

**A SURVEY OF PRESERVICE TEACHERS IN REGARDS TO THEIR
ATTITUDES AND PERCEPTIONS OF SCIENCE FICTION LITERATURE
AND ITS USE IN THE CLASSROOM**

by

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for the Honors in the Major Program in Elementary Education
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Abstract

In 1957 at the University of Chicago, Robert Heinlein asserted that through science fiction humanity can wonder upon important questions without causing harm to the real world.

Through such speculative experiments science fiction can warn against dangerous solutions, urge toward better solutions. Science fiction joyously tackles the real and pressing problems of our race, wrestles with them, never ignores them—problems which other forms of fiction cannot challenge. For this reason I assert that science fiction is the most realistic, the most serious, the most significant, the most sane and healthy and human fiction being published today. (Davenport, 1959).

Preservice teachers enrolled in the education program at a large metropolitan university were surveyed to determine if they had preconceived notions about science fiction, if they would use science fiction within their classrooms and if science fiction would be available to the students in their classrooms. Also explored was if these future educators believed science fiction was too complex for English language learners and students with exceptionalities. Analysis of this survey revealed that although most preservice teachers believe science fiction literature has value within the classroom and they planned to use it at least part of the time, about one in five believed the concepts and themes were too complex for English language learners and students with exceptionalities. The researcher of this study hopes the information contained in this study can help educators encourage students to read science fiction as well as provide the educators with a resource of science fiction literature book titles which are grade level and ability level appropriate for their students.

Dedications

To my parents, Karen and Roy Sammons, for always believing I could do whatever I set my mind to. You lit the fire of learning inside of me and I could never adequately thank you for it. I love you both.

To my family, who put up with the long nights, take-out dinners and constant deliveries from Amazon. Your love has meant the world to me and I would have never been able to succeed without your support.

To my son Jackson, one day our science fiction will become science fact. Oh, to have a conversation with you, just once.

Acknowledgements

To Dr. Elizabeth Hoffman, my committee chair, without your knowledge, guidance and encouragement this project would have not been possible. Thank you for reminding me that as Dr. Seuss once said “Sometimes the questions are complicated and the answers are simple.”

Thank you to my honors thesis committee. Dr. Cheryl Van de Mark who showed me that the mysteries of the universe can be solved with a couple of 2 liter soda bottles, a mathematical equation and a hot glue gun. Dr. Caroline Pratt-Marrett who lives and teaches one of the tenets of Science Fiction everyday: with imagination and hard work, you can change an exceptional student’s possibilities into probabilities. Dr. Sherron Killingsworth Roberts: the believer, the cheerleader, because everyone should get emails that end with smiley faces.

Thank you the dedicated staff at the Burnett Honors College for your assistance, patience and belief, that everyone has something important to say.

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Chapter One: Introduction

When Jules Verne wrote about the electric powered Nautilus journeying *20,000 Leagues Under the Sea* in 1870, the fantastical idea that a vast boat could explore the depths of the oceans and reveal its secrets was not only a masterpiece of science fiction, but a prophetic glimpse into the future. Today, a vessel with a human occupant has explored the Mariana Trench, the deepest part of the ocean. In addition, electric powered cars are commonplace, the Human Genome Project has mapped human genes, robotic exoskeletons exist which help persons with profound spinal cord injuries walk again, Cochlear implants have been created which allow those with hearing impairments to hear again and most recently eye implants have restored vision to two men who were once blind. These are only a few examples of ideas that were once thought of, and written about as science fiction, but have been transformed into science fact.

Rationale

In the summer of 1977, my parents took me and my sisters to the drive-in to see *Star Wars Episode IV: A New Hope*. I marveled, as a child would, at the space ships, laser pistols, alien species and droids that inhabited that galaxy far, far away. But, my imaginings did not stop there. For the first time in my short life, I began to envision what our world would be like with cars that floated on air, robots to do daily menial tasks and visitors from other planets. If it had not been for that hot, humid, August night, my love for science and science fiction might not have ignited.

As I grew up and attended school, I would devour any and all science fiction books made available to me. Sadly, though, the selection of quality science fiction books was thin or downright non-existent in most of my classroom libraries and school libraries. Now that I am an

adult and a preservice teacher, one of the first things I do when I enter a classroom for observation and now, internship, is look at the science fiction literature that is being offered in the classroom libraries. Unfortunately, the selection is as thin as when I was a child. It was then that I started to wonder *why?*

I feel that teacher attitudes and perceptions about science fiction literature need to be explored to better understand how, and if, these attitudes and perceptions will impact the availability and use of science fiction literature in their classrooms. In light of this, the purpose of this study is to examine the preconceived perceptions, attitudes and use of science fiction literature in the classroom by preservice teachers enrolled in the education program at a large metropolitan university. Furthermore, this study examines how the teachers' preconceptions and attitudes of science fiction literature might impact the future educator's use of science fiction literature within their curriculum.

When discussing classroom libraries, research suggests that "it makes sense that children who have access to quality literature will be highly motivated readers and discerning writers. A good book inspires wonder, curiosity, deep thinking, emotional involvement..." (McGee & Richgels, 1996, p. 177). The fantasy/science fiction genre is often referred to as the genre which "sparks the imaginations" of students so it seems to be a perfect fit for the wonder, curiosity, deep thinking and emotional involvement to which McGee and Richgels refer. It is the genre which asks its readers to put aside their pre-conceived notions and expand their beliefs of what is possible to include the impossible. "Science fiction is a form of imaginative literature that provides a picture of something that could happen based on real scientific facts and principles" (Lynch-Brown & Tomlinson, 2011, p. 139).

Chapter Two: Review of the Literature

The History of Science Fiction as a Genre and Its Use in the Classroom

This chapter will focus on a review of related research surrounding the topic of science fiction literature. It will explore the origins of the science fiction genre, what the changes to Florida's educational standards means to literature choices, what quality children's literature is and finally specific research related to using science fiction in the classroom.

First, the actual origin of science fiction as a genre is a subject that many scholars are still unable to agree upon. However, whether its beginnings were within the pages of the Sumarian *Epic of Gilgamesh's* (trans. 1984) quest for immortality or *Ramayana's* (Valmiki, trans. 1968) flying machines or even Mary Shelley's (1818) *Frankenstein*, there can be little argument that the Scientific Revolution, the period of time between Copernicus' realization that the sun was the center of our solar system and Newton's theory of gravity (Hatch, 2002), and Industrialization, America's and Europe's transformation from an agrarian centered society to one of industry, catapulted the genre to the forefront. And through the writings of H.G. Wells' *Time Machine* (1895) and *The War of the Worlds* (1898) and Jules Verne's *Journey to the Center of the Earth* (1864) and *From The Earth to the Moon* (1865), the modern science fiction genre was formed. To further cement science fiction as a viable literary genre, the Hugo Awards were established in 1955 to honor excellence in the fields of science fiction and fantasy worldwide. Further, in 1966, the Nebula Awards were established to recognize works of science fiction published in the United States. Both are considered the premiere awards in the science fiction genre and include winning authors such as Isaac Asimov, Orson Scott Card and Frank Herbert.

With the implementation of the Common Core State Standards (National Governors Association Center for Best Practices [NGA Center] & Council of Chief State School Officers [CCSSO], 2010) and the inclusion of more nonfiction informational text than previous standards, it is increasingly important that the fictional choices presented to students represent a wide variety of quality literature in an array of genres.

Quality in writing has to do with originality and importance of ideas, imaginative use of language, and beauty of literary and artistic style that enable a work to remain fresh, interesting, and meaningful for many years. The best children's books offer readers enjoyment as well as memorable characters and situations and valuable insights into the human condition. These books have permanent value. (Lynch-Brown & Tomlinson, 2011, p. 5)

As purveyors of ideas which are supposed to challenge students' thinking and force students to contemplate "What if..." educators are tasked with tapping into the creative, artistic and scientific minds of students. To serve as captains, if you will, of a time-travelling, galaxy-exploring classroom full of students that seek to push the limits of their own imaginations. The use of science fiction literature in the classroom as a tool to aid educators and students in this investigation seems like a logical literary choice.

