

THE EFFECTIVENESS OF PROMOTING SCIENCE THROUGH ROCKETRY WORKSHOPS AS A CORPORATE SOCIAL RESPONSIBILITY INITIATIVE IN MALAYSIA

A Qualitative study on the Effectiveness of conducting Rocketry Workshops in
Malaysia by Creating Awareness and Inspiring Youth to excel in the field of
Aerospace Science

Captain Mohammed Faiz Kamaludin

President

Astronautical Association of Malaysia (AstroX)

mfaiz@angkasawan.org.my

ABSTRACT

Malaysia is facing a worrying decline in science literacy. According to international benchmark assessments derived from recent Trends in International Mathematics and Science Study (TIMSS) and the Programme for International Student Assessment (PISA) results, the level of science proficiency of 14 to 16 year olds in Malaysia is well below the international average and on a downward trend. Malaysian students are also shying away from the science stream according to statistics based on candidates sitting for the SPM examinations. The source of the problem is that students do not see science as something enjoyable or fun, that they would like to pursue for higher education. Current Corporate Social Responsibility (CSR) initiatives in Malaysia are in the form of corporate philanthropy and charitable giving. There must be an effort and initiative by government agencies and organisations to invest in quality aerospace educational programmes, such as rocketry workshops to promote science education. This paper will explore the effectiveness of conducting rocketry workshops in Malaysia by creating awareness and inspiring youth to excel in the field of aerospace science.

Field of Research: *Rocketry, Aerospace Science, Corporate Social Responsibility*

1. Introduction

Corporate Social Responsibility (CSR) is currently the buzzword in business, as most organisations are working hard towards becoming a good corporate citizen by doing their part in contributing back to society while operating in an environmentally sustainable manner. The concept of CSR has been around for 4 decades, yet it is still missing a single, agreed definition by researchers and practitioners alike. Being broadly defined, CSR covers a wide array of spectrum involving every large and small organisation in planning and implementing CSR activities whether directly or indirectly, in developed or developing nations (Taneja, Taneja, & Gupta, 2011). The movement can be seen here in Malaysia, with CSR efforts going beyond basic corporate philanthropy.

This research paper will look at efforts by aerospace industry players in Malaysia conducting CSR work in support of aerospace education. This research will look into teething problems faced by non-profit organisations or NGOs in sourcing for funds and sponsorships to conduct aerospace related educational programmes in schools, colleges and universities nationwide. The literature review covers the evolution of CSR, CSR theories and CSR practices in Malaysia. This research effort is aimed at developing a more structured framework and approach for government agencies and corporations in

Malaysia to invest in quality CSR programmes in promoting aerospace education and its effectiveness and benefits to the youth and community of the future generation.

Aerospace education is gaining interest among schoolchildren and the youth of Malaysia after the successful launch of Malaysia's first astronaut, Dato' Dr. Sheikh Muszaphar Shukor in October 2007. However, government agencies, big corporations and business communities are reluctant to invest in good CSR programmes to promote aerospace education, due to the high cost involved in running these programmes. Common CSR initiatives by government agencies and corporations look into philanthropic contributions to charitable causes such as welfare homes, cancer patients and the under privileged communities. These are worthy efforts to be socially responsible to the community, however this paper will highlight that there should be an avenue to recognise and help potential schools and promising young individuals to experience the exposure of quality aerospace education.

2. Research Objectives

The main objective of this study is to conduct research on the effectiveness of aerospace related outreach programmes in the form of rocketry workshops in Malaysia by inspiring youth and the younger generation to excel in the field of science and technology. In doing so, the study will seek:

- a) To explore the possibilities of developing a more structured framework and approach for government agencies and corporations to invest in quality CSR programmes promoting the above cause.
- b) To look into possible avenues for CSR funding for aerospace education from various sources not limited to big corporations but also from small to medium-sized enterprises (SMEs).

Findings from this research will add to the knowledge and understanding on the subject of Corporate Social Responsibility especially in the Malaysian domain. This study would be deemed significant by helping to develop a more structured approach in promoting the knowledge of aerospace and science in Malaysia through non-profit organisations and other commercially driven entities. In addition, the research findings will also contribute towards studies related to the current trend in employee loyalty through participation in community service and other CSR practices.

