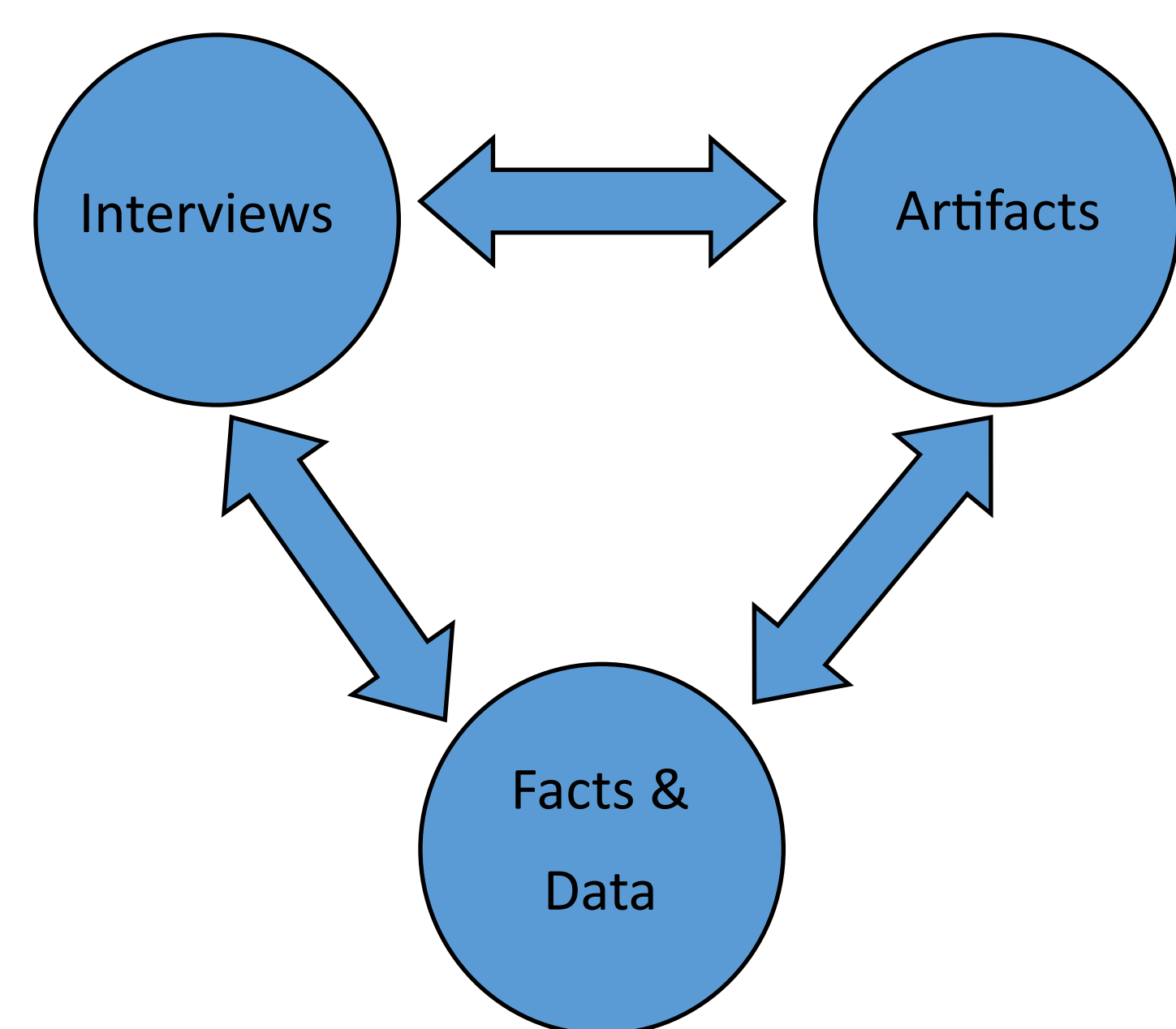


## Investigation of the S.T.E.M. Graduation Discrepancy in the U.S. and Singapore

### METHODOLOGY

“Triangulation is the process of corroborating evidence from different individuals (e.g. interviewing both a principal and a student), types of data (e.g. observational field notes and interviews), or methods of data collection (e.g. documents and interviews)” (Creswell, 2012, p. 259). The two methods of data collection used in this study are interviews and artifacts.