In 1973, Hollister and Thompson wrote *Grokking the Future: Science Fiction in the Classroom* in an effort to promote the use of science fiction by educators as a means of "demonstrating how science fiction offers new insights into current social issues and ... to help students become more creative in their thinking about the future, thus increasing their options for tomorrow" (p. 6). This guide for teachers outlined not only how to integrate science fiction into

the curriculum, but how to use it as a means to explore many social issues students were interested in at the time, such as the environment, population control and social justice issues.

In 1999, Julie Czerdena, former educator turned author who is known for her work in developing scientific literacy, wrote a teacher's guide entitled *No Limits: Developing Scientific Literacy Using Science Fiction*. It was a collection of information, activities and worksheets, the purpose of which was to help teachers incorporate science fiction into their curriculum in a way that would promote and develop scientific literacy within their students. She states in her book that "when students read a good science fiction story, they are entertained. But as you guide them deeper into the science "what if" that lies beneath the story, they learn to explore scientific concepts with a critical eye, to see the importance of context and source, and to recognize potential issues" (Czerdena, 1999, p. 1).

Chapter Three: Purpose of the Study

As stated previously, the purpose of this study was to examine the preconceived perceptions, attitudes, and use of science fiction literature in the classroom by preservice teachers enrolled in the education program at a large metropolitan university. Furthermore, this study examined how the preservice teachers' preconceptions and attitudes of science fiction literature would impact the future educator's use of science fiction literature within their classroom.

After collecting and analyzing the data, determinations could be made in terms of how often a preservice teacher plans to incorporate science fiction literature in their curriculum in activities such as read alouds, literature circles, and/or guided reading. Also, this thesis would determine if this population of preservice teachers' attitudes about science fiction literature would influence whether science fiction literature will be available as a selection in their classroom libraries and literature circle choices.

As a result of this examination, this thesis offers teachers reading suggestions for the elementary school level from the science fiction genre, which follow the same criteria of quality literature as other genres. This list of recommendations provided take into account grade level and subject matter and also include selections that are specifically chosen to introduce the science fiction genre to English language learners and students with exceptionalities.

A consideration when choosing which literature to incorporate in the classroom, the goals of the state's Department of Education, the school district the school resides in and the goals of each individual school needs to be taken into account. These goals are normally aligned within

the educational standards chosen on the state level. The standards that impact Florida's schools are detailed in the next section.

Standards

Although many tout Benjamin Bloom and his concepts of higher-order thinking as the founder of the modern education standards-based reform movement, it was not until 1983 when *A Nation At Risk: The Imperative for Educational Reform* (U.S. Department of Education, 1983) was published did the movement really gain steam as lawmakers, educators and even parents, took a hard look at the state of the education system in America. In 1994, the *Goals 2000: Educate America Act* was passed by Congress. Its purpose, among other things, was to assist in "... the development and certification of high-quality, internationally competitive content and student performance standards" and stimulate "... the development and adoption of a voluntary national system of skill standards and certification to serve as a cornerstone of the national strategy to enhance workforce skills" (*The Goals 2000 Educate America Act*, 1994). Although The Goals 2000 Educate America Act was later replaced by No Child Left Behind in 2001, many of the ideas, such as high student expectations, access to technology and appropriate software, the integration of arts in the schools, and the need for parental involvement, were incorporated into the new Act.

Here in Florida, there have been three major standards and revisions adopted by the Florida Department of Education: The Sunshine State Standards in 1996, the Next Generation Sunshine State Standards (NGSSS) in 2007 and most recently in 2010, the Next Generation Sunshine State Standards (Common Core) – English Language Arts. The movement to the Common Core State Standards (CCSS) represents an acceptance of a national set of standards by

45 states across the country and the District of Columbia. However, it is important to note that only the standards are mandated, the school districts within the state of Florida still control the curriculum and materials that will be used to implement these standards.

The mission of the Common Core State Standards Initiative explains that “the Common Core State Standards provide a consistent, clear understanding of what students are expected to learn, so teachers and parents know what they need to do to help them” (NGA Center & CCSSO, 2010). The CCSS place emphasis on the development and use of critical thinking skills, and the use of literature to foster those skills. Within the anchor standards for reading, the terms integrate, evaluate and analyze, words easily associated with critical thinking, are used often (NGA Center & CCSSO, 2010). And so, as Czerdena points out in 2006, “Good science fiction is story, science, and speculation all wrapped up in a package custom-made for improving literacy and critical-thinking skills—it does not get more convenient” (p. 4). The marriage of literacy with critical thinking that students engage in while reading quality science fiction, it seems, is a clear illustration of the vision of the new Common Core State Standards.

In 2013, working in cooperation with the writers of the CCSS, the Next Generation Science Standards (NGSS) was introduced. These standards recognized that the ability of the CCSS and the NGSS to work together was crucial in order to increase student’s scientific literacy skills. For example, the Common Core College and Career Readiness Anchor Standards for Reading: Integration of Knowledge and Ideas number 8 states students should be able to “delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence” (NGA Center & CCSSO: English Language Arts, 2010, p.10). The NGSS ties this reading standard to science instruction

by connecting that “reading in science requires an appreciation of the norms and conventions of the discipline of science, including understanding the nature of evidence used, an attention to precision and detail, and the capacity to make and assess intricate arguments, synthesize complex information, and follow detailed procedures and accounts of events and concepts” (NGSS: Executive Summary: Appendix M, 2013, para. 1). In most science fiction literature, the reader is often asked to evaluate the scientific concepts, tie it to real world scientific probability and evaluate the validity of the argument, much like the CCSS and NGSS standards relating to scientific informational text. As with the CCSS, NGSS are guiding standards, not a dictation of materials and curriculum to be used to achieve those standards.

If clear connections were offered between science fiction literature and the CCSS, NGSS and NGSS, would teachers be more apt to include this literary genre in their lesson plans? The data collected by this study’s survey of elementary and middle school teachers hopes to answer that question.

The flexibility that is offered within the new CCSS and NGSS opens the door for inclusion of science fiction literature in today’s classroom. What this survey hoped to answer was “Will teachers walk through that open door, hand-in-hand, with their students?” The research methodology and the questions the researcher asked the preservice teachers that would help determine the answers to these important queries are detailed in the next section.

Chapter Four: Methodology

To determine the best means of collecting and recording data for this particular investigation, several methods were explored. The researcher and committee chair decided that a multiple choice survey would provide an accurate picture of the preservice teachers' preconceptions, as long as a reasonable range of answers was provided to the target population. When crafting the questions that were included in the survey, care was taken to insure the answers provided could create a clear picture, both positive and negative, without room for any bias on the part of the researcher.

There were two potential problems that the researcher and committee chair anticipated. Of the most concern was the possible lack of internet availability for some members of the target population and the potential for a smaller number of respondents than anticipated. To overcome these concerns, part of our decision to use an email delivery system for the survey link was based on the fact that it would be disseminated only to those students with internet/email access. It was also decided that Qualtrics would be used to create the survey, because it is available as an app on both Android and Apple products, and can be accessed using any Smartphone or tablet, thus expanding the group of possible respondents to those who do not have readily available access to a computer, but have other devices at their disposal.

To address the possible issue of a number of respondents being smaller than anticipated, the committee chair contacted the Executive Director of Undergraduate Affairs and Partnerships. The Executive Director agreed to email all teacher candidates enrolled in internship at a large metropolitan university in support of this research. This ensured the widest and most reliable distribution of the survey link to the targeted population of this research.

Timeline

The timeline for the research process was as follows:

- September, 2013 – Complete Proposal and gain Committee approval
- Early September, 2013 – Complete CITI training
- Early October, 2013 – Initiate Internal Review Board (IRB) review process
- Late October, 2013 – Receive IRB Approval
- Late October, 2013 – Submit Proposal to Honors College
- Early December, 2013 – Initiate Survey
- December, 2013 – Collect Survey Data
- Early January 2014 – Close Survey and Begin to Collate Data
- Early January, 2014 – Begin Thesis Writing
- Early December, 2013 – Submit Intent to Graduate to Honors College
- Late February, 2014 – Request Defense from Advisor
- Late March, 2014 – Submit Thesis for Initial Format Review
- Early April, 2014 – Complete Thesis Defense
- April 17, 2014 – Submit Approval Form and Thesis to Honors College
- April 18, 2014 – Final Thesis Submission

My research began by examining the book selections offered in my third grade internship classroom at a central Florida elementary school, as well as the three adjoining third grade classroom libraries. I then visited the Media Center at the school and examined the selection of science fiction literature.