3. Literature Review

3.1 Evolution of CSR

CSR is gaining momentum in the business world today as corporations compete to contribute socially and environmentally in addition to operating a profitable business. Defined as the duty of a corporation to create wealth in ways that protects or enhance societal assets (Steiner & Steiner, 2009), corporate social responsibility must go beyond social investing and philanthropy, which is currently being practiced by most business entities. Companies must change their mind-set in the way they operate their business to be more socially responsible (Javier, 2005). According to Hollender and Breen (2010) confronted with a vast ever-expanding array of socially worthy activities, many companies are hazy on which efforts to concentrate on. Current trends indicate that successful companies concentrate their efforts on building communities with a purpose and not by just making a profit, but making a profit in order to do something better (Philips, 2006).

3.2 CSR Theories

According to Garriga and Mele (2004) most of the current CSR theories can be broadly classified as instrumental, political, integrative and ethical. All four of the above CSR theories emphasizes on meeting objectives that produce long-term profits through usage of business power in a responsible

way. In this research paper, we will examine CSR efforts mainly utilising the instrumental theories in which, it is presumed that corporations are identified as an instrument for wealth creation and inversely states that the creation of wealth to be their sole social responsibility (Singh, Yahya, Amran and Nabiha, 2009). However, the equation only examines the interactions between business and society in the economic concept. Based on instrumental theories, a corporation will classify CSR activities as social investments when their philanthropic efforts are aligned with the company's mission statement, for example, when an aerospace company teaches aerospace education to students of the local community, it is seen as a move to be socially responsible towards the local community by increasing the field of knowledge in their industry (Garriga & Mele, 2004). Responsible companies must build a culture that acts more like a community than the typical corporate hierarchy. In other words, building communities that utilises profits to fulfil a larger purpose (Hollender & Breen, 2010).

3.3 CSR in Malaysia

CSR efforts in Malaysia have been described as still in its infancy stage, however research by Thompson and Zakaria (2004) indicates improvement in CSR reporting by organisations in Malaysia, through the corporate environmental reporting format. The Global Reporting Initiative (GRI) was established in 1997 to provide corporations a universal set of guidelines in reporting CSR efforts, in which the general public is able to access a company's environmental and social performance (Singh, et al., 2009). Since its inception, the number of companies issuing reports in accordance to GRI guidelines have increased from 20 in 1999 to over 1,000 companies in 2006 (Taneja et al., 2011). In addition, corporate social responsibility can also be globally measured by method of publishing information based on social, economic and environmental performance in the form of a corporation's annual sustainability report.

According to research by Zulkifli and Amran (2006) on CSR practices in Malaysia, it states that 43% of surveyed companies, reported on their social performance whereas another 26% only made a commitment to do so in the near future. Their paper states that within an 18-month period extending from July 2003 to December 2004, approximately RM 82.1 million were given away to various charitable societies, orphanages and the poor. This is an indication that for many Malaysian companies, commitment to CSR is expressed in terms of charitable giving. The top three donors distributed RM 30.5 million, which is about 34.3% of the contributions, and the top ten companies accounted for over 80% of the total contributions. In their findings, Malaysian companies that conduct CSR practices generally contribute towards charitable programmes that are related to the nature of their businesses.

Research carried out by Lu and Castka (2009) indicates that Malaysian organisations are generally practicing CSR in the form of philanthropy and public relations (PR). They concluded that public awareness of CSR is important and that the movement should not be limited to support from large organisations only. Here it is important to recognise that CSR funding may come from various sources such as smaller companies and SMEs. To further support this, Philips (2006) reported that a local US airport fixed base operator (FBO) conducted CSR work more extensively compared to other bigger companies within the same locality. In Europe, more than half of European SMEs are involved in different degrees of socially responsible causes. Their involvement indicates 48% for micro enterprises and up to 70% for the SMEs (Perrini, 2006). It can be seen from the above statistics that support for CSR funding can come from various sources not limited to large corporations.

3.4 Community work through Aerospace Education

The purpose of an educational process is to prepare students to make a positive impact in society. In a paper by Rahman, Md Hashim and Bakar (2010), looking at CSR from an Islamic perspective, corporations must be accountable to society by means of promoting social justice and social responsibility. In their study, companies were willing to be responsible corporate citizens, however organisational and financial constraints have been identified as factors hindering their desired CSR targets. Corporations listed in Malaysia are lacking in CSR implementation by nearly 66%, in

comparison to international CSR standards ranking them under poor and average categories (Goi & Yong, 2009). This can be true for developing nations, as research by Geva (2008) indicates that large corporations in developing countries conduct CSR efforts through corporate philanthropy as a way to solve major social problems as a result of inadequate support from government agencies due to lack of regulation and ineffective enforcement. Therefore, it is important to have strong background institutions to support a particular cause, for an example the need for a government body such as the National Space Agency (ANGKASA) to support aerospace education in Malaysia. In addition, a paper by Michael (2003) has highlighted that besides company-led or government-led CSR initiatives, many observers consider that the third sector, which consists of NGOs and civil society as the additional motor to support the CSR movement. This is where the Astronautical Association of Malaysia (AstroX) is contributing towards aerospace education in Malaysia.

