



BASIS GOODYEAR
SENIOR PROJECTS 2021-2022



Goodyear SENIOR PROJECTS

At this point in their senior year, BASIS Charter School students have completed a set of four BASIS Capstone classes to earn their BASIS Diploma with Honors. In addition, many students are in the process of completing the prestigious College Board's AP Capstone Diploma™, a challenging, two-year sequence of AP Seminar™ and AP Research™, plus four other AP® Exams, all of which require extensive research, writing, and oral defense. The BASIS Diploma Senior Project marks the culmination of this hard work and perseverance.

Completed in the third trimester of their senior year, the Senior Project is unique, self-designed, and reflective of the students' varied academic interests and passions. Regardless of the discipline —business, art, humanities, science, engineering, social work, medicine, or law — each senior must develop and explore a research question. Creating an abstract that sets the tone of the research, participating seniors must submit a project proposal, and later, orally defend their methodologies.

Under the guidance of an external advisor who is a professional in their field, as well as a faculty advisor from their school, students dedicate a minimum 10–15 hours per week to the completion of their Senior Project. To document their journey, students post weekly blog entries about their experiences, successes, and challenges as they explore their guiding question. This journaling provides a unique viewpoint on the student activities and adds a reflective layer to their research process.

Throughout the development of the Senior Project, BASIS Charter Schools support their seniors every step of the way as they develop investigative skills and their own individual scholarly pursuits. The abstracts in this publication clearly illustrate each senior's ability to apply the knowledge, and intellectual curiosity they have acquired in the classroom to professional research methods and learning. At the successful conclusion of this project, students are eligible for a BASIS Diploma with High Honors, the most distinguished accolade offered by BASIS Charter Schools.

Each member of the BASIS Charter Schools network commends our seniors for their dedication, and motivation, not only for completing this Senior Project, but for their commitment to the BASIS Charter School Curriculum. Congratulations to them on this powerful achievement, and our best wishes as they move forward on their educational journey.



Carolyn McGarvey
Chief Executive Officer
BASIS.ed AZ+



Peter Bezanson
Chief Executive Officer
BASIS.ed Texas

ANJALI B.

EXAMINING HOW CHARACTER PORTRAYALS OF LAWYERS ON TELEVISION SHOWS AFFECT THE PUBLIC'S PERCEPTION OF THE LAW INDUSTRY



ABSTRACT: How does the scheming lawyer, a character created by television shows (TV), affect people's perspective on lawyers? Does the stereotype of scheming lawyers affect people's behavior when dealing with a lawyer? These are the questions I answered through interviewing lawyers, paralegals, and legal assistants. I also asked everyday people these very same questions. I looked into the specific law TV shows people watch, the themes of these shows, and the shows' portrayal of lawyers. I focused my own research on the themes and influence of "Law & Order" because this show is the longest-running law show and the second most popular law show based on IMDb. I also examined published scholarly articles and books to gain knowledge and applied comparable analysis to my own study. Through this inquiry, I answered some of these questions and learned the impact of law TV shows.

- **BASIS ADVISOR:** Brianna Spence • **ON-SITE MENTOR:** Georgina Lageschulte
- **LOCATION:** Becker, Zarling & Smith Law

PATRICK B.

ADDRESSING HEALTH DISPARITIES IN LOW-INCOME DEVELOPING COUNTRIES THROUGH BIOMEDICAL ENGINEERING



ABSTRACT: Today, over a billion people live without access to medical clinics, roads, or electricity. In these populations, traditional medical devices are both too expensive and do not suit conditions. For example, even donated medical devices are eventually unserviceable in low-income, developing countries because of their lack of biomedical technicians. Organizations like Engineering World Health have sought to address these issues by designing medical devices with the conditions of low-income, developing countries in mind. In times of war, however, even these devices prove inefficient when armed groups attack doctors, hospitals, and biomedical devices. By volunteering as the American Red Cross's Arizona/New Mexico International Humanitarian Law Deputy Coordinator, I analyzed the effects of war on healthcare and educated others about these issues. Through the Engineering World Health's High School Design Competition, I learned both about the engineering process and the specific biomedical needs of low-resource, developing countries.