I also searched the books the university library has available and the OneSearch tool provided by the university's online library to search articles, journals and books on the use of science fiction literature in the classroom and teachers' attitudes and perceptions about science fiction literature.

I spoke with my committee chair about my goals for this research project and the best ways to achieve those goals. We discussed the pros and cons of interviews and self-completing surveys. Research indicates that "interviews are more time consuming for the researcher and it may be the case that interviewer bias, where the interviewer influences the replies by revealing their own opinions, can be avoided by self-completion questionnaires" (Phellus, Bloch & Seale, 2012, p. 82). Therefore, we decided a survey would be a more appropriate approach to data collection.

The delivery of the survey was narrowed down to two possibilities: regular postal mail delivery of the survey and an online web based survey. According to the university's Institutional Knowledge Management Department, 1,973 seniors are in the university's education program. At the cost of \$.46 per standard envelope, with a total cost of \$907.58 and taking into consideration that "in a population in which each member has Web access, a Web survey application can achieve a comparable response rate to a questionnaire delivered by surface mail" (Kaplowitz, Hadlock and Levine, 2001, p. 100) we determined regular postal mail would be costly with little benefit.

Researching the effectiveness of online web based surveys, Don Dillman (2000), a researcher in the development of effective survey methods stated "there is no other method of collecting survey data that offers so much potential for so little cost" (p. 400). And because of

my need to access a unique population and the ease and convenience an online survey presents, my committee chair and I agreed that an online survey would be the most efficient and effective method to gather the data from the target population of this study needed to answer the questions posed in this project. The survey was composed by the researcher with guidance from the theisis chair created using Qualtrics, a program available through the university and can be found at the following weblink: https://ucfcd.qualtrics.com/SE/?SID=SV_7UkM1pD4ppB4g2p or see Appendix A for a list of survey questions.

Target Population of This Study

Since it is important to understand preservice teachers' preconceived attitudes and perceptions about the science fiction genre and how those preconceptions may impact their use of science fiction in the classroom, the target population for this study was preservice teachers attending a large metropolitan university.

The target population consisted of students in the undergraduate Elementary Education degree program currently taking either course EDE 3942, Internship I or EDE 4943, Internship II. The university has approximately 3, 847 undergraduates, with approximately 600 in the Elementary Education Bachelor's degree program.

Once the target population had been selected and the survey disseminated, the next step was to analyze the results. The first portion of this analysis included an examination of third, fourth and a combined fourth/fifth grade classroom libraries in an elementary school located in a central Florida school district as detailed in the next section.

Chapter Five: Results

Classroom Library Investigation Results

Before analyzing the data collected through the survey, the researcher thought it was important to investigate the science fiction offerings in typical elementary classrooms to get an idea of what might be available to students. So while completing my junior and senior internships at a Title I elementary school in the Osceola county, Florida public school system, I evaluated the libraries of four third grade classrooms, four fourth grade classrooms and a combined fourth/fifth grade classroom that is used specifically for students labeled as gifted. These classroom libraries contained between 300 and 500 titles from a vast selection of genres. Unfortunately, typically between only ten and twenty science fiction selections were available, including all science fiction sub-genres. Of the books available, several of them, including titles such as *The Hunger Game* series (Collins, 2008) and *The City of Ember* (DuPrau, 2003) are of the sub-genre called dystopia, which takes a futuristic, yet darker and usually post-apocalyptic view of the world. Also available in many of the libraries were books considered part of the popular science fiction sub-genre known as steampunk, which is a mix of fantastical clockwork devices, alternative history and typically set in Victorian England or turn-of-the-century-post-industrial-revolution America. These books such as *The Golden Compass*, part of the *His Dark Materials* series, (Pullman, 1995) have been popularized by major motion pictures; therefore, they have found their way onto the shelves of classroom libraries. Unfortunately, most often the selection of science fiction was generally limited to those books that have transitioned from paper to film. Only the fourth/fifth grade combined gifted classroom had selections that would

be considered classic science fiction, but even those were limited to Jules Verne's *20,000 Leagues Under the Sea*, and *The Time Machine* and Mary Shelley's *Frankenstein*. I spoke at length to each of the 9 teachers about their classroom libraries. They all stated that their goal in creating their classroom library was to offer a variety of reading choices to the students, keeping in mind educational goals, student interest and student reading level. When I asked specifically about the lack of science fiction literature in their classroom libraries, all but one of them admitted that they did not focus on science fiction as a literary genre because of their perception that the science fiction genre lacked enough grade level appropriate books. The one teacher whom I spoke with said she actively looks for science fiction books to add to her library stating that many of the offerings have situations, concepts and vocabulary that is too complex for most of her students, so she focuses on choosing books to add to her classroom library that are good fit books for most of her students. They all agreed that if a student specifically asked for a science fiction book and it was not available in the media center, they would add that book to their classroom library.

Survey Results

Of the 70 participants responding to the online survey, 10 chose not to accept the conditions of the Informed Consent at which time their survey was concluded. The remaining 60 respondents were made up of 6 males, 50 females and 4 who chose not to identify their gender. When analyzing the remaining data, the researcher divided the questions into groups that provided specific, related data regarding personal attitudes, professional attitudes, use in specific classroom activities, and use by students who are labeled either English language learners or

students with exceptionalities. A few questions did not fall into any of these groups, so they are analyzed individually.

The analysis groups are: Personal Attitudes Analysis, Professional Attitudes Analysis, Classroom Activity Use Analysis, Use by English Language Learners and Students with Exceptionalities Analysis, Connections to CCSS, NGSSS and NGSS Analysis, Science Fiction Value Analysis, Science Fiction Availability Analysis, and Personal Knowledge Analysis. As stated before, the questions were created by the researcher and the respondents were given an opportunity to comment at the end of the survey. A breakdown of each analysis group follows in the next section.

Personal Attitudes Analysis.

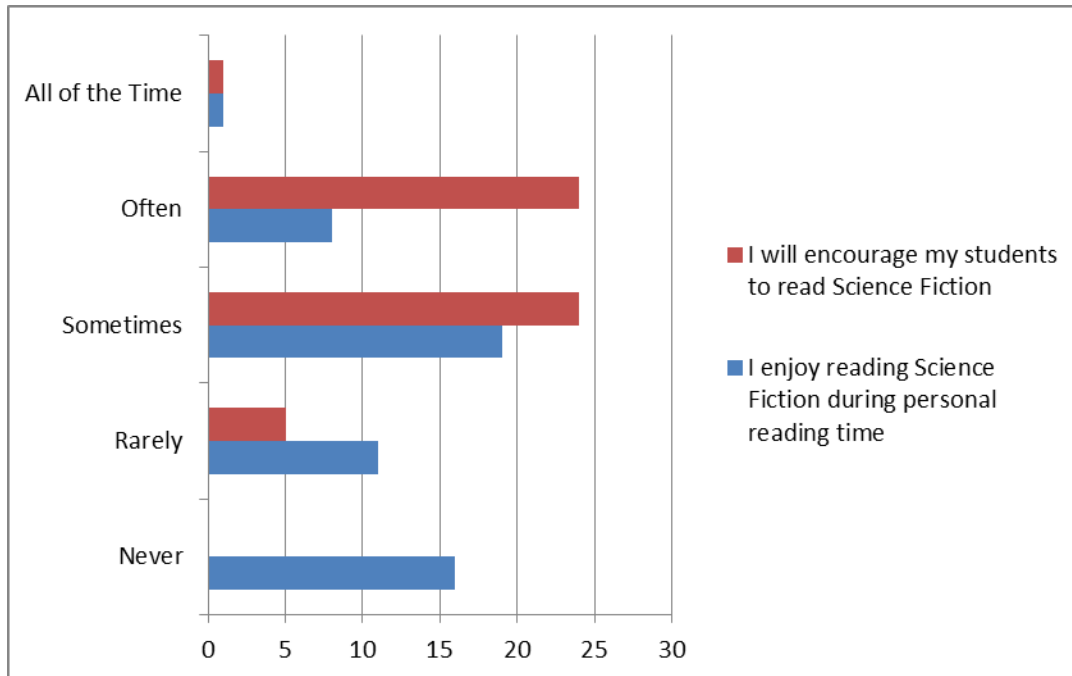


Figure 1. Personal Attitudes. This figure illustrates the respondent's personal attitude towards science fiction and their plans to encourage their students to read science fiction.