According to research by Philips (2006), for the period from 1996 to 2005 more than 30,000 employees of United Airlines have volunteered for community service. This is a fine example of employee volunteerism in an effort to be socially responsible. In another study, 40 percent of Americans believe that the most important proof of a company being socially responsible is by having a good track record in supporting communities and treating employees well (Hollender & Breen, 2010). It can be seen that companies must be actively involved in CSR efforts through community service to attract or retain employees in their organisation. This is an important point that needs to be highlighted to aerospace industry players in Malaysia. Lastly, it should be stated that variance in culture will influence CSR efforts conducted in different countries. Recognising and identifying cultural variance could provide a positive solution in implementing CSR efforts on educational programmes for communities that require them in different localities and region (Feeman & Hasnaoui, 2010).

3.5 Interest in Science (Malaysia)

Two international assessment indicators are showing a disturbing downward trend on Malaysia's level of science literacy. Firstly, the Programme for International Student Assessment (PISA) assesses the competencies of 15 years olds in reading, mathematics and science. It is conducted every 3 years by the Organisation for Economic Co-operation and Development (OECD). The PISA 2012 report, revealed that Malaysia's science literacy among 15 to 16 year old students ranked 55th out of 64 countries. Malaysia scored 420 points, which is below the OECD average of 501. With this score, Malaysia is ranked lower than China, which is ranked first, Hong Kong second and Singapore third (OECD, 2013). This is a decline for Malaysia, compared to the PISA 2009 results in which placed Malaysia 52nd with a mean score of 422 points.

The second assessment indicator, which is the Trends in International Mathematics and Science Study (TIMSS) is a global assessment conducted every 4 years by the International Association for the Evaluation of Educational Achievement (IEA) on the knowledge of mathematics and science of 10 and 14 year old students. Malaysia's science literacy among 14-year-old students has declined by nearly 17% from 2003 to 2011. Malaysia scored 510 in 2003, 471 in 2007, and 426 in 2011. The TIMSS 2011 report also showed that Malaysia scored below the international average and was ranked 32nd out of 45 countries (Martin, Ina, Mullis, Foy, & Stanco, 2012). The declining ranking in TIMSS highlights a mismatch between Malaysia's current education system and that of the higher order thinking skills (HOTS) in which TIMSS and PISA are based on.

3.6 Enhancing Students' Interest in Science (Malaysia)

The Parent Action Group for Education Malaysia (PAGE) commented that the TIMSS results underscore the urgent need to re-focus attention to science education, which is not reflected in Malaysia's education system. One of their recommendations is to devote a whole section for science education in Malaysia's Preliminary National Education Blueprint 2013-2025, which only addressed a

small segment on the teaching of science and mathematics. The focus has been too much on what language science and mathematics are taught in, but in actual fact, it is 'knowledge' that will help students excel. The new education blueprint 2013-2025, aspires Malaysia to be in the top third of countries in terms of performance in international assessments, as measured by outcomes in TIMSS and PISA within the next period of 15 years (Ministry of Education, 2012). The national blueprint has been designed to promote the HOTS method of learning. The strategy is paying early dividends by marked improvements in both the PISA 2015 and TIMSS 2015 reports. Malaysia scored 443 points in science for PISA 2015, an increase of 23 points from the PISA 2012 report and recorded a score of 471 points for TIMSS 2015 an increase of 45 points from TIMSS 2011 (OECD, 2015). Even though this is an improvement for Malaysia, there is plenty of room for growth as compared to our neighbouring countries such as Singapore, Japan, Taiwan and Korea that consist of the top four countries globally for achievement in science literacy.