- **BASIS ADVISOR:** Christine Dell • **ON-SITE MENTOR:** Stephanie Nelson • **LOCATION:** American Red Cross

EMMA B.

AN INQUIRY INTO EFFECTIVE TREATMENTS FOR CHILDREN WITH ANXIETY AND DEPRESSION



ABSTRACT: Many children today are experiencing mental health issues such as anxiety and depression. Once it is determined that a child needs treatment for anxiety and depression, effective treatment can help avoid problems developing as they get older that could lead to serious risks such as self-harm. What are the most effective treatments for children with anxiety and depression? I interviewed behavioral health specialists and read multiple books and articles that aided me in discovering different treatments that would be best for children. Irenic Therapeutic Services provides a safe therapeutic environment and teaches clients effective coping skills and self-awareness in order to help the clients overcome their own obstacles. Through my internship at Irenic Therapeutic Services, I observed how my external advisor assessed her clients, and I researched treatments such as cognitive behavioral therapy and different medications. I found that because there are multiple treatments for children with anxiety and depression, it is all about finding the one that works best for each individual, since each individual is different and reacts differently to certain treatments. I also organized a school event and presentation to raise awareness for mental health issues. Through my research and events, I hope more people had a better understanding and now feel safer in opening up about mental health issues.

• **BASIS ADVISOR:** Melissa Burger • **ON-SITE MENTOR:** Krystal Burton • **LOCATION:** Irenic Therapeutic Services

RAYMOND G.

ANALYZING THE ELEMENTS OF FILMMAKING TO PRODUCE ENGAGING AND EFFECTIVE VIDEOS



ABSTRACT: Especially with the recent coronavirus pandemic, the online world continues to become more relevant, and YouTube, America's largest online video platform, follows this trend. YouTube is a free platform where users can post and watch videos that span every topic from education to lifestyle. Khan Academy uses YouTube to deliver a world-class education online, and Dude Perfect uses YouTube to share impossible sports trick shots. But what makes an effective and engaging YouTube video? What makes people want to continue watching? With a passion for filmmaking, I aimed to explore these questions through my project by creating my own videos and learning from others' successful videos. As a quantitative guide for my inquiry, I used YouTube Studio, which provides a range of metrics for the videos that I posted. The main metrics used to determine the engagement of a video were the average percentage of the video viewed and the retention of the audience throughout the video. Another major factor that could influence these metrics was the topic of the video, but all of my videos ranged within the broad topic of lifestyle. Throughout all of my videos, the first ten seconds were consistently the most vital for engaging the viewer for the remainder of the video. As a source of qualitative data, people who watched the videos were able to opt into an optional online survey to provide any feedback about the video. Under the guidance of Ms. Tacubao, a social media specialist and marketing manager, I explored what it truly means to have an effective and engaging video through the lens of audience retention and viewer feedback.

• **BASIS ADVISOR:** Madeline Nicholls • **ON-SITE MENTOR:** Colleen Tacubau • **LOCATION:** Independent Research

LYNDON K.



EXPLORING THE VIABILITY OF WATER DESALINATION VIA CAPACITIVE DEIONIZATION

ABSTRACT: "Water, water, everywhere, And all the boards did shrink; Water, water, everywhere, Nor any drop to drink." - Samuel Taylor Coleridge, The Rime of the Ancient Mariner. Only 3% of the water on Earth is freshwater. Despite this daunting statistic, fresh water is used in many manufactured product production processes, but more importantly, water is needed for life to prosper. As the population continues to grow, the demand for freshwater will only increase, so we must find ways to sustainably secure our freshwater supply for now and in the future. Water conservation can be tackled in two different directions: technology and education. For example, we can create and improve water harvesting methods, water-saving technology, water conservation campaigns, or specific water policies. Throughout my senior project, I worked with Arizona Project WET to educate youth around Arizona about water in the Earth's System and Arizona's water resources by guiding hands-on learning activities. I also researched a novel method of desalination that takes advantage of ion electrosorption at the surface of a pair of electrically charged electrodes called capacitive deionization desalination. By studying the method and its parameters, I built a working device. The long-term goal of my project is to have a deeper understanding of all the ways water conservation can be approached to secure a sustainable water supply for now and the future.