Questions 3 and 4 inquired about the preservice teacher's personal enjoyment of science fiction literature and their plans to encourage their students to read science fiction literature. The results show that although only 9 of the 55 respondents, or 16%, read science fiction "Often" or "All the Time". A majority of the preservice teachers would encourage their students to read science fiction literature at least some of the time. Of the 54 responses, 49 (91 %), indicated they would encourage their students to read science fiction literature "Sometimes", "Often" or "All of the Time".

Professional Attitude Analysis.

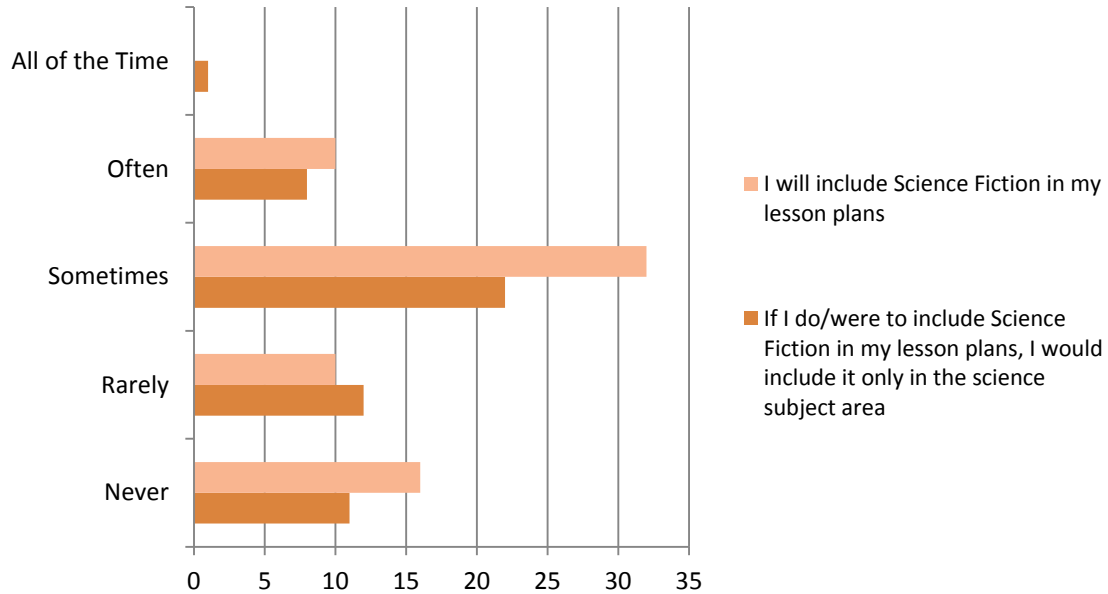


Figure 2. Professional Attitudes. This figure illustrates the respondent's professional attitude towards science fiction and the inclusion of science fiction literature in their future lesson plans.

These questions were designed to evaluate the preservice teachers' intention to include science fiction literature in their lesson plans and specifically, if they plan to use science fiction outside of the science subject area. Of the 55 respondents, 42 (76%), indicated that they would include science fiction literature in their lesson plans. Furthermore, 45 of the 54 respondents (83%) indicated they would use science fiction literature in subject areas other than just science.

Classroom Activity Use Analysis.

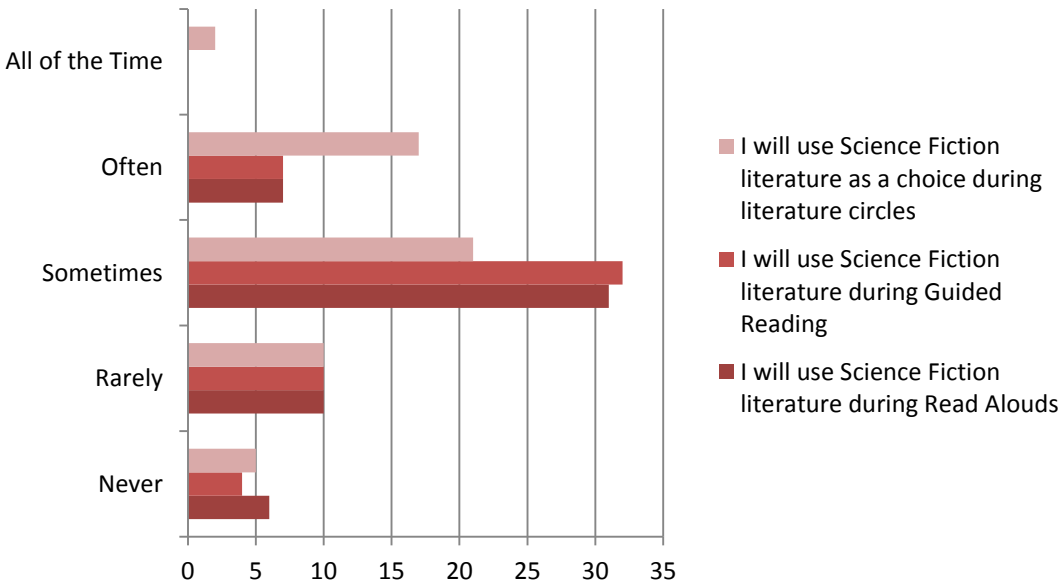


Figure 3. Classroom Activity Use. This figure illustrates the respondent’s planned use of science fiction literature in specific classroom activities.

The questions in this group were analyzed based on the preservice teachers’ plans to incorporate science fiction literature in specific best practices classroom reading activities. Respondents indicated that in all three activities: literature circles, guided reading, and read alouds, science fiction literature would be included at least some of the time. Specifically, literature circle choices would include science fiction literature “Sometimes”, “Often” or “All of the Time” in 40 of the 55 responses, or 73%. During guided reading, 39 of the 53 preservice teachers, (74%), plan to include science fiction literature selections “Sometimes”, “Often” or “All of the Time”. Finally, 39 out of 54 respondents, or 72%, indicated that literature choices during read alouds would include science fiction “Sometimes”, “Often” or “All of the Time”.

Use by English Language Learners and Students With Exceptionalities Analysis.

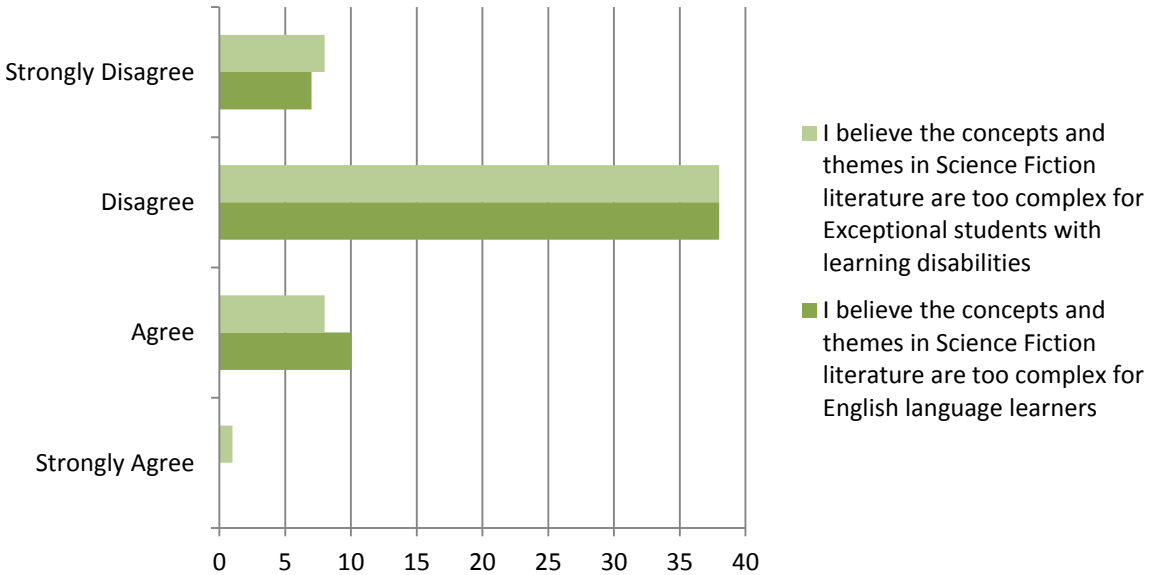


Figure 4. Use by ELL and ESE students. This figure illustrates the respondent’s perception about the concepts and themes in science fiction literature and their beliefs of ELL and ESE students’ ability to understand those concepts and themes.