#### Interviews

- . 3 Embry-Riddle Asia students were interviewed during a visit to Singapore, and surveys were received by 4 students following the trip.
- . Informal interviews were also conducted by listening to conversations between the students and between other people encountered during the trip.

#### Artifacts

- . Spending several days exploring Singapore offered the unique opportunity to observe the dense and bustling landscape.

#### Literary Review

- . Data was obtained through this method to make stronger conclusions about these observations.

### SAMPLE OF SURVEY RESPONSES

**Who or what influenced you to choose your major? Please be specific.**

“I have always been interested in how things work, which made me go into electronics engineering student in Polytechnic... additionally, my parents felt that the aerospace industry was a growing industry in Singapore and with that, they encouraged me to further my studies in this field.”

**What are the occupations of your parents? How influential was your family in choosing your major?**

“My mum is an administrator while my dad is a technical engineer. Both of them influence me to do what I love and would like to do and be in the future. They are very supporting of what I like and have always encourage me endlessly to pursue my goals.”

**How did your lower schooling prepare you for your University education? How influential was it in choosing your major?**

“I would say that my secondary school made me realized that I love math and science a lot. From there, I decided to pick up engineering and proceeded on to have an interest on aviation.”

**Is education important to you? Please explain.**

“Yes. Ultimately, education is very important to me. I believe with education it will help you to go far, not only career wise but also in life. I believe education is endless; there is always something new to learn every day in life until we grow. Additionally, I believe education can also help me to become a better and a more rational person. Most importantly, with education, it will provide me with better position and pay in a company. This is especially in Singapore.”



A young student in Chinatown interviewed me about my trip for a school assignment.

### Elizabeth Worsham

IGNITE Undergraduate Research  
Senior, B.S. Mechanical Engineering  
worshame@my.erau.edu

### ABSTRACT

The term STEM (Science, Technology, Engineering and Mathematics) was coined in the early 2000s by the National Science Foundation and defines educational areas that are important for students and the country’s economic growth (Dugger, 2010, pg.2). According to the U.S. Department of Labor, the 5% of U.S. workers in a science or engineering related field are responsible for 50% of the sustained economic expansion. The job market for STEM majors is growing at twice the rate of other occupations, but in 2011 only 13% of United States students choose a STEM major in college as compared to almost 50% of students in Singapore (Center on International Education Benchmarking). A saturated STEM job market benefits the economy as well as the technological growth of a country, but yet United States students are not graduating with STEM majors at a comparable rate to those in European and Asian countries, especially Singapore. This discrepancy is due to family life and culture, Government policy and the need for sustainability, and the education system of each country.

### REFERENCES

Center on International Education Benchmarking. (2012, July 31). NCEE statistic of the month: investigating the skills mismatch. Retrieved from <http://www.ncee.org/2012/07/statistic-of-the-month-investigating-the-skills-mismatch/>

Creswell, J. (2012). Educational research: Planning, conducting, and evaluating quantitative and qualitative research (4th ed., p. 259). Upper Saddle River, N.J.: Pearson/Merrill Prentice Hall.

Idris, N., Daud, M. F., Eu, L. K., & Ariffin, A. D. (n.d.). Consultant report securing Australia's future STEM: country comparisons. Retrieved from <http://www.acola.org.au/PDF/SAF02Consultants/Consultant%20Report%20-%20Singapore.pdf>

National Center for Education Statistics. (1998). Parent involvement in children's education: efforts by public elementary schools. Retrieved from <http://nces.ed.gov/pubs98/98032.pdf>

Singapore Ministry of Education. (2013). Education Statistics Digest 2014. Retrieved from <http://www.moe.gov.sg/education/education-statistics-digest/files/esd-2014.pdf>

UNESCO Institute for Statistics. (n.d.). Government expenditure on education, total (% of government expenditure). Retrieved from <http://data.worldbank.org/indicator/SE.XPD.TOTL.GB.ZS/countries>

