science & technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

NATIONAL SCIENCE WEEK

Review of the First Ten Years of the National Science Week Programme of the DST

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Final Project Report

Submission date: 20 October 2011

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Appreciation

To the various stakeholders – SAASTA and DST management and leadership, stakeholders in other countries running similar initiatives, Grant Holders, Scientists, Educators, Learners and other key stakeholders in the sector who contributed to this report, we would like to extend our sincere gratitude for the input provided over the duration of the project.

The project team who delivered on the review included the following:

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- Daleen Botha (Editor)

Executive Summary

Introduction

The National Science Week (NSW) is a flagship initiative of the Department of Science and Technology (DST) that promotes public awareness and engagement with Science, Engineering and Technology (SET). The NSW celebrated its ten year anniversary in 2009. The DST considers the ten years of the existence of this initiative a milestone; hence, a decision was taken to review the NSW.

This review is commissioned by the DST and the Department intends to handle the results of the review in the following way:

- The highest level to which the review results will be presented is the Minister of Science and Technology and the Department's EXCO; and

- With the approval of the Minister of Science and Technology, the results of the review will be shared with key stakeholders in the National System of Innovation (NSI).

About the NSW

Over the period under review, implementation of the NSW followed a number of approaches. From 2000 – 2002, a tri-provincial model was followed (the NSW was implemented in three provinces and rotated to another three provinces the following year, covering all nine provinces over a three-year period). The approach shifted to a one-site approach in all provinces in 2003 and expanded from 2004 – 2009 to include multiple sites in all provinces.

DST is responsible for the provision of funds and implementation guidelines to implement the NSW. SAASTA is the implementing agency and takes on the responsibility of being the national coordinator of the NSW. Activities organised and conducted during the NSW are intended to respond to a set of objectives which include the following:

- NSW objective 1: Contribute to the development of a society which values and appreciates Science, Engineering & Technology (SET);
- NSW objective 2: Provide a platform for scientists to engage each other and also to engage with the non-scientific community;
- NSW objective 3: Promote partnership between media and scientists;
- NSW objective 4: Profile the work of the DST and its priorities; and
- NSW objective 5: Attract learners to SET careers.

Purpose of the study

The objectives of the review included the following:

> **Study objective 1: Impact of the NSW (Results):** An assessment of the extent to which the NSW met its five objectives and the extent of capacity development of the Grant Holders

Study objective 2: Implementation aspects: Identification of implementation achievements of the NSW including coverage, successes/best practices that emerged over the years, weaknesses of past years, as well as international benchmarking to inform the improvement of the NSW

Study objective 3:

Process aspects: The TOR provides various evaluation questions to be responded to in the review.

These process aspects include:

- An assessment of value for money of the Government-funded initiative;

- An assessment of inclusivity of the NSW in terms of DST/SAASTA programmes and inclusivity in terms of the National System of Innovation (NSI);

- Profiling Mathematics and determining the synergy of the National Science Week and National Maths Week;

- Assessing whether the NSW accommodates the nation building and transformation agenda and cultural/linguistic diversity;

- Determining the most appropriate timing of the NSW;

- Establishing whether the NSW is a national brand, whether sufficient branding occurs, target beneficiary understanding of the role played by SAASTA/DST/NSW and whether the NSW has enhanced the image of the DST;

- Determining how South Africa can participate itself in terms of intergovernmental initiatives such as SADC SET Week; and

- Identifying the institutional arrangements of DST and SAASTA and capacity to enhance the NSW.

Methodological approach

The following methodological approaches were used to meet the objectives of the review:

- Literature review and desktop analysis of secondary data;
- Document review and analysis of primary data sources, which included Grant Holder documentation, financial statements and some media clippings;
- Primary data collection and analysis, which included in-depth interviews (face-to-face) with DST and SAASTA officials responsible for implementing the NSW; in-depth focus group interviews with a sample of learners and students at Higher Education Institutions (HEI's); as well as with various officials at DST implementing other science awareness programmes;
- Interviews (face-to-face and telephonic) with a small sample of journalists engaging with SET and a sample of learners across provinces who attended the NSW;
- Interviews with DST leadership (Minister Naledi Pandor and EXCO forum members);
- Site observations of the 2011 National Science Week and;
- In-depth interviews with the following stakeholders:
  - Grant Holders;
  - Scientists;

- o Leadership representing Mathematics (including SAMF, NMW stakeholders, AMESA, SANCIMU); and
- o Stakeholders implementing similar science weeks in Australia, Canada, the United Kingdom and Spain.