In 2012, it was reported that less than 20% of the 472,541 students who sat for the Sijil Pelajaran Malaysia (SPM) were science stream students. In the mid-1980s, the ratio of students taking science to arts subjects was 31:69. This ratio further declined to 22:78 in the mid-1990s. To counter the decline, the government introduced incentives to promote students to study science. Among measures are tax breaks for parents, scholarships and textbook assistance for students that opt for the science stream. These measures are taken to boost students' interest in science with the objective of having 60% of students in the sciences. The erosion of interest in science had become a national issue and we believe that this research was timely to help promote aerospace knowledge to schools in Malaysia by conducting rocketry workshops with the purpose of generating interest in the field of science.

In our proposals to acquire funding to run our workshops, we underlined some of the long-term benefits of conducting rocketry classes for schoolchildren to potential investors. We made projections that after their participation in our programme; students will see science as a subject that is fun. They will also be able comprehend the correct philosophy of science. According to a report by the Academy of Sciences Malaysia, our nation will require 500,000 degree holders in the field of science and technology by 2020 to become a developed country. In 2015, there were only 85,000 people working in the field of science in Malaysia. Lastly, we also predict that the participants of our programme will continue their involvement in the field of science and the aerospace industry.

4. Research Methodology

According to Wiggins and Stevens (1999), there are 3 classes of research strategies. They are non-experimental, experimental and quasi-experimental. The non-experimental techniques are commonly used for applied research in social sciences whereas experimental and quasi-experimental researches involve manipulation of variables within a controlled environment. The research strategy that was employed in this study was conducted using the non-experimental method. According to Taneja, et al. (2011) current CSR research design employs both qualitative and quantitative research approaches. However, from their studies it was concluded that approximately 80% of researchers have used the qualitative method. Qualitative research is able to better address process-orientated questions (Leech & Onwuegbuzie, 2007). For this paper, the research collection strategies (Chaleunvong, 2009) and data sources were conducted using the following methods:

- a) Questionnaires for all workshop participants.
- b) Interview sessions with randomly selected students.
- c) Field observation from direct observation of students.
- d) Science Test scores for 3 years of 20 students in our target group that attended the workshop against 10 students that did not attend the workshop as the control group.

1.1 Initial Research Process

To carry out the proposed rocketry workshops intended for our research, a number of proposals were sent to various organisations:

- a) Dana Belia 1Malaysia.
- b) Malaysia Airlines.
- c) Pintar Foundation.
- d) Boustead Holdings.
- e) AirAsia.
- f) Odyssey.
- g) CAE.
- h) Felda.
- i) Firefly.

Outcome: After 6 months, AstroX received a grant amounting to RM 50,000 to conduct rocketry workshops throughout Malaysia. Malaysia Airlines declined to sponsor any workshops citing budgetary constraints. Other entities such as Pintar Foundation and Odyssey expressed interest and would consider our CSR efforts in their future plans. Felda declined to sponsor our workshops whereas AirAsia and CAE offered us simulator visits to their facilities instead. Lastly, Firefly offered us discounted tickets to our workshop locations on their flights.

From the initial research process, we were able to determine several factors to be true with other research papers:

- a) The funding for the entire project was given through a youth development grant provided by a government agency in support of providing aerospace education to schoolchildren in Malaysia. This verifies research by Geva (2008) that developing nations require government agencies to carry out CSR efforts to solve major social problems. At the time the grant was awarded (2012), Malaysia was facing a sharp decline of students being interested in science. As such the promotion of science through rocketry workshops was an ideal solution to address this particular national issue.
- b) Prominent corporations were keen to provide funding but instead decided to keep our project on hold (or under KIV) due to budgetary constraints. This is in line with the outcome of studies carried out by Rahman, Md Hashim and Bakar (2010), which states that organisational and financial constraints have been identified as factors hindering corporations that were willing to become responsible corporate citizens and achieving their desired CSR targets.
- c) Other major corporations such as Felda also expressed interest, however they have their own CSR programmes in place. This is an indication that for many Malaysian companies, commitment to CSR is expressed in terms of charitable giving that are related to the nature of their business (Zulkifli and Amran, 2006).
- d) CAE and AirAsia were willing to help promote aerospace science by providing us with simulator centre visits for up to 40 students. This is a positive step for smaller industry players such as CAE in conducting CSR efforts as explained by Philips (2006) that smaller organisations conduct CSR work more extensively compared to other bigger companies within the same locality.
- e) Firefly offered us discounted tickets for our travels from state to state. They were very helpful in our quest but cited having other CSR activities of their own in the form of charitable giving. This indicates that most organisations practice CSR in the form of corporate philanthropy (Lu and Castka, 2009) and should go beyond social investing and philanthropy (Javier, 2005).