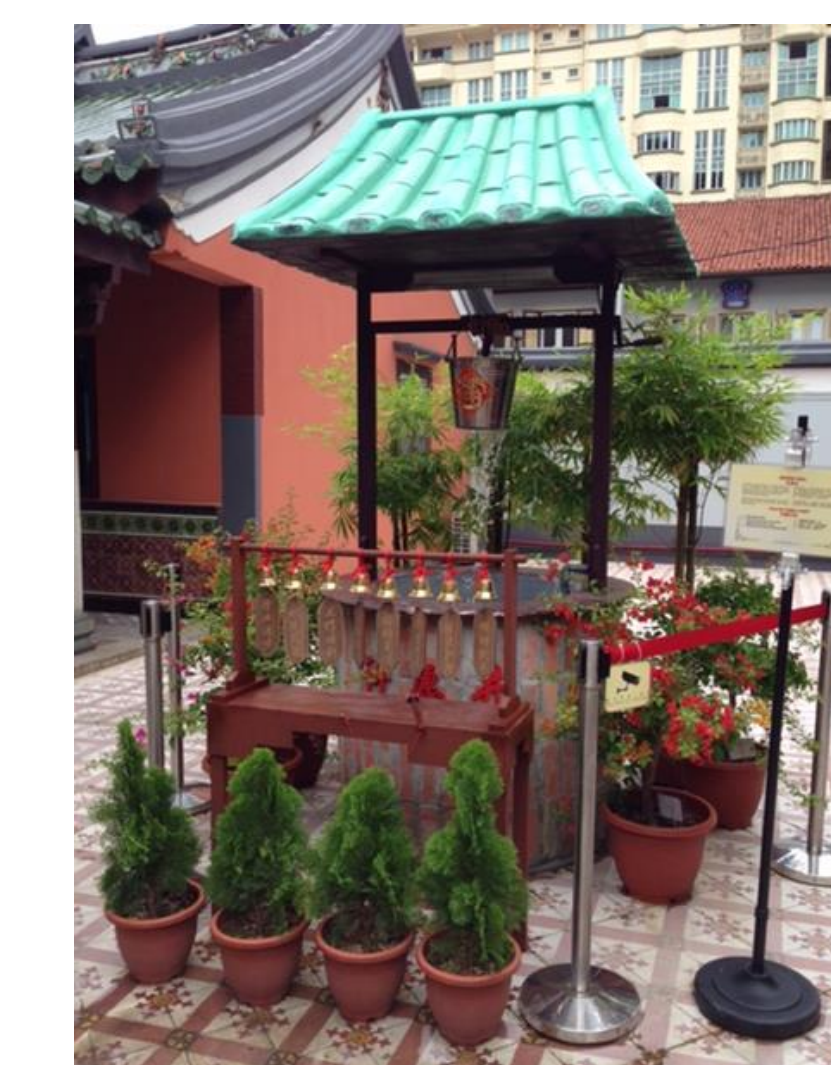
### FINDINGS

#### Family Life and Culture

- . Parental involvement in the student’s math and science education helps push the students to be more competent in those areas,
- . Exposure through STEM related activities and competitions fosters an interest in those fields.
- . The education culture in Singapore focuses on improving the quality of life through learning and a person’s chosen career.

#### Government Policy

- . The Singapore Government has built an education system focused on creating quality labor, rather than low cost labor, so business would want to locate in Singapore.
- . Singapore has become an invaluable location for the STEM market because of the quality and talent of its residents.
- . Unlike the United States, where public education through high school is compulsory and free to students, every level of education in Singapore has a monthly tuition.



Students come to this Taoist temple to ring the bell for prosperity in education.

