with 45 percent of parents reading aloud, which produced a mean GPA performance bump of 17 points relative to families where the parents did not read aloud. This observation was independent of parents' language skills and was witnessed whether the language in which they read was their native tongue or English. Personal efficacy, one's belief in one's own ability to effect change or attain goals is strongly tied to the perception of family efficacy, and despite the majority of the literature supporting the Western concept of personal efficacy, based in the individual, the authors quoted believe that the family link is critical in supporting high attainment in education among the Indochinese students, and this cause-and-effect link is also observed among the fore-mentioned Jewish, Japanese, and African-American students.

The family value which stood out among the parents of the Indochinese students was "love of learning," which translated into a 24-point performance bump over the most-often-cited American value of "seeking fun and excitement," and a 52-point GPA bump over the other most often cited American value of "material possessions." When studied similarly Asian schools show significant differences along similar lines with American schools that are statistically similar [9]. Asian students would "wish for" educational outcomes (by almost 70 percent) given a "wizard" who could grant any wish, while American students wished most often for money and then for material possessions with only less than 10 percent selecting an educational outcome.

This enthusiasm for school was seen to emerge in part from a longer day (eight hours) that interspersed significant periods of recess, lunch, and other social time with classroom seat time. By contrast, American experience was a stiffly regimented, shorter day emphasizing seattime and having little time available for social interaction, with extra-curricular activities put off until after school, and with about twice as much time subsequently spent watching television per evening than Asian students.

But in common with Asian students, Indochinese refugee students in the U.S., and American-style students, humans in general are said to be "infovores" craving information because it produces pleasure said to be akin to the effects of narcotic addiction to experience novel (especially visually stimulating and fast-paced) situations, and to interpret and associate new experiences with our own memories [10]. Hence the twin result of generous social time and intellectual achievement helping to produce enthusiasm for school among Asians and the predilection by Americans for viewing television does not appear to be a dichotomy; both sets of students are answering the same biological need.

There is evidence that our brain rests in a bath of endomorphin-inhibiting compounds [10] somewhat like a well-controlled nuclear reactor within its matrix of neutron-flux-absorbing control rods. For example, neurons with arrays of what are known as mu-opioid receptors are observed to suppress other neuron synapses normally releasing the inhibitory neurotransmitter gamma aminobutyric acid (GABA). This process takes place as mu-opioid receptors are arrayed in a climbing gradient from lower-order processing areas to higher-order integrative areas where objects and scenes (in the visual processing system) are assembled from more primitive inputs, and particularly where associations with memories are established. The mu-opioids produce pleasure by letting the brain function without inhibition in those areas and, mechanically speaking, that rewards learning about the environment. In particular, we crave both novelty and experiences that are *interpretable* using associations with our memories in order to experience those pleasurable effects.

The authors indicate that fast-paced visual stimuli are favored by our brains, but that *conversations also rank highly with us* and the associative and interpretive typically substitute for sheer visual novelty. For me, the resonances of this research with the lessons of the recent Asian model of family-centric learning, or, alternatively the experience of puzzling-out something hard with a parent at bedtime in a similar context as a story-telling episode are self-evident.

The contrary view, that difficult material *cannot* be learned by quite young minds because they will not "sit still" long enough to "get it," or because such information cannot at this time be well-depicted visually in a cartoon or other story format such as an interactive computer graphics application, fails to recognize that the effect of an intimate, personal interaction between a parent or other loved one and a child can be an engaging and effective learning mode also.

AN AXE TO GRIND?

Yes. When I have approached the subject of young minds mastering advanced topics in physical science and mathematics in order to attain practical objectives here and now (that is, outside of the context of formal development of a topic's theory and its introductory practice) professional educators have, so far uniformly, pushed back with their firm conviction that my approach is at best spurious, if not actually harmful (Certainly it is harmful to their developed formats and curricula!).