1.2 Data Collection

With funding provided by a government grant, AstroX was able to conduct rocketry workshops throughout Malaysia as an effort to promote aerospace science to schoolchildren between the ages of 9

to 14. The workshops got students to build real-life rockets (fire combustion) using solid fuel and they were exposed to software programming and coding to measure the thrust of the rockets.

The rocketry workshops were conducted from August 2012 until June 2013 at the 10 following locations throughout Malaysia:

- a) Rebung, Kuala Lumpur.
- b) SMK Raja Perempuan, Ipoh, Perak.
- c) SK Beris Kubor Besar, Bachok, Kelantan.
- d) Asia Pacific Smart School, Selangor.
- e) SMK Cedung Jaya, Maran, Pahang.
- f) SRK Laksamana, Kota Tinggi, Johor.
- g) SMK Permatang Rawa, Bukit Mertajam, Pulau Pinang.
- h) SMK Agama Sheikh Abdul Malek, Terengganu.
- i) SRJK Tamil Jasin, Melaka.
- j) Rumah Anak-anak Yatim/Miskin Rukaiyah, Kajang, Selangor.

1.3 Sampling Justification

The sampling of selected schools were varied to justify a broad spectrum of students coming from diversified backgrounds throughout Malaysia:

- a) Rural schools.
- b) Urban schools.
- c) Government cluster schools.
- d) Private smart schools.
- e) Religious Islamic and Tamil schools.
- f) General public: Recipients chosen through on-line competitions and other methods.
- g) Orphanage and welfare home students.

1.4 The Questionnaires (Appendix A)

For each school the rocketry workshop was limited to 20 students. The 20 students selected were generally the school's top science students. From the selected 20 students, all 20 of them were required to answer a questionnaire after completing the workshop to evaluate whether attending the workshop in any way had changed their perception of science. In addition, open-ended questions on the skills they acquired during the workshop were also asked and the relevance of that skill that may be applied to them in their daily lives.

1.5 Interview Sessions (Appendix B)

From the selected 20 students that attended the workshop, 6 to 14 students were randomly selected for an interview session. The interviews were conducted one on one with the students after completing the workshop to evaluate whether attending the workshop had changed their perception on science and whether they were interested to venture into aerospace science as a possible career path. Questions on the skills they acquired during the workshop were asked and the relevance of that skill that may be applied to them in their daily lives. Other questions concerning social skills such as responsibilities, teamwork, pursuit of knowledge and how to be a better scientist were also asked. This is in tandem with the CSR studies of the ethical theories by Garriga and Mele (2004) on human development with consideration to the present and future generations, and the common good of society.

1.6 Field observation

E-JOURNAL OF THE GLOBAL SUMMIT ON EDUCATION 2017 (GSE 2017).

(E-ISSN 2289-6880). 4th December 2017, Melia, Kuala Lumpur, Malaysia. Organized by

<https://worldconferences.net>

General observation of the selected 20 students was initiated as soon as we met them. During the introductory session, we asked them about their ambitions and the career path they intend to take. This gave us the opportunity to evaluate their level of commitment, self-dependence and general attitude towards life. In addition, we also gave a 'Space' talk to the entire school ranging from 40 to 500 students to give opportunity to the other students from that school that were not selected for our workshop to enjoy some knowledge on Malaysia's manned spaceflight mission. Field observation here is important to ensure whether the audience were inspired during the presentation and how they responded to it.

1.7 Science Test Scores

We returned to the participating schools and collected a linear 3-year test scores on the science subject for the 20 students that attended the rocketry workshop and compared them with 10 students that did not attend the workshop to evaluate any improvements in academic test scores. We collected test scores for year 2012, 2013 and 2014.

1.8 Data Analysis

The main concept of qualitative data analysis is to gather unstructured information such as questionnaires, interviews and feedback forms derived from the above strategy to understand 'why' a situation or condition happens (Wiggins & Stevens, 1999). To enhance the analysis process, data from different sources can verify the findings (Powell & Renner, 2003). A combination of results from one-on-one interviews can be cross-examined against results derived from survey questionnaires conducted on participants after receiving our space talk.

1.9 Data Analysis using NVivo10

In an effort to acquire an enhanced appreciation of the qualitative data collected and to obtain the best desirable data representation, the Nvivo10 software was utilized for this purpose. From the data entry process it was recorded that:

- a) 112 Interviews sessions were conducted.
- b) 193 Questionnaires were completed.
- c) Over 330 Nodes were created.
- d) Over 7,000 References were generated.