Findings

The following key findings and recommendations are an outcome of the review:

<u>Involvement of NSI stakeholders</u>:

Stakeholders of the NSI include primarily private enterprises, universities and public research institutes and the people within them. The following are some findings and recommendations of the review in terms of participation or lack thereof:

- **Participation of Government Departments**: The Department of Education's participation was an integral component in the success of the multi-sites NSW implementation approach. Involvement of Provincial and District Departments of Education was pivotal in facilitating school participation in the NSW and the majority of Government stakeholders included District Education Departments across provinces. These also constituted Education Research Centres (ERC) and (EDC).

  Over the review period, three National Departments were involved; however, there is no consistency in the involvement of Departments other than the Department of Education. The Department of Minerals and Energy (DME) participated in the NSW as a Service Provider (providing their own funding) in 2008 but was no longer involved in 2009. The Department of Rural Development and Land Affairs (DRDLA) was involved as a Service provider in 2008 and 2009 and the Department of Agriculture (DOA) was involved as a Grant Holder in 2009. Cooperation between the DST and National Departments can be enhanced.

  Various DST programmes already engage with other National Government Departments through MOU's. A first step for the DST going forward could be to gain a greater understanding of these MOU's. Considering *the compilation of a database of projects* that highlights the outputs of MOUs according to various themes, may be beneficial to the NSW. This could be updated quarterly or annually.

  At provincial level, it may be worthwhile determining which factors improve the likelihood for partnerships between provincial departments and the DST by looking at those Provincial Departments of Education who have built the NSW as part of their annual plan. These factors may contribute to directing further marketing at provincial level to gain buy-in from those Departments that have a mandate of education, youth or rural development to contribute in an appropriate way to the NSW (creation of partnerships). At local level, Local Government making street poles available as their contribution towards the NSW leading up to the NSW is one of the examples for their support in terms of the NSW. It is worthwhile for the DST to determine whether the different spheres of Government would partner through such contributions and to identify the ways that various National, Provincial and Local Government institutions believe they could add most value to enhance the NSW.

- Where there is buy-in from the different spheres of Government, an MOU may be a viable option to solidify the partnership. To support actions as a result of the MOU, *an implementation plan should be developed annually* that includes activities that target this sphere of Government and activities that each National, Provincial and Local Government stakeholder commits to. The review found that because the MOU was signed so many years back by the Department of Education, its impact in terms of support has been distilled and perhaps this is the reason for challenges experienced in some provinces.

- **Science Councils, Science Centres and HEI participation**: The participation of HEIs across the years was generally low. Out of the 23 HEIs in the country 11 (48%) have participated in the NSW. Participation in each year has typically been between six and seven HEIs. The participation of Science Councils gradually increased from 2005 when five of them partook in the NSW, to 2009 when 12 of them were involved in NSW activities. Science Centres' participation has generally been high.

- **Policy**: **The absence of a National Strategy on Science Awareness** – there is no guideline in place for NSI stakeholders. The development of a *National Strategy on Science awareness* would provide guidance for NSI stakeholders and could support the opportunity for funding being leveraged by these stakeholders who want to be involved in the NSW. It is likely that some NSI stakeholders would commit some of their budget to the NSW, should planning for the programme take place early.

- **Grant holder participation**: Of the 133 Grant Holders that participated in the NSW from 2003 to 2009, the majority of them (n=83; 62%) were involved for a short time i.e. one to two years. Grant Holders who came on board and experienced the NSW for a short period of time either did not want to be involved after a year or two, or were not re-selected due to not being suitable Grant Holders. The majority of Grant Holders interviewed (above 75%) alluded to raising public awareness and exposing learners to Science and SET careers as the key force behind their participation. Most of the Grant Holders are themselves involved with Science at different levels. For that reason, they view NSW as a platform to showcase science and its role in people's daily life, support science educators and encourage learners to study science subjects and take up SET careers. Most Grant Holders are motivated to participate in NSW because its objectives tie in with their mandates*.* Another motivating aspect mentioned by a number of Grant Holders is the availability of funding. There is room for stakeholders to drive their mandates using funding provided by DST and SAASTA. Another bonus feature attached to participation in NSW that some Grant Holders allude to as a motivating factor is the exposure that they get. The 22% of Grant Holders involved in the NSW for a medium (3-4 years) and the 16% involved for a long period of time (5-7 years), indicated that collaboration and networking opportunities afforded through the NSW, were beneficial. Many of them also indicated that their capacity was built through SAASTA's technical support provided in terms of project management, report writing as well as financial management.