My interest emerges from the experience of writing a book for young people to help them understand the technical background to the amateur radio licensing exam. While I am motivated by the desire to advance my hobby by introducing more people to it, as well as filling some common gaps in knowledge for those amateurs of all ages who have already earned their license, I've frankly indulged my desire to write the book that I myself would have wished for at age ten or so (my book is serialized in 8 volumes, and the first three volumes can be found at the self-publishing site lulu.com. The remaining volumes are in progress and Volume Four is in final editing as of Spring, 2015).

This impulse on my part is reflected in the Random Kid Movement (http://www.randomkid.org/projects/dreamstolife), which also forms a template for the initial organizational steps necessary to connect and motivate all the interested parties, but most especially the students themselves. The mission, from their web page, is:

"The RandomKid mission is to provide staff and services to youth, of all backgrounds and abilities, for the development, management and accomplishment of their goals to help others. Visit this link to see what makes us so unique.

We educate, mobilize, unify and empower youth to directly impact local and global needs. By helping students to become innovative and successful world problem-solvers, we are securing a better fate for our world now, and into the future. We don't ask them to be a part of us; we become a part of them." [1]

However, upon examination by critics it turns out the topics I cover in my book are generally considered suitable only for an undergraduate or even graduate audience, given the way that our educational system is presently organized. But I believe (and this is only my interested opinion) that American education today suffers from a failure of nerve that is not present in some other cultures, and shows itself in a lack of confidence in our children and consequent mediocre levels of competence for them in cohort-appropriate comparisons (we fall about in the middle of the pack, according to the OECD in 2006, at 29 of 57 advanced countries in general skills and 37 of 57 in mathematics). In other words, we are the geometers of a vicious circle.

The program I've laid out in describing MMARS and GAIA is presently attainable with effort by the current amateur community, and maybe that is where it rightly belongs. However, if we Americans continue to compartmentalize our knowledge behind gatekeepers, and in a way that keeps our young people safe from challenges, we guarantee that we will be hiring foreigners, both directly and by purchasing their exports, to do our difficult (and lucrative) work of creating innovations, growing the U.S. economy, and *becoming our leaders* for the foreseeable future. There is evidence we are over-educating young Americans for their future roles in the service economy as it is, if that is where we are content to set our sights. Only by distributing our knowledge and transferring it to those whose energy and imagination will take it to wing will we be doing right by our heritage, those who taught us, as well as those who would wish to learn.

WHO BENEFITS FROM PARTICIPATION IN MMARS AND GAIA?
I Support World Peace Too; So What?

The obvious first answer is the young people who participate benefit, but, as the sentiment above says it, so what? Well, apart from restating the not-obvious link between investment in education and World Leadership, I know from experience this matters at least to the parents of gifted students; who rightly believe their schools have sold them a bill of goods with little or nothing of substance to show. Gifted-ed parents should not have to be educating their children themselves after school, or instead of school altogether, although that is where we are headed, one way or another. Maybe a low-cost program that only requires that teachers make the effort to learn the math and physics and then mentor their gifted students who can then take off on their own can make the difference. Although it will probably be necessary, as I've described above, for parents to take their turn also.

Probably the only *critical* beneficiary to this proposed partnership, at whatever level it may emerge in practice, however, is amateur radio. A partnership with schoolchildren and, in particular, gifted students who can become entrepreneurial with knowledge, represents the most important opportunity for we hams to save and expand our hobby since we began relaying signals from ships foundering on the high seas. The detailed analysis I also want to defer to **Appendix Two**.

The competition with the amateur radio hobby from other forms of entertainment is intense and is gaining strength. There is little relevance for amateur radio to communications any more in our mobile worldwide culture; the Internet also provides information in depth and detail if desired; multimedia entertainment always beckons us, and for tinkerers, the challenges of networking, constructing computers and peripherals, and programming new applications are all profound. Amateur radio is becoming like fly fishing by comparison; a niche activity for a relatively few, knowledgeable enthusiasts.