#### Education System

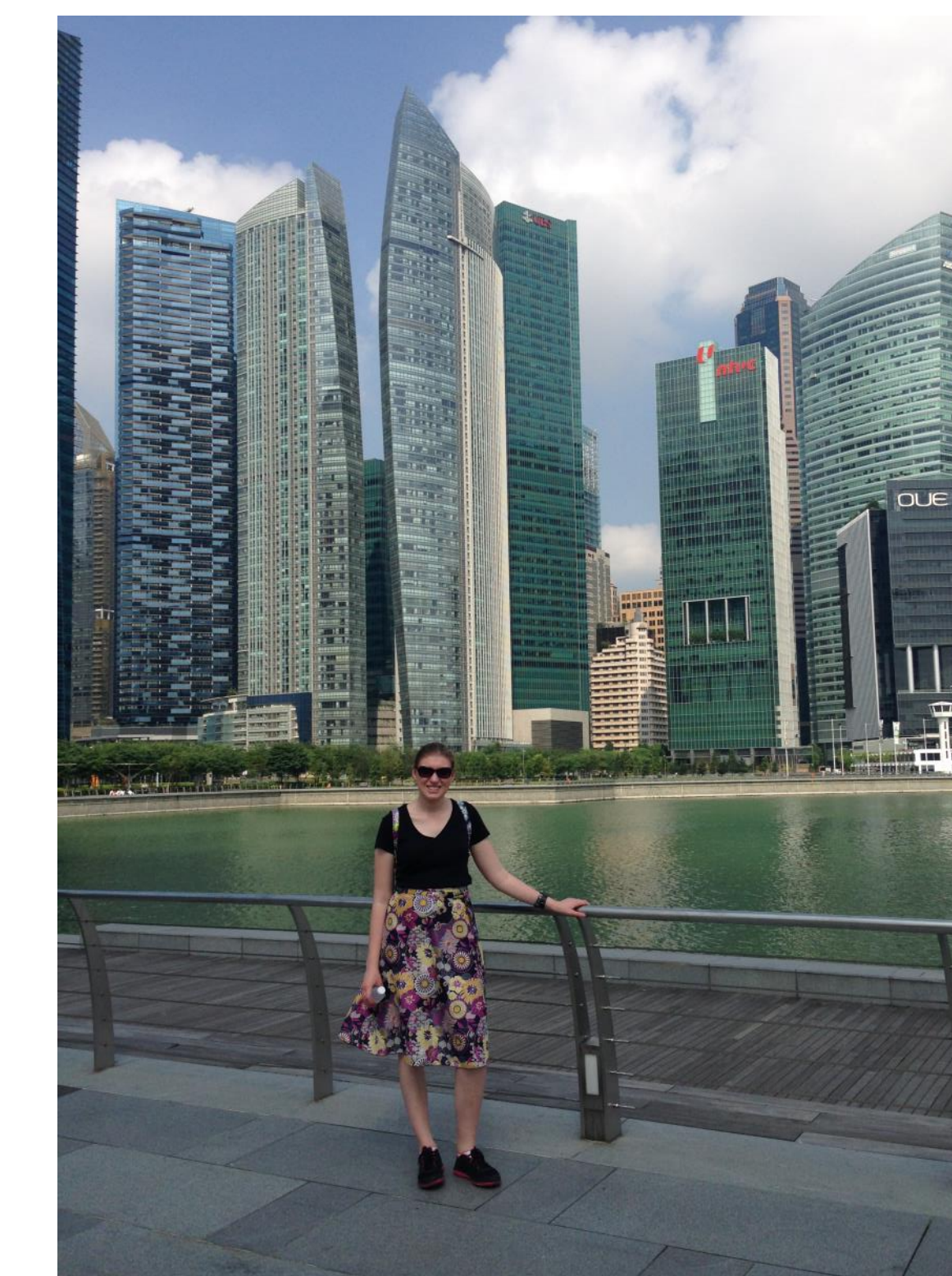
- . The system separates students into different secondary schools according to their education goals and test scores.
- . Students in Singapore receive a better math and science foundation throughout their primary school than U.S. students, which could contribute to their readiness and interest in pursuing STEM degrees.
- . Singapore Universities are more selective than U.S. Universities.



An advertisement for a secondary school reads “adding value to your life.”

### CONCLUSION

Students in Singapore graduate with STEM degrees at a higher rate than U.S. students because they are encouraged by their family and culture and government policy, and are better prepared for the degrees by the education system. In the family, parents are much more involved in their children’s education and education is seen as a way to improve one’s quality of life. Government policy encourages students to enter STEM fields through the creation of the Ministry of Science and Technology and a high percentage of government spending on education. The education system also fosters interest in STEM and helps prepare students in the subjects at the level of their capability. All these factors are contributors to the higher graduation rate of STEM students.



Singapore’s skyline is a constantly changing landscape of industry and technology.