  Across the years sampled within the review period (2003, 2005, 2007, 2009), the most common NSW activities included lectures, presentations, demonstrations; career guidance; role modelling workshops for learners and educators; science shows and experiments; and community and educational tours. Activities undertaken align with both the deficit model of public understanding and the model of public engagement, suggesting that a dual approach is useful given the varied objectives of NSW.

- Stakeholders interviewed indicated that ideally more organisations should come on board and participate in the NSW. **A marketing drive and building/nurturing relations with organisations** across the country could encourage participation in the NSW by more organisations.

- It is recommended that future NSWs include *more sector representation of stakeholder groups*. A starting point could be the identification of individuals within HEIs, Science Councils, spheres of Government (National, Provincial and Local) and NGOs who are involved in SET issues and could enhance the quality of activities presented at the NSW. It is also recommended that a budget for NSW implementation be apportioned to Science, Technology, Engineering, Mathematics and Innovation (STEMI). *Building a database of individuals and organisations and their value adds to SET* will assist in determining, on a continual basis, which sectors are well represented and which sectors need further representation.

- The combination of an up-to-date database as well as a continuous drive to build relations and gain the buy-in and support of individuals and organisations in terms of their contribution to the NSW would make it possible to ensure sector representation of Grant Holders and Service Providers (those willing to contribute their own resources to the NSW).

- **Lack of knowledge and awareness of the call for proposals** has been identified as hampering the involvement of other organisations in the NSW. Grant Holders and Scientists indicated that other organisations were not part of NSW because they simply are not aware of the funding opportunity awarded by SAASTA and DST and they may not be aware of the purpose of the NSW and how they could contribute. As a recommendation, an *implementation plan is proposed for the next phase of the NSW*. As a starting point, an assessment of the level of involvement of current NSI stakeholders against the potential contribution of these stakeholders to the NSW would be worthwhile. Almost all NSI stakeholders that have been identified in one way or another complement one or more of the NSW objectives. NSI stakeholder involvement in the NSW should be objective-driven by considering what they do (their service offerings and strengths in terms of SET awareness they could provide) and how this complements the NSW objectives. Aligning these aspects to an implementation plan that identifies, for example, what activities the CSIR or NRF provide and which NSW objectives they align with, could be a powerful means of enhancing the NSW.

Synergy between the NSW and related intergovernmental initiatives:

South Africa is a member of both regional and continental intergovernmental bodies such as the South African Development Community (SADC) and the African Union (AU). As a result, the DST participates in science and technology activities that are part of these bodies' agendas, including the promotion of science awareness.

The SADC SET week was launched in Mauritius in 2010. Other African countries within SADC and beyond have started following the way South Africa celebrates SET week. On an annual basis, South Africa is approached by other countries to participate in their NSW events. The current challenge is that South Africa has no strategy in place to participate in cross-border activities. With each invitation by other African countries, South Africa races around to see what can be put together to participate. The DST deals with the situations as they arise - which is proving to be a difficult approach to sustain.

DST and SAASTA stakeholders were interviewed to explore the best way for South Africa to organise itself to participate in intergovernmental activities and impart knowledge to other countries in the region and in Africa. The following recommendations were made:

- ***Establish cross-border guidelines or a cross-border strategy for public awareness programmes***;
- Provide mentorship to delegates who visit Grant Holders and Service Providers through a hands-on experience of a NSW. As part of the delegation, include a pre-visit needs assessment interview to understand their expectations and a post-visit round table session to share valuable lessons learnt and experiences of the event;
- Identify information sharing opportunities and communicate regularly to share findings and experiences of the NSW with other countries. This is a cost-effective way of building relations and marketing South Africa as a leader globally in terms of National Science Weeks;
- A cross-border strategy should be implemented through an MOU and an intergovernmental Science awareness implementation plan developed at the start of the new NSW project life cycle; and
- Dedicate a small portion of the NSW budget (no budget currently provided for this) to support efforts of cross-border initiatives.

NSW's contribution to the cultural and linguistic environment of South Africa:

On the whole, NSW positively contributed to nation building and transformation agendas of the country during its first ten years of implementation, especially from 2005 with the multi-sites approach. In the next phase of the NSW, care should be taken to ensure that measures taken to address inequality do not eliminate some people and compromise nation building and transformation. An exclusive approach of focusing on only Africans is not as ideal as involving all race groups in the celebration of NSW. The NSW should include all sections of the population. There should be a sense of belonging by all cultures and race groups when it comes to the NSW and a level of participation by NGOs and industry that represents all cultures and race groups in South Africa.