5. Research Outcomes and Discussion

The outcome from the qualitative study indicated an increased percentage of interest in students in learning about science as well as aerospace science. From the data analysis conducted from 2012 to 2014, our findings indicate:

- a) 56% of students showed interest in the subject of science to begin with before attending the rocketry workshop.
- b) 97% of students found that the subject of science to be enjoyable after having attended the rocketry workshop.
- c) 79% of students have shown interest in pursuing a degree or further education in the field of aerospace and science after attending the rocketry workshop.

In addition:

- a) Data from the interviews conducted showed that 100% of the participants would recommend the rocketry workshop for others to attend.
- b) Data from the survey questionnaires conducted indicated that the rocketry workshop was fun; exciting and most importantly the exposure increased their interest in science.
- c) Data from the interviews conducted indicated that studying science and hard work are the required traits needed to become a good scientist.

Some findings from our field observation:

- a) Only 35% of students from the private school have ambitions of what they want to be when they grow up. The other 65% were without any known ambitions, they didn't seem too worried about their future.
- b) 95% of the students from the Tamil school would like to become doctors when they grow up. This is an interesting discovery indicating a high level of ambition at an early age.
- c) 80% of students from the rural school were able to complete the science experiment, which consist of measuring and mixing different percentages of chemicals within the allotted time of 20 minutes. Other schools took 40 to 50 minutes to complete the task. In addition, some of them required help from their respective teachers. They were accustomed to a form of spoon-feeding to accomplish their work.
- d) It was observed that students from the religious school showed the least sign of enthusiasm or excitement during the rocket launches, in which other schools enjoyed with great thrill. Only 33% of the students indicated interest to pursue further studies in the field of aerospace and science.

From our research, we have concluded that the linear science test scores (2012, 2013 and 2014) for students that attended our workshops showed an improved trend as compared to the control group that did not attend our workshops. Some findings from the test scores:

- a) In 2013: A year after having gone through the rocketry workshops, public students indicated a rise of an average of 3.4 points above the mean average scores for 3 years, which equates to an increase of 4.5% on average. The government cluster school from Ipoh also indicated an increase of an average of 5.5 points in their science test scores as compared to the control group that only showed an average improvement of 3.0 points per student.
- b) In 2014: 2 years after having gone through the workshops, most schools indicated a slight decline in test scores except for the private school (Asia Pacific Smart School), which indicated an average increase of 0.2 points above the mean average per student.
- c) It is interesting to note that the Tamil school students, showed improved test scores for each following year increasing from 0.5 points to 1.0 point on average per student (2013 to 2014).

We understand that there may be variables and are other factors influencing science test scores such as difficulty of the test papers, performance on test day and differences in the science syllabus. Measuring test scores are deemed not to be conclusive as described by Schaffhauser (2013) and that improvement in test scores does not necessarily equate to improvement in abstract reasoning or a person's logical thinking. With this in mind, we will continue our efforts to conduct further data analysis and device better instrumentation and methods to provide a clearer picture of the progress and performance of students in their interest towards science.

6. Conclusion and Recommendations

This research is an effort to conduct a comprehensive study on CSR practices in Malaysia related to aerospace education and its effectiveness and benefits to the youth and community. We were able to determine several factors to be true and in line with other research papers. The funding for the entire project was given through a government grant in support of providing aerospace education to

schoolchildren in Malaysia. This reinforces the fact that developing nations require government agencies to support CSR efforts to solve major social issues. After the completion and success of the first rocketry programme, AstroX received another grant amounting to RM 60,000 from the same agency to conduct advanced rocketry workshops to the other remaining states in Malaysia. The advanced rocketry workshops focused on a different segment, which were high school students aged between 15 and 18 years old and was successfully completed in 2014.

With the downturn in economy in 2015, non-profit organisations found it difficult to obtain grants to promote worthy causes. There was a need for non-profit entities to transform themselves into social enterprises to survive in the current business climate. Corporations were reluctant to invest in non-profit organisations because the measurement of success or social impact were often non-existence or unclear. To survive, NGOs required ingenuity and the desire to innovate beyond borders. Non-profit organisations needed to modify their business model by generating income to sustain their operations without relying on grants or donations (Frankel & Bromberger, 2013). This spurred the growth of social entrepreneurship in Malaysia in tandem with the global movement of this niche sector. AstroX embarked on such a journey in 2015 due to difficulties in obtaining further grants to promote science.