- **BASIS ADVISOR:** Dr. Jershon Eagar
- **ON-SITE MENTOR:** Asst. Research Professor Shahnawaz Sinha and Dr. Ibrahim Abdallah
- **LOCATION:** Phoenix Forge and Arizona Project WET

AMELIA L.



PRIVACY IN THE 21ST CENTURY: AN INVESTIGATION INTO SECURING USER DATA IN SMART HOMES

ABSTRACT: "Alexa, play my liked playlist!" This is a phrase many are familiar with. Alexa, Google Home, and Amazon Echo are just a few of the most mainstream smart home technologies, but do users of security cameras, baby monitors, some fridges, and other smart technologies know that they collect your data? As the demand for more smart technology increases, there is a growing privacy issue rising behind the scenes. The problem is that many smart homeowners do not know if their private data is secure. Large companies behind these smart products ensure that users' data is protected under their firewalls and programs, but how could that one claim reassure consumers when the growing force of hackers are adapting ways to successfully breach smart interfaces? The goal of my project was to determine the best solution to protect smart home users' data through independent research with the help of an information security specialist. With the findings of my research, I produced a short film on the issue of smart home privacy and how to best combat the rising force of hackers.

- **BASIS ADVISOR:** Jonathan Griffin
- **ON-SITE MENTOR:** Jill Rhodes
- **LOCATION:** Independent Research

HANLY S.

SCIENCE AND FAITH: AN INQUIRY INTO END-OF-LIFE CARE



ABSTRACT: According to an article on NBC News, every year, there are four million patients admitted into the ICU, and out of those patients, 82% of the patients' families withdraw care. However, in the past two years, the number of deaths and patients admitted into the ICU dramatically increased because of COVID-19. When loved ones are in the ICU, families are put in a situation in which they have to quickly make life and death decisions guided by science, faith, or both. However, when such situations occur, you often are not prepared, and you do not know what factors to consider. What will the quality of life of the patient be? What if you disagree with the medical advice given to you? How will faith influence your decisions? Such questions are complex, and the answers are often based on personal ideals. However, there are many things that can be done to help eliminate confusion when making these decisions. In this senior project, I inquired into how Christian and Buddhist values influenced end-of-life care decision-making for patients and families.

• **BASIS ADVISOR:** Bryan Baker • **ON-SITE MENTOR:** Sadie Jones • **LOCATION:** Mountain View Hospice

RIA V.

DUTY TO WARN: LAW AND ETHICS



ABSTRACT: After visiting your doctor or therapist, do you expect your physician to expose your information to your family, to your friends, to unknown people, or even to the police? Most patients trust their physicians to maintain confidentiality, especially in today's day and age where the mental health field is expanding immensely. In some cases, however, physicians must breach confidentiality if their patient poses an imminent or direct threat to others. Through this project, I learned about how physicians tackle this problem of deciding whether to maintain confidentiality because of their legal duty to their patient or to follow their moral duty to protect the public. People are losing faith and trust in doctors and therapists and holding back what they say in fear of being arrested or committed because confidentiality can be broken in certain cases. Doctors and therapists have to use their professional judgment to decide whether someone is a direct threat of harm, for patients may not explicitly state that they want to hurt others. Numerous practitioners are sued for breaking confidentiality or not breaking it soon enough and thus face this ethical dilemma of what constitutes breaking confidentiality. In the long run, breaking confidentiality can actually be harmful to society in that the basis of the mental health field, confidentiality, is damaged. However, at the same time, if the patient does indeed pose a danger to others, society is affected. My external advisor is a medical malpractice lawyer, and I met with him every week to discuss my project and a case that he is handling related to the duty to warn. By studying previous cases and reading scholarly articles, I explored how lawyers handle ethical issues in the cases they encounter, and what the threshold is for breaking this sacred bond of confidentiality between doctors and their patients.

• **BASIS ADVISOR:** Bryan Baker • **ON-SITE MENTOR:** Lincoln Combs • **LOCATION:** Independent Research



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