In terms of cultural and linguistic contributions made by the NSW, the use of local languages during some NSW presentations, broadcasting on radio in all 11 languages, outreach to all areas in South Africa and activities that emphasised South Africa's cultural and linguistic environment, such as excursions and tours of mines and IKS activities. However, the majority of activities provided during NSW events over the period under review; materials published and distributed; and NSW messages provided, were in English. Without increasing the NSW budget significantly, a communication strategy should be put in place for future NSWs that emphasises the building of relations with a wide range of Public Relations Companies and Media Organisations (print and electronic media) that represent the eleven official languages. Media releases in an extended range of media sources should be encouraged and targets should be put in place to enhance SET reporting around the NSW as well as SET reporting beyond the NSW. Journalists, TV and radio presenters across cultures and linguistic groups should be identified and included as part of a media marketing campaign. Such a campaign should be planned in detail in terms of regularity and format of increased publicity and communication to all cultures and racial groups in all 11 official languages.

A communication strategy was developed and revised for the NSW. The communication strategy should include details of how the NSW can maximise its contribution to South Africa's nation building and transformation agendas or the country's cultural and linguistic environment.

NSW Achievements:

In terms of coverage and outreach, during the period (2004 – 2009), the NSW contracted 86 Grant Holders to implement NSW activities, reaching 34 of the 54 districts across all nine provinces and 1,023,132 participants who were reported to attend NSW activities.

There was coverage of previously disadvantaged areas by 70% of the Grant Holders, a significant achievement of the NSW for the ten-year review period. The following illustrates the distribution of 2009 NSW sites across District Municipalities:

Distribution of 2009 NSW Grant Holders across District Municipalities

LIMPOPO (5)
1. Vhembe – 5
2. Mopani – 2
3. Capricon – 1
4. Greater Sekukune - 1

NORTH WEST (4)
1. Central – 1
2. Southern – 3
3. Bojanala – 1
4. Bophrima - 2

MPUMALANGA (3)
1. Gert Sibande – 3
2. Ehlanzeni - 3
3. Nkangala - 2

GAUTENG (5)
1. City of Tshwane – 8
2. City of Jo'burg – 6
3. Sedibeng – 1
4. Metsweding - 1

LEGEND
☐ Provinces
☐ District Municipalities
♦ Sites

FREE STATE (5)
1. Motheo – 5
2. Fezile Dabi – 1
3. Lejweleputswa – 2
4. Xhariep – 1
5. Thabo Mofutsanyane - 1

NORTHERN CAPE (5)
1. Frances Baard - 3

KZN (11)
1. eThekwini – 5
2. Uthukela – 1
3. Uthungulu – 4

EASTERN CAPE (7)
1. Alfred Nzo – 1
2. Amatole – 5
3. Cacadu – 2
4. O.R Tambo – 1
5. NMM – 2
6. Capricon - 4

WESTERN CAPE (6)
1. Overberg – 2
2. City of Cape Town – 6
3. Cape Winelands - 1

Scale 1:10337440

0 50 100   200 km

Value for money:

Over the years, DST has invested considerable resources into the NSW. More than R 22 million was spent on the implementation of NSW over three of the sample years (2005, 2007, and 2009) in the review period. In this same period, almost R 12.5 million was granted to 42

organisers in 2005, 45 in 2007 and 75 in 2009 to undertake a variety of activities to promote greater understanding and engagement in SET, mainly among learners and educators.

Unfortunately, SAASTA did not collate additional contributions leveraged by Service Providers who partook in the NSW out of their own and Grant Holders rarely provided sufficient details in site reports to calculate additional money leveraged. However, the review identified that a significant amount of additional money was leveraged from grants awarded and it is recommended that a system be put into place to determine the amount leveraged as a result of money spent on grants.

Key findings in terms of whether the NSW met its five objectives:

Of the three objectives that the review responded to, the objective of determining the extent to which the NSW met its five objectives was the most difficult. ***There was no results chain mapped to identify the expected outputs, outcomes and impact of each objective***.

Inputs in terms of activities and implementation aspects were collated by reviewing all Grant Holder proposals and site reports for 2003, 2005, 2007 and 2009 and determining which activities Grant Holders focused on. Outputs, in terms of outreach, were determined through analysis of final report numbers provided through annual reports by SAASTA to DST.

Findings from desktop analysis as well as interviews with Journalists, Scientists and learners are still being collated to determine which objectives have been met. Currently, the following can be ascertained:

- **Objective 1 (contributing to a society that values and appreciates SET):** Learners have been the dominant focus of the NSW (around 85% of the target audience), followed by Educators (around 5% of the target audience) and the general public (around 10% of the general public). In 2009, a total of 204,174 stakeholders were reached by the NSW.