From our research findings we believed that there was a need for schools in Malaysia to have astronautics club as part of their co-curricular activities to add value to the current science syllabus that they are learning in school. Based on our data analysis, we were able to acquire full approval from the Ministry of Education to form astronautics clubs in all primary schools across Malaysia through the establishment of Astronautics Club Malaysia in 2015. Students are now able to enjoy aerospace education and become members of the club through their schools during the co-curricular period held fortnightly during school hours. In addition, we have developed and launched an app called GoCikgu on both Android and iOS platform to help educate schoolteachers on how to adopt and run our programmes in their schools. The app is also made available for the public and students to download.

To step up our efforts, we have proposed to the Ministry of Education to increase the frequency of co-curricular activities during school hours to twice a week. We have also pushed for an increase in the activity time to 4 hours per session. The ministry explained that they do not have any spare period or time to be converted into co-curricular activities. We predict that with an increase in hours of exposing children to learning science and astronautics, there will be a better rate of conversion of students into the field of science from 79% to the range of 85% to 90%. This is an area that will require further research and understanding.

In conclusion, it can be seen that obtaining funds with the objective of promoting science through aerospace education can be a daunting task in Malaysia especially with the scarcity of grants available. However, by understanding key factors involving CSR trends and the current state of science literacy of students in Malaysia, one is able to explore various options and avenues in obtaining funding for the intended purpose. Another option is to embark on a transformation process and become a social entrepreneur to promote this worthy cause.

Acknowledgement

This paper is a result of a collective effort by members of AstroX who are dedicated and passionate in promoting the knowledge of science and aerospace to schoolchildren across Malaysia. AstroX was awarded second runner-up for innovation in social entrepreneurship during the national 2016 New Blue Ocean Strategy (NBOS) competition.

References

Chaleunvong. (2009). Data collection techniques. *Training Course in Reproductive Health Research*. Vientiane: GFMER.

E-JOURNAL OF THE GLOBAL SUMMIT ON EDUCATION 2017 (GSE 2017).

(E-ISSN 2289-6880). 4th December 2017, Melia, Kuala Lumpur, Malaysia. Organized by

<https://worldconferences.net>

- Feeman, I., & Hasnaoui, A. (2010). The meaning of corporate social responsibility: The vision of four nations. *Journal of Business Ethics* , 100, 419-413.
- Frankel, C., & Bromberger, A. (2013). *The Art of Social Enterprise: Business as if people mattered*. Gabriola Island, Canada: New Society Publishers.
- Garriga, E., & Mele, D. (2004). Corporate social responsibility theories: Mapping the territory. *Journal of Business Ethics* , 53, 51-71.
- Geva, A. (2008). Three models of corporate social responsibility: Interrelationships between theory, research and practice. *Business and Society Review* , 113 (1), 1-41.
- Goi, C. L., & Yong, K. H. (2009). Contribution of public relations (PR) to corporate responsibility (CSR): A review on Malaysia perspective. *International Journal of Marketing Studies* , 1 (2), 46-49.
- Hollender, J., & Breen, B. (2010). *The Responsibility Revolution: How the next generation of business will win*. San Francisco: Jossey-Bass.
- Javier, P. V. (2005). Corporate social responsibility: Teaching corporate social responsibility. *Caribbean Business* , S10.
- Leech, N. L., & Onwuegbuzie, A. J. (2007). An array of qualitative data analysis tools: A call for data analysis triangulation. *School Psychology Quarterly* , 22 (4), 557-584.
- Lu, J. Y., & Castka, P. (2009). Corporate social responsibility in Malaysia: Experts' views and perspectives. *Corporate Social Responsibility and Environmental Management* , 16, 146-154.
- Martin, M. O., Ina, V. S., Mullis, Foy, P., and Stanco, G. B. (2012). *TIMSS 2011 International Results in Science*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center.
- Michael, B. (2003). Corporate social responsibility in International development: An overview and critique. *Corporate Social Responsibility and Environmental Management* , 10, 115-128.
- Ministry of Education. (2013). *Malaysia Education Blueprint 2013-2025*. Retrieved from <http://www.moe.gov.my/userfiles/file/PPP/Preliminary-Blueprint-Eng.pdf>
- Organisation for Economic Co-operation and Development. (2013). *PISA 2012 Assessment and Analytical Framework: Mathematics, Reading, Science, Problem Solving and Financial Literacy*. OECD Publishing.
- Organisation for Economic Co-operation and Development. (2015). *PISA 2015 Results: Excellence and Equity in Education*. OECD Publishing.
- Perrini. (2006). SMEs and CSR theory: Evidence and implications from an Italian perspective. *Journal of Business Ethics* , 67, 305-316.
- Philips, E. D. (2006). Corporate social responsibility in aviation. *Journal of Air Transportation* , 11 (1), 65-87.
- Powell, E. T., & Renner, M. (2003). *Analyzing Qualitative Data*. Madison: University of Wisconsin-Extension.