These two questions were designed to evaluate preservice teachers’ beliefs about whether the content of science fiction literature would be too complex for English language learners and students with exceptionalities. Most of the responding preservice teachers, 84%, or 46 out of the 55, “Disagree” or “Strongly Disagree” that students with exceptionalities would find the concepts and themes of science fiction literature too complex. Also, 82%, or 45 of the 55 respondents “Disagree” or “Strongly Disagree” that the concepts and themes in science fiction literature would be too complex for English language learners.

Connections to CCSS, NGSSS and NGSS Analysis.

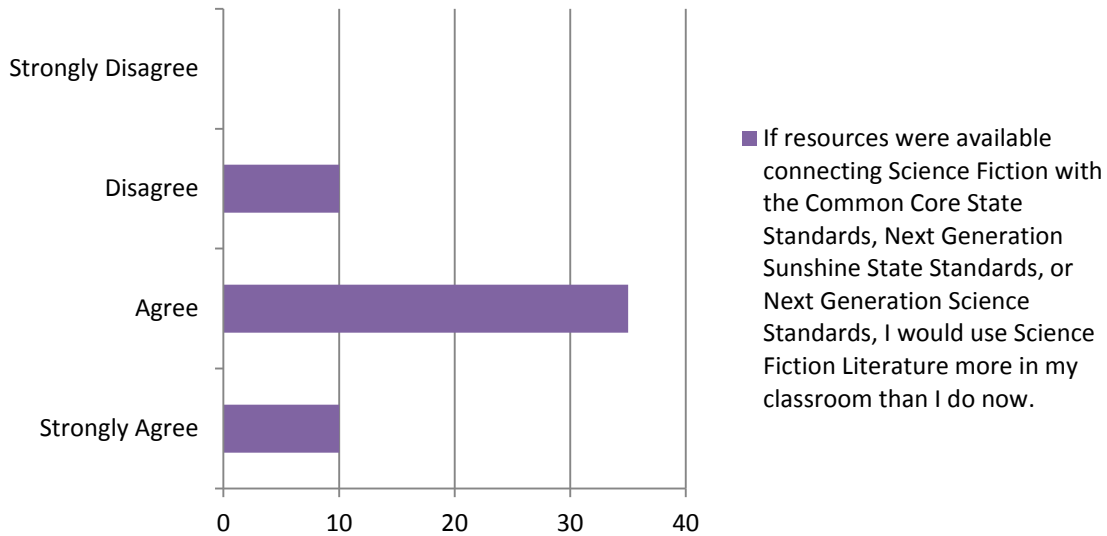


Figure 5. Connections to CCSS, NGSSS and NGSS. This figure illustrates the respondent’s willingness to use science fiction literature in their classroom if it is connected to either the Common Core State Standards, the Next Generation Sunshine State Standards or the Next Generation Science Standards.

This question was intended to probe the preservice teachers’ willingness to include science fiction literature in their lesson plans if resources were made available to them that could connect science fiction with the Common Core State Standards, Next Generation Sunshine State Standards or Next Generation Science Standards. Responding preservice teachers, 45 of the 55 (82%), either “Agree” or “Strongly Agree” that if these resources were available to them, they would include science fiction literature in their lesson plans.

Science Fiction Value Analysis.

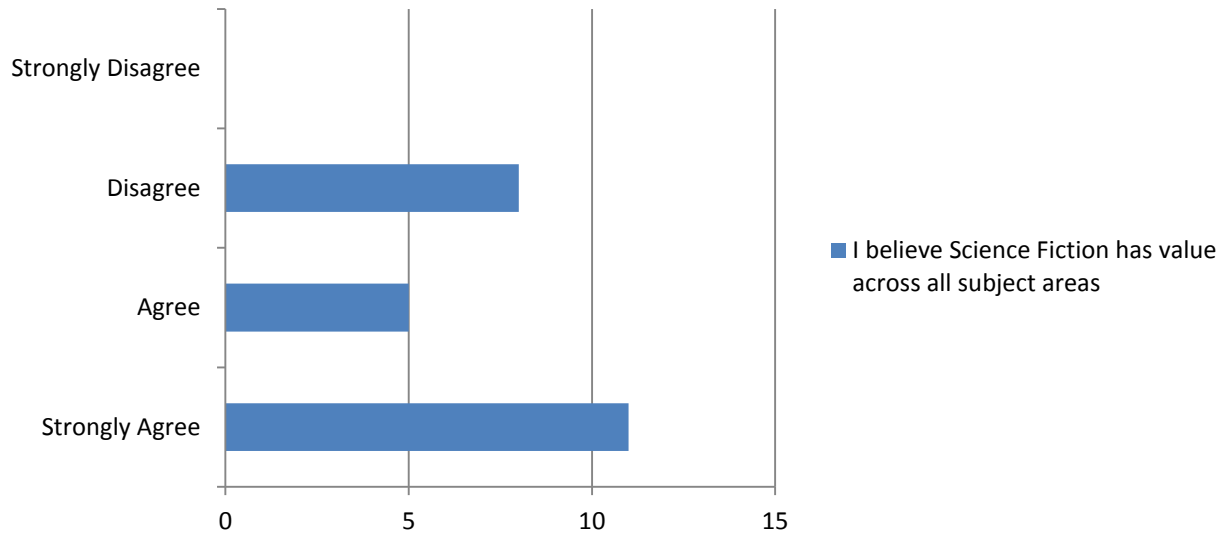


Figure 6. Science Fiction Value. This figure illustrates how strongly the respondents feel about the value of science fiction literature across all subject areas.

When asked if the respondents believed that science fiction literature has value across all subject areas, 46 out of 54 (85%) “Agree” or “Strongly Agree” that it does.

Science Fiction Availability Analysis.

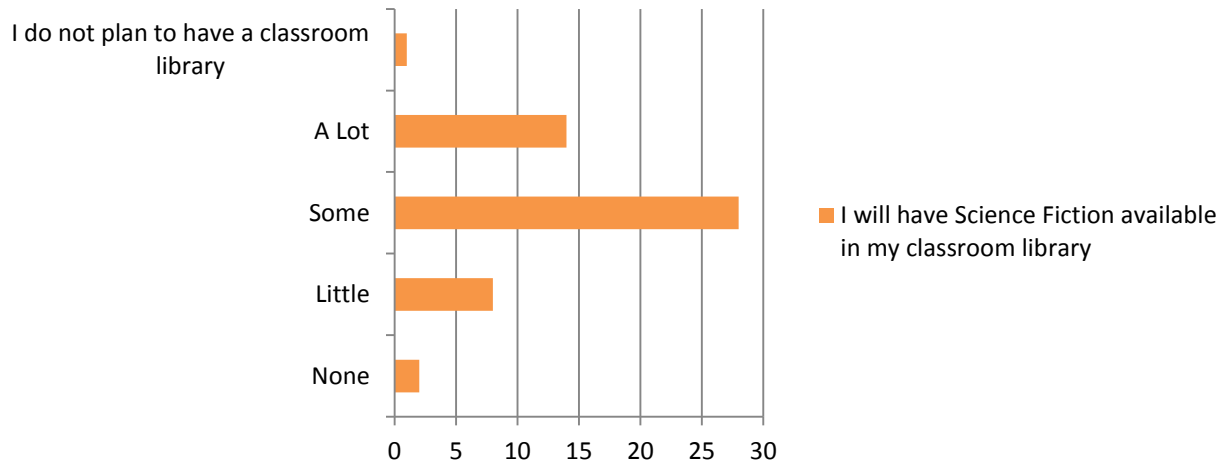


Figure 7. Science Fiction Availability. This figure illustrates the respondents' plans to include science fiction literature into their classroom libraries and to what extent.

“Some” or “A Lot” of science fiction literature would be available in the preservice teachers’ classroom library as indicated by 42 out of the 53 respondents (79%).

Personal Knowledge Analysis.