  Raising science awareness, promoting science exposure and creating science interest has been cited as the main achievement of NSW by more than 75% of Grant Holders interviewed. Grant Holders cited the following achievements in this regard:

  o Exposing learners to the role of science in their daily lives,
  o Exposing learners to scientific practises in scientific environments for example tours to sites where science is practised; and
  o Exposing learners to different scientific activities, practises and experiments.

  The majority of learners interviewed (more than 70%; n=32) believe that the NSW is great and beneficial to them. Many learners come from rural and disadvantaged schools and said that the NSW provides them with exposure to science experiments for the very first time. This same group of learners would prefer to have enough time to absorb and apply what they have learned at NSW, but doing so in August is quite late.

  An earlier time would work best for them and not clash with their exam preparation. Hosting the NSW in May was indicated, by most of the stakeholder groups interviewed, as the most appropriate time.

- **Objective 2 (providing a platform for scientists to engage each other and the non-scientific community:** Because NSW is primarily focused on the engagement of scientists with learners, many scientists do not get an opportunity to engage with each other. Because the NSW is busy, the majority of scientists interviewed (more than 70%) would prefer to focus on learners. However, some scientists (32%) feel that it would be worthwhile to create informal settings within NSW for scientists to engage with each other. Although a large percentage interviewed already feel that they do this within their disciplines at conferences and workshops, nonetheless, the network opportunities would still be appreciated (peer learning within a cross cutting environment).

  In terms of scientists engaging with the non-scientific community, there is a strong appreciation by the scientific community for the opportunity that NSW provides them to be able to share with the public. Especially those organisations where the public is not part of their focus, being able to share and bring forth what they are working on with learners allows them to make their insights and activities accessible and relevant at the same time.

- **Objective 3 (Promoting partnership between media and scientists):** This objective has not been met through the NSW to date and no activities could be identified that aimed to meet this objective in any way. Awareness of the NSW is raised through publications in advance of the NSW and during the NSW. Media are invited to the National Launch but little more is currently done. The general trend is that journalists publish based on space bought by the DST, especially press releases sent through by the DST.

  There is a need for NSW to promote something exciting that will attract the attention of journalists so that they can report on it. Scientists and the DST media department outlined that the media are engaged when there is something that appeals or is of interest to them and is part of an important breakthrough. Scientists mainly report through science journals or when engaging the media as part of a government sponsored campaign or within an organised event.

  This limits the reach of their research findings and adds to distance of science as a public-interest topic. Scientists feel that media coverage of the events is not broad enough to share important information with the public and there is a need to 'de-mystify science' in the public eye and there is a strong need to make science more understandable to the general public though popular media.

- **Objective 4 (Profile the work of DST and its priorities):** Objective 4 has been met through National Launches being opened by the Minister. In terms of branding, promotional and educational materials have been correctly branded during the NSW using the guidelines provided in the Project brief to SAASTA and the DST logo has always been placed at the top in the centre. There is correct usage and positioning of logos. All Grant Holders interviewed, correctly described the branding requirements. Site visits conducted by the Evaluation team during 2011 found that branding was visible at NSW sites visited. However, the amount of branding varied across sites.

  The review found that the NSW is a national brand limited to those stakeholders involved, to parents and friends of learners who attended the NSW and to a lesser extent, to the general population who saw, read or heard about the NSW. There is a low level of brand awareness of the NSW within the general population.

Learners reported knowing little about the NSW until they heard about it at school – stakeholders recommended that the NSW as a DST initiative, needs to be advertised and promoted more.

Projective elicitation was done with a sample of learners and students in two of the nine provinces where the NSW was implemented during the review period. The purpose of the elicitation was to establish the levels of recall of brand logos by learners by presenting each brand separately, using pictures of each logo as well as photos of banners and branded materials used during the NSW. The review found that the NSW logo was strongly associated with the core value proposition of promoting science and technology, especially the Science Week, emphasising career guidance and information.

The brand persona projected for the NSW by learners and students is the following: relatively young, intellectual, confident, hard-working, motivated and approachable (open and friendly). This brand image provides reassurance to learners and students that they are embarking on a future that is attainable, through belief in themselves and that maths and science are not difficult. Trust and respect for the brand is portrayed and it is related to as a friend.

Learners perceived all three brands (NSW, SAASTA and DST) to be concerned with SET and its promotion. Careers and people involved with these organisations were considered hard working and having a high self-esteem. The overarching essence is that of knowledge and a shared future focus emphasising improvement to a better future world.