Counter that image with the vision of a vital, expanding, vibrant interplanetary role for amateur radio! We're not going to get there by doing the same old things like contesting or chasing DX (worldwide contacts) or refurbishing antique apparatus (my particular joy). Likewise the "foul-weather hams," the emergency volunteers, do not typically translate their entry-level license into an abiding intrinsic interest in the hobby. We're going to have to enlist as partners in a great enterprise the young people, an activity that will serve us as a raison d'etre and provide a conceptual framework and socializing influence in lieu of any *imposed* organization, and with their energy and imagination make a go of this, and do it soon!

DELIVERABLES
mmarsandgaia.org

- I currently own the domain name mmarsandgaia.org, and freely donate the use of some of the bandwidth to The Mars Society as an easily-remembered slogan and a beacon; and for locating a marketing and thought-leadership kernel, and a clearing house for further development of these ideas and others that are generated from them by all amateurs worldwide.

- The book "The Young Amateur's Guide To Radio Physics" comes in eight volumes, comprising some 2000 pages (Volumes One - Three are now published and Volume Four is in final editing: the remainder are in progress at this time). This serial, volume-by-volume approach enables very detailed step-by-step explanations, undertaken by an avuncular grandfather persona teaching his three grandchildren, William aged 10, Tonya also aged 10 but younger than her cousin, and Beatriz aged 8. The analysis of the critical physical science concepts and the mathematical operations they engender is at a bedrock level; absolutely nothing is left unexplained (the reason the book requires 2000 pages), and the reader is led by the narrative, acquiring the necessary information and expertise almost effortlessly. The objective is to enable my readers to credibly, *actually* participate in the scientific exploration of our Solar neighborhood, and bring their ideas and creativity to bear on research and even to initiate research on their own initiative. The book explains to readers how to build a software-defined radio transceiver and equip a station; and how to participate in the MMARS and GAIA project if they so desire, and/or after taking the FCC amateur exam then using their station in the general Amateur Service.

APPENDIX TWO

Is amateur radio in decline, and in need of a gifted-ed partnership to survive in the long term?

Despite recent years of record annual growth in the number of new hams, in my opinion and the opinion of others the hobby is headed for the dustbin of history. We hams sit on large and lucrative tracts of electromagnetic spectrum that is allocated to us by international treaties. We've seen repeated efforts in the U.S. by military and commercial interests to grab that spectrum for their own purposes. Two things have worked to our advantage thus far, namely, the U.S. is a signatory to the international covenants governing that spectrum that precludes much of it from military or commercial use; and secondly, our continued and vigorous activity in the emergency-management arena represents a strategic resource that the country can ill afford to lose.

But much of the new growth in our hobby comes from individuals who volunteer to be emergency-management workers and who seek a reliable method of communications in that context. The number of those who become "hooked" and then pursue amateur license upgrades is questionable. But already, we are seeing the effects of technological change affect the balance of the emergency-management picture too.

The 2010 earthquake and tsunami disaster in Haiti saw private organizations and *commercial* organizations act quickly to deploy new Broadband-Hamnet™ –style portable apparatus that provided broadband links for all the relief agencies. Those links handled the vast majority of emergency communications traffic, and continue in action to this day, while the majority of amateur radio volunteers have, by and large, long since given up and gone home (and whose efforts, with due respect, amounted to only a trickle by comparison of the total communications traffic passed). Our traditional served agencies, hospitals, shelters, and others are now observed to be experimenting with setting up their own Broadband-Hamnet™ –style installations here at home [4], and, in some cases, amateurs are now struggling to get ahead of the bandwagon again by offering their own services in support of Broadband-

Hamnet™ networks. However, that trend toward independence by EMOs will only continue, perhaps further obviating the need for and the value of volunteer hams.

The globalization of commerce has meant that the domestic interests that seek to lease our spectrum now have their counterparts abroad, or have themselves expanded out into the world with influence in the capitals of other ITU signatories, and we can expect growing pressure on governments to move to at least a curtailed amateur endowment in exchange for large and continuing revenue streams by lessees as amateur activities become (or are perceived to be) less and less valuable. Certainly a successful program such as I have sketched will support our relevance in the public mind, especially as interplanetary communications become endemic. The topic of the growth of amateur radio into an interplanetary role is properly the subject of another paper, but it must be mentioned that the boots on the ground will belong to agents of governments, national militaries, and global commercial interests, and few will be the partisans of amateur radio (except by the accident of random astronauts having privately acquired their amateur licenses). So use and custom and the resulting laws governing activities "out there" will most likely *not* respect our hobby in practice, without the psychological influence of an existing and growing interest and vigorous interplanetary activity by Earth-based amateurs.