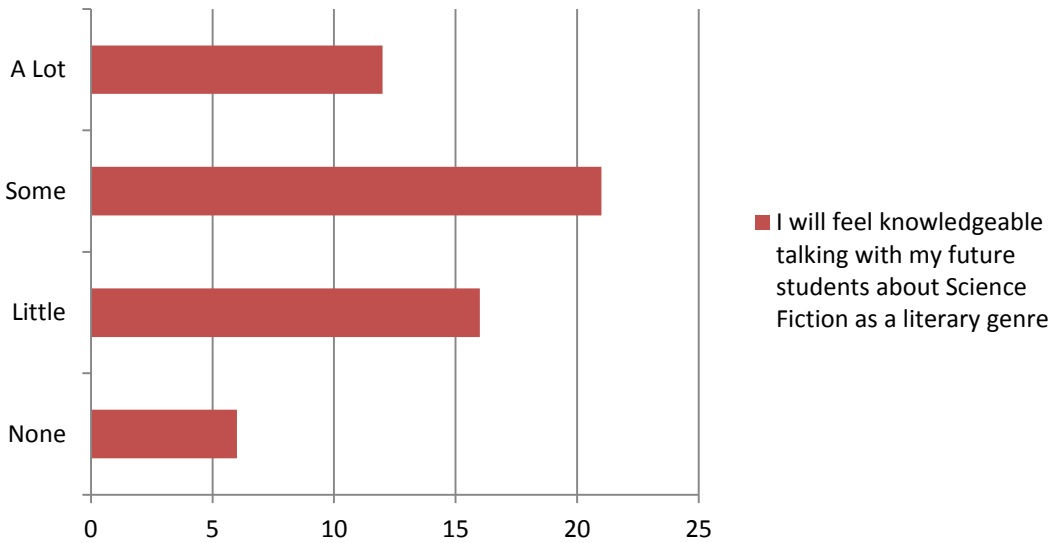


Figure 8. Personal Knowledge Analysis. This figure illustrates the respondent's level of comfort when discussing the science fiction literary genres with their future students.

Finally, preservice teachers were asked if they felt knowledgeable talking about science fiction literature as a literary genre with their future students. A majority, 33 out of the 55 respondents, (60%), indicated they felt they had "Some" or "A lot" of knowledge regarding science fiction literature that they would share with their class.

Comments added by Survey Participants:

- Secondary social studies education. Can't see having time to meet with a research student.

Sorry

- I believe it is important to expose my students to all forms of literature.
- As a mathematics teacher, I see little potential in using science fiction in my classes.

Chapter Six: Conclusions and Future Research

Conclusions

Based on the results of the survey, I am encouraged by the responses of my fellow preservice teachers. Admittedly, as I was exploring the respondents' preconceived notions of science fiction literature, I had to set aside my own preconceived notions of what I expected the results to be based on my own experiences in elementary, middle and high school. The results overwhelmingly indicated that most preservice teachers approached all literature with an open mind and were accepting of all genres, even if it was a genre they themselves did not particularly enjoy reading on a personal level. The results also clearly show the preservice teachers surveyed would encourage their students to read science fiction literature and include them as selections in read alouds, guided reading activities, and/or literature circles. Most also indicated that science fiction would have a prominent place in their classroom libraries, right next to the fantasy, realistic fiction and picture books. Again, I found this very encouraging.

A question that does need to be raised however is the possibility of acquiescence bias, or "the general tendency of a person to provide affirmative answers to items of a questionnaire, regardless of the content of the items" (Messick, 1966). In this case, preservice teachers giving the expected "teacher answer" instead of relaying their true personal feelings. In order to address this potential issue, it is recommended that future research which is based on personal opinions be asked in a manner of equally positive and negative questions, instead of only positively worded questions that were used in this study. For example, instead of stating "I will have science fiction literature in my classroom", state "I will not have science fiction literature in my

classroom.” By making this small change, it helps to eliminate possible acquiescence bias in future research studies.

The survey questions that seemed to be a cause of concern for me as an educator were the responses to the questions regarding the preservice teachers’ beliefs that science fiction literature’s concepts and themes may be too complex for English language learners and students with exceptionalities. Educators should always have high expectations for their students, even students who struggle with the English language or may have learning disabilities. That almost 20% of the respondents “Agree” or “Strongly Agree” that ELL students and students with exceptionalities would not be able to grasp the concept of science fiction literature indicate that there are some teachers who may not hold all students to the same levels of high standards as their peers. I believe investigation into the cause of this sentiment as well as how to address this misconception would be beneficial to the ELL and ESE student populations.

Many research based best practice interventions for students with exceptionalities can be used to assist in teaching English language learners, and vice versa. The same can be said for literature choices because often times books that are appropriate for students with exceptionalities will have language that is more straightforward and precise, making them also excellent choices for English language learners. Although literature choices in science fiction, especially at the kindergarten through third grade levels, can be limited, still quite a few superb science fiction genre picture books are available. *A Cat’s Steampunk Alphabet* by G.D Falksen and Evelyn Kriete (Falksen & Kriete, 2012) and *Her Majesty’s Explorer: A Steampunk Bedtime Story* by Emilie Bush (Bush, 2012) are both outstanding examples of children’s literature in the steampunk science fiction subgenre that contain easy to understand themes, engaging characters

and brilliant illustrations; all essential elements of appropriate literature choices for ESE and ELL students alike.

Another point which I think is extremely important to make and should be addressed, is that many science fiction books, especially the classics, have been translated into languages from across the globe, making them accessible to students who, although may have limited English language skills, may be fluent readers in their first language. This is also true for some of the science fiction books which are enjoying a level of popularity right now. *Divergence* by Veronica Roth (2011) and *The Maze Runner* series by James Dashner (2009) are both available in over fifteen languages.

To assist educators in making science fiction more available to all students, I have compiled a list of science fiction books that are appropriate for students in the elementary grades (see Appendix B), English language learners (see Appendix C) and students with exceptionalities (see Appendix D) in hopes that teachers can use these resources to encourage all of their students, not just fluent English speakers and regular education students, to explore all genres of literature and to find a connection to literature that perhaps they might not have otherwise. Each of the books on this list follows the same criteria of quality literature as other genres.

Future Research

Future research that I would like to pursue would start with surveying preservice teachers who have transitioned into full time teaching positions and have been teaching for two or three years to see if their attitudes regarding science fiction literature have changed, or if they have been able to include science fiction literature into their lessons as they had indicated. This would, of course, be difficult since the survey was anonymous, but I believe would still be of

value if the target population were any sampling of teachers who have been teaching two or three years.

Because of my minor in exceptional education and interest in providing students with exceptionalities as many educational opportunities as possible, I believe further research into why a portion of the preservice teacher population concluded that ELL and ESE students would not be able to grasp the concepts of science fiction literature would be beneficial to the teaching profession, whether it is a personal belief, or a belief based on the lack of knowledge of book choices available in the science fiction literary genre. And to expand further on that research, explore what can be done to change these preconceptions, either through training at the college level, or making available to teachers science fiction literature reading lists specifically designed for ELL and ESE students.

Another direction future research could take, would be to explore the interest level in science fiction literature in the Science, Technology, Engineering and Mathematics (STEM) fields, by surveying students enrolled in the STEM programs at a major metropolitan university. Possible questions this survey could include are if the student presently reads science fiction, how often they read science fiction, when they became interested in science fiction, and if science fiction impacted their decision to pursue a career in the STEM field. Expanding on this, specific under-represented populations, such as women and minorities, could be targeted to explore the impact science fiction literature may or may not have had on their decision to enter a STEM career field. I believe any information that may possibly help educators to nurture student interest in pursuing a career in a STEM field needs to be explored.

Educational Implications

Classroom.

In 1957 at the University of Chicago, Robert Heinlein, often referred to as the Dean of Science Fiction, asserted that through science fiction humanity can wonder upon important questions without causing harm to the real world.

Through such speculative experiments science fiction can warn against dangerous solutions, urge toward better solutions. Science fiction joyously tackles the real and pressing problems of our race, wrestles with them, never ignores them—problems which other forms of fiction cannot challenge. For this reason I assert that science fiction is the most realistic, the most serious, the most significant, the most sane and healthy and human fiction being published today. (Davenport, 1959, p. 44-45)

As the demand increases for educators to challenge students with higher order thinking questions and complex scenarios which force students to question the world around them, teachers need access to tools that will assist them in encouraging these types of responses from students. In order to bridge the gap between fact, thoughts and dreams, science fiction literature can be used to segue into discussions which ask the students to set aside their personal judgments and engage in conversations that ask, “What if...?” The applications in the classroom for science fiction literature are limited only by the imaginations of the educators using it.