The display of NSW logo's on items such as T-shirts and school bags as utility items that are kept by students, seem to have the ability to carry the brand and brand associations beyond the execution period.

Experiences that are associated with the NSW brand are critical determinants of perceptions, associations and future expectations and engagement with SET related activities. Learners as the recipients of the information and end-target within the South African population related their experiences in various ways. On an emotional level NSW created excitement, motivation and fascination. Involvement in NSW activities on a functional level provided:

- o Exposure to SET careers and bursaries to pursue them;
- o Learning about endangered species and environmental protection;
- o Learning about how SET work in everyday items such as magnets and cars;
- o Seeing and experiencing experiments in physics and chemistry; and
- o Winning prizes.

- **Objective 5 (Attracting learners to SET careers)**: It is unclear what the progress of NSW has been in terms of meeting Objective 5. The primary reason for this is the absence of rigorous monitoring of the NSW against intended objectives. As an outcome of the review, a revised monitoring instrument was provided to the DST and SAASTA that other than observation at sites includes informal interviews with Grant Holders, Scientists, Journalists and Learners who are present at NSW sites. Tracking learners, an activity that HSRC began to do, is required to determine NSW's influence on career choices.

Without increasing costs significantly for tracking information on learners' experience at NSW activities and their influence on career interests, could be collated through informal interviewing during the NSW.

Grant Holders had different perspectives on what NSW must do in future to achieve this objective. A quarter of interviewees thought that specific activities, most notably role modelling, must continue to be implemented to influence learners' career decisions. Other activities believed to be important in this regard are community and educational tours that expose learners to SET career practice in "real time" and science competitions. It is assumed that as long as the activity is motivating and sparks learners' interests, it has the potential to influence their career aspirations.

An analysis of data collected through grant holder documentation reviewed for 2003, 2005, 2007 and 2009, indicates that Grant Holders started targeting foundation and intermediate phase learners from 2007. Most of the emphasis of NSW falls within Senior Phase and FET phase. Targeting the intermediate and senior phase would provide a higher likelihood of the NSW influencing subject selection and encouraging learners to improve their performance in pure Maths and Science. Targeting FET seems helpful in assisting where the school curriculum does not manage to cover science experiments and allows the opportunity of learners clarifying options for careers.

Silo-syndrome within the DST and SAASTA units limits the extent of impact that could be made by DST's public awareness programmes:

The review found that silo-syndrome exists with little collaboration across the DST and across SAASTA.

Interviews with DST's leadership (Ministry and EXCO) confirmed that the NSW is an initiative worth continuing. In its next cycle, a shared vision is for the NSW to "*retain its public awareness character*" and ensure that it possesses a multi-disciplinary character inclusive of the range of focus areas (Science, Technology, Engineering, Mathematics and Innovation), as well as inclusive of a broad range of National System of Innovation stakeholders. Space used for activities should be much more structured, dealing with a story (such as space) rather than small parts of the story (a theme per area representing the value chain). Activities should be presented by professionals who can communicate and engage well at the level necessary for the target group of beneficiaries they present to. There should be an emphasis on coherence, coordination and collaboration across sub-programmes of the DST and units of SAASTA, with stakeholders working together. A task team is proposed to ensure the elimination of silo-syndrome, allow for early planning of the NSW at least one to two years in advance and the provision of feedback relating to achievements towards preparations for implementing the event.

The benefits of coherence, co-ordination and collaboration include the following:

- **One voice of the DST**: Having separate public awareness programmes sends the message of disparity.

- **Achieving an impact against all five NSW Objectives**: Each Unit focuses on their target audience and in so doing, all five objectives of the NSW are reached in an inclusive approach to all target beneficiaries.

- **More stakeholders adding value**:   Some Units have leveraged support and partnerships from other National and Provincial Government Departments already. An example includes the IKS Unit that has 14 National Departments as well as Provincial Departments who form part of the planning committee for the IKS Expo. Some of these partners already build the IKS Expo into their business plan and provide additional funding to ensure the success of the Expo.

- **A larger budget and maximising savings**:   Consolidation of science awareness programmes with continued buy-in and leveraging of money across stakeholders supporting and implementing the NSW and related initiatives reduces the likelihood of spending money or time on the duplication and maximises the likelihood of creating a meaningful change in South African citizens.