Rahman, A. A., Md Hashim, M. F., and Bakar, F. A. (2010). Corporate social reporting: A preliminary study of Bank Islam Malaysia Berhad (BIMB). *Issues in Social and Environmental Accounting* , 4 (1), 18-39.

Schaffhauser, D. (2013). *Improving test scores doesn't equate to improving abstract reasoning*. Retrieved from <https://thejournal.com/articles/2013/12/12/research-opping-test-scores-doesnt-equate-to-improving-abstract-reasoning.aspx>

Singh, T. R., Yahya, S., Amran, A., and Nabiha, S. (2009). CSR and Public Bank Berhad (Malaysia). *Global Business and Management Research: An International Journal* , 1 (3 & 4), 25-43.

Steiner, J. F., and Steiner, G. A. (2009). *Business, Government, and Society: A managerial perspective*. New York, NY: McGraw-Hill/Irwin.

Taneja, S. S., Taneja, P. K., & Gupta, R. K. (2011). Researches in corporate social responsibility: A review of shifting focus, paradigms, and methodologies. *Journal of Business Ethics* , 101, 343-364.

Thompson, P., and Zakaria, Z. (2004). Corporate social responsibility reporting in Malaysia: Progress and prospects. *The Journal of Corporate Citizenship* , 125-136.

Wiggins, M. W., & Stevens, C. (1999). *Aviation social science: Research methods in practice*. Aldershot: Ashgate Publishing Ltd.

Zulkifli, N., & Amran, A. (2006). Realising corporate social responsibility in Malaysia: A view from the accounting profession. *The Journal of Corporate Citizenship* , 101-114.

Appendix A

FEEDBACK FORM

Your feedback is very important to us and we value your views and comments. Please take a moment to complete the questionnaire below so that we can continue to improve the programme.

1. How exciting was the rocketry workshop?

Very Fairly Not very Not at all

2. How useful was the workshop in helping you understand the subject?

Very Fairly Not very Not at all

3. Did the speaker speak at the right speed?

Just right Not clear Too quiet

4. What is your favourite part about the rocketry workshop?

5. What is your least favourite part of the rocketry workshop?

6. In your opinion, does attending the rocketry workshop benefit you?

Yes No

7. What are some life skills that you learned in the rocketry workshop?

8. Which life skill do you think is most important to follow no matter what?

9. You may also share any additional comments about the rocketry workshop:

Thank you.

Appendix B**INTERVIEW PROTOCOL****STUDENT PARTICIPANT**

1. What's your favourite subject in school? _____
 - If the student says s/he loves SCIENCE, then ask why and what is his/her favourite part.
(Go to Question 3 and skip Question 2)
 - _____
 - If s/he does not mention SCIENCE, ask if SCIENCE is enjoyable.

2. What about science do you enjoy?

3. Would you like to study AEROSPACE SCIENCE when you go to secondary school, college or university? Yes/No
 - If the student says that they would like to, then ask him/her what it is that created this desire to study AEROSPACE SCIENCE.

4. You recently were taught various skills during the rocketry workshop. Have you ever built a rocket before this programme? Yes/No
5. What is your favourite part about the rocketry workshop?

6. What is your least favourite part of the rocketry workshop?

7. What are some of the skills you learned (particular task completed for example)?

8. What are some new terms you learned (tech jargon)?

9. What are some life skills you learned in the rocketry workshop? (eg. Teamwork, Responsibility, Safety Awareness, Independence, Listening to Instructions, Pursuit of Knowledge, Helping each other, Respecting your elders, Being Honest, Integrity)

10. Which life skill do you think is most important to follow no matter what?

11. What does the phrase "Pursuit of Knowledge" mean to you?

12. How can you become a good scientist?

13. What does integrity/honesty mean?

14. Would you recommend this rocketry workshop to your friends? Yes/No
Why?

Thank you.