In the book *Alistair and the Alien Invasion* by Marilyn Sadler (1994), readers are introduced to a young man named Alistair who is described as being “a most unusual boy. There was no one else quite like him” (Sadler, 1994, p 2). He is extremely bright and has been winning

science fairs since he was five years old. As the story progresses and Alistair realizes Earth is being invaded by aliens, he uses an invisibility potion he created and decides to spy on them. When he is discovered, the aliens decide Alistair is much more interesting than the plants they are investigating and decide to follow him around and learn about him. Finally, when the aliens are in their spaceship leaving Earth, they remove their helmets and reveal that they all look exactly like Alistair. So, even though Alistair may believe that he is different or odd, there are a lot more like him in the universe than he realizes.

As detailed in *Alistair and the Alien Invasion*, many students who see themselves as different, or termed a “nerd” by other students, can relate to Alistair’s quirky behavior and perhaps see themselves in him. Students who are coping with feelings of isolation can relate to Alistair, while at the same time discovering that Alistair is, in fact, not alone in the universe. This book covers many of the emotional struggles students with exceptionalities and students from diverse backgrounds face and can help them to realize that they are not that different from their peers and it is their uniqueness that makes them special.

Reading this book during a read aloud presents an opportunity for the teacher to introduce the concepts of individuality and uniqueness. This provides an opening for a classroom discussion about what makes each student special and nurtures an environment of inclusion, especially for students with exceptionalities, English language learners, and learners from other countries. Questions such as “What is the author trying to tell us about Alistair? About ourselves?” and “Which traits in Alistair can you identify in yourself? Why did you pick those traits?” will challenge students to dig deeper into the meanings of the text, while allowing them to explore how they see themselves or how they believe others see them.

Science fiction literature, or as Robert Heinlein preferred to call it “realistic speculation about possible future events,” (Davenport, 1959, p. 22) can help students envision not just the future, but how their thoughts, ideas and dreams can shape that future. Imagination is a uniquely human quality that grows, expands and pushes the limits of the mind every time it is used. Students, regardless of their ability level or mastery of the English language, should be introduced to science fiction through various classroom activities in order to stimulate and exercise this important aspect of the human psyche. Every teacher wants a Picasso, or Mozart, in their classroom, but they should also keep their eyes out for the next Stephen Hawking or Albert Einstein as well. Introducing students to science fiction literature may just be that catalyst that the next great engineer or scientist needs to spark their imagination and set them upon a path that could change the world.

Faculty Considerations.

The most basic suggestion that the researcher can give to educators of elementary and secondary students, is to read: often and across many genres, especially those genres that may not be of particular interest to them personally. As research-based, best practices move to the forefront of education accompanied with the importance of connecting student interest with instruction, it is vital educators become familiar with what their students are reading. As this study showed, only 16% of those surveyed reported reading science fiction “Often” or “All of the Time.” The question then has to be asked, “Is there an impact to student learning when a teacher is excited and knowledgeable about a book they recommend?”

The United Kingdom Literacy Association (UKLA) project *Teachers as Readers: Building Communities of Readers* encouraged the teachers in their study to read books outside of

their comfort zone, in order to include a wider variety of children's literature in their classroom. What the researchers found was that as the teachers took a chance with their own reading, the teachers observed the same behavior in their students. This gave way to fostering a sense of reading community within the classroom as the teachers and the students shared reading recommendations with each other, prompting discussions about the books and their new-found favorite authors. "The teachers not only sought to find out what children read at home, but also let the young readers lead them into new textual territories that further broadened their repertoires and prompted them to widen the materials available in school" (Cremin, Mottram, Collins, Powell, & Safford, 2009).

The goal of every educator is student success, but that success has to start with tailoring instruction to meet not just the needs of students, but student interest as well. Teachers need to be reminded, and often, that the purpose of reading is to gain knowledge, create meaning and often times for students, to help them make sense of a sometimes chaotic world they find themselves in. Furthermore, the purpose of teaching reading is not to systematically teach students a set of skills that will help them be successful on state assessments, but to foster in students a lifelong love of reading by helping them embrace not just what they read, but why they read.

Appendix A: Survey Questions

Appendix A: Survey Questions

1. Informed Consent (Yes/No)
2. Gender (M, F)
3. I enjoy reading science fiction during personal reading time (Never, Rarely, Sometimes, Often)
4. I will encourage my students to read science fiction (Never, Rarely, Sometimes, Often)
5. I will include science fiction in my lesson plans (Never, Rarely, Sometimes, Often)
6. I will use science fiction literature during read alouds (Never, Rarely, Sometimes, Often)
7. I will use science fiction literature during guided reading (Never, Rarely, Sometimes, Often)
8. I will use science fiction literature as a choice during literature circles (Never, Rarely, Sometimes, Often)
9. I feel knowledgeable talking with my students about science fiction as a literary genre (None, A Little, Some, A Lot)
10. I will have science fiction available in my classroom library (None, A little, Some, A Lot, I don't have a classroom library)
11. If I do/were to include science fiction in my lesson plans, I would include it only in the Science subject area (Never, Rarely, Sometimes, Often)
12. I believe science fiction literature has value across all subject areas (Agree, Somewhat Agree, Somewhat Disagree, Disagree)
13. If resources were available connecting science fiction literature with the Common Core State Standards, Next Generation Sunshine State Standards or Next Generation Science Standards, I would use science fiction literature more in my classroom than I do now (Never, Rarely, Sometimes, Often)
14. I believe the concepts and themes in Science Fiction literature are too complex for English language learners (Agree, Somewhat Agree, Somewhat Disagree, Disagree)
15. I believe the concepts and themes in Science Fiction literature are too complex for Exceptional students with learning disabilities (Agree, Somewhat Agree, Somewhat Disagree, Disagree)
16. Comments: Please include any other comments. Also please indicate if you would be willing to discuss your views about science fiction literature in the classroom with the researching student. (Long Comment Box to follow)

Appendix B: Science Fiction Literature Book List for the Elementary Grades

Appendix B: Science Fiction Literature Book List for the Elementary Grades

20,000 Leagues Under the Sea by Jules Verne. Suggested Grades: 4-8. AR Level: 4.9. Lexile: 1030L Format: Graphic Novel. Publisher: Saddleback.

Synopsis: A French professor and his two companions find themselves captives on the fantastical electric submarine, Nautilus, captained by the enigmatic Captain Nemo. Their adventures take them around the globe to places real, such as the ice caps of Antarctica and the corals of the Red Sea, as well as some fictional like the Lost City of Atlantis. Published in 1870, this story foreshadows inventions such as the submarine, under-sea diving suits and air powered weapons. This is a classic science fiction novel that has been translated into every known language in the world. This text can be used in the classroom to help students understand that literature is a record of the human experience, especially during times of great change, such as the Industrial Revolution of the late 19th century.

A Wrinkle in Time by Madeleine L'Engle. Suggested Grades: 5-8. AR Level: 4.7 Lexile: 740L Format: Chapter Book. Publisher: Scholastic Award: Newbery Medal Winner

Synopsis: Meg Murray is the daughter of two scientists who battles constantly with who she is, and blames herself for the troubles her family faces because of how different she is. The protagonist in this story is a girl who is flawed, awkward and above all else, believable. Meg's adventure through time, space and the 5th dimension, coupled with the immortal, quirky and sometimes downright strange people she meets along the way, helps her to discover who she truly is. This is more than a story about a single girl, but about her family and the strength and determination they discover in themselves along the way. The story elements, literary devices and inferences in this book make it a perfect choice for a read aloud or book study.

Charlie and the Great Glass Elevator by Roald Dahl. Suggested Grades: 4-8. AR Level: 4.4 Lexile: 720L Format: Chapter Book with Pictures. Publisher: Puffin

Synopsis: The continuation of the adventures in *Charlie and the Chocolate Factory*, the Bucket family along with Mr. Wonka find themselves hurling through space and time. From visiting the orbital space hotel to battling the Vermicious Knids, this intergalactic adventure is a great way to engage students with characters they already know and love and have them take their adventure further with predictions and answering the question "what's next?"