- **Eliminating duplication and expanding best practices that exist within the DST**:   Of particular relevance is the success that the IKS Unit has had in terms of leveraging additional funding for their science awareness programme. A key reason for this success is a dedicated institutional collaboration person whose sole responsibility is to do fund-raising for the IKS Expo. Consolidating science awareness programmes and committed dedicated personnel for marketing, publicity, fund-raising, etc. will increase the likelihood of not only an enhanced NSW, but also of Units spending time and resources duplicating activities.

It is recommended that the NSW and extended activities would be part of all Units' business plans, which implies unified ownership across the DST in terms of science public awareness.

Institutional capacity to deliver an enhanced NSW:

In terms of the ability to deliver the NSW, the NSW implementation team have the necessary expertise to successfully manage implementation of the NSW. As the NSW has broadened its coverage, the current Implementation Model and approach, which relies on calls for proposals, becomes an administrative challenge because there is insufficient human resource capacity. The current team successfully manage implementation of the NSW but not without very long hours and a commitment to the excellence they strive for.

SAASTA currently provide administrative value to successfully implement the NSW. However, because SAASTA officials are stretched to their full capacity, content improvement of the NSW has not been a focus. SAASTA as an organisation has grown in the past six years in terms of the various projects implemented on behalf of the DST - the number of multi-million rand projects implemented by the same NSW team has also significantly increased over the years. However, the staff complement has not sufficiently increased to provide enhanced service delivery. There is currently insufficient human resource capacity (the number of hands to do the job) at SAASTA to implement an enhanced NSW. With three resources to manage nine Grant Holders in 2004 and four resources to manage more than ten times the volume of Grant Holders in 2011 in addition to managing an array of other multi-million rand projects, it is highly possible that institutional capacity to deliver enhanced programmes is less attainable.

Conclusion and recommendations

With the vast range of insights gathered during the review, it is essential to consider the current implementation model and propose a revised implementation model for the future of the NSW.

The 2012 – 2016 NSW proposes an Implementation Model that focuses on partnering with NSI stakeholders (Government Departments at National, Provincial and Local level; Science Councils; Higher Education Institutions; and Industry) and encouraging them to contribute their expertise, time and resources in terms of STEMI. Grant funding would be one mechanism available to organisations who can provide valuable contributions to the objectives of the NSW and who do not have sufficient financial resources to do so without DST funding.

There is no doubt that the NSW should be continued. There is not one year that can be identified during the ten year the ten years of NSW implementation under review (2000 – 2009), where the NSW was not delivered. In each year, efforts were made to improve in terms of outreach to target beneficiaries. In this context, the two divisions of the DST and SAASTA are suitable to implement the NSW.

This review identified the type of adjustments required to take the National Science Week from current practice to next practice. A next practice NSW would be seen as a national initiative that celebrates all aspects of science in terms of Science, Technology, Engineering, Mathematics and Innovation. It would be an opportunity in the year where achievements across STEMI are acknowledged at the highest level and showcased during the week.

A next practice NSW has a number of characteristics described in this report. These include **collaboration and ownership** by a variety of stakeholders across Government and the NSI; a task team inclusive of stakeholders from sub-programmes and units across the DST and SAASTA and other key stakeholders to provide **strategic direction conceptually**; a **clearly defined strategy** with **appropriate objectives** and focus areas **that have measureable indicators** in place; a **knowledge management system**, and a **revised funding mechanism**.

The DST and SAASTA could consider the **establishment of a public engagement forum or sub-forums for each stakeholder group** (learners, students, parents, the general public, scientists, journalists, Government, Science Councils and Science Centres, Inter-governmental stakeholders, as well as other Grant Holders and Service Providers). A formal public engagement platform before and after a NSW event would provide the opportunity for reporting and press releases at no cost, increasing public awareness of DST and its initiatives. This could allow the opportunity for scientists to engage each other, demonstrate to citizens that the NSW is 'world-class' and it could allow the application and management of stakeholder expectations before and an assessment of stakeholder satisfaction after the NSW.

A next practice NSW would **determine where the strengths, in terms of marketing and relationship building expertise, are currently** (high-level performers within the DST and SAASTA who successfully leverage partnerships and additional funding for public awareness programmes currently) and how to embark on active marketing in light of this.

A marketing strategy will be a key constituent for the 2012 – 2016 NSW Implementation Model to be successful.

A next practice NSW would include **an all-encompassing name** to demonstrate inclusivity, it would have **formalised participation with international initiatives** and regular sharing of best practices and lessons learnt with global role-players and specific support to other African countries with a formalised cross-border strategy in place. **Political support** and **capacity development** would be continued. There would be **detailed planning early** for all focus areas of the NSW, providing quality activities at suitable venues and planning cost-effective media coverage with the collection of key data that determines whether indicators have been met. A next practice NSW would have **good communication** to raise awareness and market the NSW, with continuous communication amongst task team and steering committee members to ensure enhanced programme content.