NOTES

1. RandomKid, continued; "We provide services that make it possible for students to:

- **Position themselves as a project CEO** by providing them with free support staff and services, including:
    - Consultation for concept/project development for any cause that inspires them
    - Product development (yes, you can brand your own products)
    - Seed funds to jump start projects/products
    - Web pages (with your own thermometer and online donation link)
    - Ability to safely unify your efforts with other like-minded youth
    - 501C3 umbrella coverage
    - Media and public relations
    - Telephone conferencing
    - Free web conferencing
    - Event planning
    - Financial administration
    - Funding for your schools/youth groups (you designate % of proceeds)

- **Build leadership skills** by being engaged in the process and mobilizing their community

- **Circulate their ideas** so other students can easily join in and replicate their project, nationally and/or internationally.

- **Unify their project with other youth** and youth groups to increase their 'voice', financial power and impact

- **Establish networks** with students from varied backgrounds in order to bring diversity to their planning process and experience

- **Gain entrepreneurial skills** by designing, manufacturing and selling their own products, original art works and music to support their causes (when requested)

- **Experience their impact** by connecting with the recipients of their efforts in a way that is empowering to all

- **Hone the skills** to successfully complete future philanthropic desires independently of RandomKid."

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AUTHOR'S BIOGRAPHY

James Popoff holds a Ph.D. in Population Geography and Spatial Interaction Modeling that uses statistical thermodynamics to model human location decisions. An experienced applied mathematician and statistician, with a career spent working in commercial site-selection, and in online customer segmentation, as well as teaching, he is a seasoned mentor to his colleagues and students. He also brings 25 years' experience as a radio amateur (a ham radio operator and amateur electronics technician), and holds the highest level of license granted in the U.S.A. With respect to gifted education, he also has had experience across several funding epochs, starting with the 1980s, when he was an active gifted-ed parent. Over many years he has had conversations with other parents and teachers, did his time as a classroom assistant and, more recently, served as a sometime substitute teacher in gifted-ed classes. His first book, "The Young Amateur's Guide To Radio Physics" was published in 2013 in its first volume, and now has three volumes in print at the self-publishing website lulu.com, with Volume Four presently in final editing, and with a planned final production of eight volumes in some 2000 pages. This is the guide for readers to pass the FCC license exam, construct their own software-defined radio transceiver and equip a station, and master the mathematics and physics to participate *credibly* as scientists-in-telepresence with the formal Mars mission explorers.

Ralph Waldo Emerson (1803-82) and Lessons for Gifted Students

Michael E. Walters

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There are many lessons that gifted students can learn from studying the life of Emerson. One of the major lessons is to return to the craft of writing essays. For many students the activity of writing an essay is very limited. This is due to their dysfunctional interactions with electronic media–for example, text messages that do not deal with complete thoughts. Emerson was greatly influenced by the French essayist, Michel de Montaigne, who perceived the *essai* as an experiment in social thought. Another lesson that gifted students can learn from Emerson is the significance of taking walks. He saw walks as his laboratory into the study of nature. A good example of this is an essay he wrote on Henry David Thoreau who describes the beauties of a clam shell. When he opened the clam shell, he noticed the coloring was like a rainbow. It was a marvel to understand that this clam buried in the sand had the same colors as the sky. The main lesson that gifted students can learn from studying Emerson and his works is how he combines format and content.

Many of Emerson's essays were written in an aphoristic form. He realized that aphoristic thought was composed of using both metaphors and allegory. This insight can be found in his essay on Shakespeare which is in his collection, ***Representative Men*** (1850). Many wise individuals have said that the greatest treasures are right in front of us, buried in our own back yard. Ralph Waldo Emerson is one of the greatest treasures in American culture.

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