George's Secret Key to the Universe by Lucy Hawking. Suggested Grades: 4-8. AR Level: 5.6 Lexile: 850L. Format: Chapter Book. Publisher: Simon & Schuster.

Synopsis: George's parents are quick to warn him about technology and their new neighbors, Eric a scientist and his daughter Annie. But George befriends the strange family and along with the supercomputer, Cosmos, the trio embark on an adventure that puts the concepts of physics, time and the universe in terms that children will easily understand. Written by world renowned scientist Stephen Hawking and his daughter Lucy, this book was designed to help young children understand the mysteries of the universe and spark scientific inquiry.

If You Decide to Go to the Moon by Faith McNulty & Steven Kellogg. Suggested Grades: K-3. AR Level: 4.1 Lexile: AD690L Format: Picture Book. Publisher: Scholastic Press

Synopsis: In a picture book setting, the reader will accompany a young boy as he prepares for, travels to and returns from the moon. This book uses children friendly language to help explain the very scientific process of travelling through space and walking on the moon. The book also explores the dark contrast between space and the vibrant, alive world we live in. Although there are a few minor inaccuracies, those can be addressed and used as teachable moments. This is a fantastic picture book to use as a read aloud prior to starting a unit on space or the solar system. There are math elements in the book as well as pictures which illustrate beautifully the earth's diverse eco-systems.

Ignatius MacFarland: Frequent! By Paul Frieg. Suggested Grades: 4-8. AR Level: 5.9 Format: Chapter Book. Publisher: Little, Brown Books for Young Readers.

Synopsis: Ignatius MacFarland is bullied in school to the point where he decides to build a rocket to take him far away. During a test of the rocket he builds out of trash cans, Iggy is somehow transported to another world. Or was he? This tale tackles many of the issues students face today: bullying, the desire to fit in and dealing with what makes them special. The characters are interesting and Iggy befriends a wonderful female role model. This book was obviously written with humor intended for the target age group, but that is what makes the story and its characters appealing.

The Giver by Lois Lowry. Suggested Grades: 5-8. AR Level: 5.7 Lexile: 760L Format: Chapter Book. Publisher: Houghton Mifflin. Award: Newbery Medal Winner.

Synopsis: Jonas lives in Sameness, a community where everything is chosen for you, from who you will marry, what children you will be given and what you will do for the rest of your life. At the age of 12, Jonas is selected to study with the Giver, as a Receiver of the Memories. Along with this prestigious assignment, Jonas receives something completely unexpected: doubt. He begins to question his beliefs and the perfectness that is Sameness. Throughout the entire book Jonas attempts to put himself in others' shoes, to understand why they do what they do. This dystopian novel is an excellent book for large and small group discussions about motivations, actions and consequences.

The Jupiter Chronicles: The Secret of the Great Red Spot by Leonardo Ramirez. Suggested Grades: 2-5. Format: Short Chapter Book. Publisher: Leonardoverse

Synopsis: Callie and her brother Ian are courageous, adventurous children in search of their father who has been missing for five years. After looking into a telescope that has been hidden away in their attic, the siblings are whisked away to Jupiter, and the mystery surrounding their father's disappearance intensifies. This novel was written with the intention of introducing children to the Steampunk science fiction genre, so the story elements and writing is easy to understand, especially for those students who struggle to read.

**Appendix C: Science Fiction Literature Book List for English Language
Learners in the Elementary Grades**

Appendix C: Science Fiction Literature Book List for English Language Learners in the Elementary Grades

Commander Toad in Space by Jane Yolen. Suggested Grades: K-2. AR Level: 3.3 Lexile: 530L. Format: Chapter Book. Publisher: Puffin.

Synopsis: The first book in the *Commander Toad* book series introduces readers to the bright and brave Commander Toad and his crew aboard the Star Warts spaceship. Through colorful illustrations, easy to read storytelling and characters with very real personality traits, readers will take a journey across the galaxy where no spaceship has gone before, all the while sharing what is special and unique about Earth. English language learners will build self-confidence in their reading as they are able not only able to finish chapter books, but also comprehend the message.

Horrid Henry and the Mega Mean Time Machine by Francesca Simon. Suggested Grades: K-3. AR Level: 3.4. Lexile: 480L. Format: Chapter Book Publisher: Sourcebooks Jabberwocky.

Synopsis: This book, in the *Horrid Henry* book series, finds Henry yet again tricking his gullible brother, Peter, into thinking he has invented a time machine and sent him to the future, wearing their mother's dress of course. Each book in this series explores the lighter side of childhood, but for every bit of mischief Henry can come up with, there are real consequences that he must face. The easy reading style and the fun pictures make this selection appropriate for those struggling to read and English language learners.

Robot, Go Bot! by Dana Rau. Suggested Grades: K-3. AR Level: 1.0. Format: Comic Reader. Publisher: Random House.

Synopsis: This story is based around a little girl who constructs a robot out of spare parts. However, she is very demanding which causes the robot to finally run away. The pictures are rich in color and the words are simple 3-5 word sentences. This is an excellent choice for emergent readers who want something more sophisticated than just picture books or alphabet books

Zita the Spacegirl by Ben Hatke. Suggested Grades: 4.8. AR Level: 2.1. Lexile: 250L. Format: Graphic Novel. Publisher: First Second.

Synopsis: Zita, whose confidence can sometimes lead her into trouble and her best friend Joseph find a strange device in a meteor crater. Without much hesitation Zita activates the device and the pair is whisked away to another planet where Joseph may just be the next sacrifice of doomsday cultists. *Zita the Spacegirl* is just one in a series of Zita graphic novels.

**Appendix D: Science Fiction Literature Book List for Students with
Exceptionalities in the Elementary Grades**

Appendix D: Science Fiction Literature Book List for Students with Exceptionalities in the Elementary Grades

A Wrinkle in Time by Madeleine L'Engle. Suggested Grades: 5-8. AR Level: 4.7 Lexile: 740L
Format: Chapter Book. Publisher: Scholastic Award: Newbery Medal Winner.

Synopsis: Although this book's main character is Meg Murray, her younger brother, Charles Wallace Murray is a genius. However, Charles did not speak until he was four years old, which caused many to believe he had a learning disability. It was quite a shock when Charles started speaking in complete sentences with a more extensive vocabulary than most adults. Much like his sister Meg, Charles struggles throughout the book with embracing his differences, and like many children who face difficult challenges in their lives, learning how to just be a kid.

Alistair and the Alien Invasion by Marilyn Sadler. Suggested Grades: K-2. AR Level: 3.5
Lexile: 510L Format: Picture Book. Publisher: Simon & Schuster.

Synopsis: Alistair is a boy genius who is like no other child he knows. He loves science and is considered an unusual boy. One day while whizzing around the Milky Way in his space ship, he witnesses some aliens invading earth. Through a lot of patience and understanding, Alistair makes friends with the aliens and they finally leave. As the alien's spaceship shoots across the galaxy, the aliens remove their helmets only to reveal they look just like Alistair. This is a great book for learning that no matter how much we feel we are different or alone, there is someone that looks or feels the same way we do.

Space Case by Edward Marshall. Suggested Grades: K-3. AR Level: 2.8 Lexile: 430L. Format: Picture Book. Publisher: Dial Press.

Synopsis: This *Reading Rainbow* book choice is about an alien that visits earth and just happens to land on Halloween. At first, he is mistaken for a trick-or-treater and befriends a human boy named Buddy McGee. Buddy invites the little alien to spend the night, where he learns about bedtime, breakfast and going to school. This book tells a lovely tale about a boy and an alien who can look past each other's differences and build a wonderful friendship. Bright pictures and easy reading make this an excellent choice.

Walking Your Octopus: A Guidebook to the Domesticated Cephalopod by Brian Kesinger.
Suggested Grades: 2-5. Format: Picture Book. Publisher: Baby Tattoo Books.

Synopsis: Though not a science fiction book in the strictest sense, *Walking Your Octopus* is a fun introduction to the Steampunk sub-genre of science fiction. Written and illustrated by Brian Kesinger, one of Walt Disney's Animation Studios' award winning story artists and illustrators, the "guidebook" combines Victorian England, steampunk couture and a very unusual pet. Students with exceptionalities will relate to the trials and tribulations of not only owning a pet octopus, but being on as well. As the book says "it takes more than the above-average person to own and care for an octopus".

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