The next cycle of the NSW should include budget line items for the following:

- **Capacity Development and/or skills transfer**;
- **Monitoring and evaluation feedback and reporting;**
- **Intergovernmental initiatives;**
- **Marketing and nurturing relationships with key stakeholders;**
- **Communication and publicity;**
- **National Launch Events** that link to NSW activities at the launch site;
- **Materials distribution** (including banners);
- **Project management** and related fees; and
- **Grant funding** to Event Organisers.

As a next step, it is recommended that inputs, activities, outputs, outcomes and impact indicators (the results chain) be defined for each objective of the NSW to guide its implementation in the next phase. Mapping the interventions that currently exist would be useful to determine how the NSW can filter from and feed into interventions to maximise efforts in terms of attracting learners to SET careers.

The recommendations put forward to take the NSW to next practice in its next cycle require other kinds of changes to take place for the NSW to fully flourish. The review identified that at a policy level, the NSW should be driven by **a national strategy for science awareness** to guide NSI stakeholders on their involvement in the NSW and on how to communicate various aspects around science. At an organisational level, the review identified that **coordination** is lacking amongst units **within the DST and within SAASTA** and that greater coherence and collaboration will create a platform for enhancing the content and quality of the NSW. It will also be critical to think about the system changes that are needed to support a next practice NSW. This includes the need to **resource SAASTA adequately**. It is viable to determine whether SAASTA is best placed under the auspices of the NRF, or whether it is 'hidden away'. Perhaps **if SAASTA was positioned as a neutral science body** in a way that it could look for funds from all organisations and in particular Donor Agencies, if it had its own SAASTA Act, its own legislation, its own board and a modest amount of money from the broader DST, significantly more funding and activities could be leveraged. Further investigation is required to determine the most effective positioning of SAASTA as well as how much money should be committed by the DST to ensure an enhanced NSW in the future.

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1 Introduction

"For the youth of today to become the scientists of tomorrow we need to foster awareness among learners of the various careers that are available in the world of science, engineering, technology and innovation"

Science and Technology Minister Naledi Pandor, August 2010

It is imperative to create a society that understands and values Science, Engineering and Technology (SET) and the critical role that SET plays in ensuring national prosperity and sustainable development[1]. The attainment of this goal depends among others, on effective and user-friendly dissemination of information on SET as well as creating a public awareness of the role that science plays in our everyday lives. Being a custodian of the White Paper on Science and Technology, the Department of Science and Technology (DST) conducts and supports several initiatives that promote and allow people to engage with SET. One such initiative is the National Science Week (NSW), which is regarded as a flagship project of the DST. The NSW celebrated its ten year anniversary in 2009, which the DST considers a milestone.

The year 2012 will mark the development and implementation of the next cycle's implementation strategy as an outcome of the findings and recommendations presented in this review. This report presents a range of findings from the ten-year review and provides a roadmap to guide the development of a revised approach to the next cycle of the NSW so that this initiative of the DST (referred to as a public awareness programme) enters its second decade as a flagship project.

As part of the review, the Research Team interviewed the Minister of Science and Technology and the Department's EXCO to share key findings and recommendations and to solicit their inputs to guide the way forward in terms of the NSW. With the approval of the Minister of Science and Technology, the results of the review will be shared with key stakeholders in the National System of Innovation (NSI).

This chapter sets the scene for the report by describing the NSW and its objectives, how these fit into the vision of the DST and the role played by both the DST and SAASTA as part of implementing the NSW (Section 1.1). Key stakeholders of the NSW and its target beneficiaries are described in Section 1.2. In Section 1.3, the evolution of the NSW is illustrated by describing the different approaches to implementation over the ten-year review period (2000 to 2009). The purpose and objectives of the review are listed in Section 1.4 and the structure of this report is presented in Section 1.5.

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[1] White Paper on Science and Technology, 1996

1.1 About the NSW, DST and SAASTA

As an initiative of the DST, the NSW is managed by the South African Agency for Science and Technology Advancement (SAASTA).

It is a countrywide celebration of science, engineering and technology, involving various stakeholders and/or role players conducting science-based activities.

A youth focus is deemed important since South Africa has outlined a National System of Innovation (NSI) that relies on among others, appropriately capacitated human resources. Various studies have postulated that learners' negative attitudes towards science and maths may impose a significant barrier that diverts young and talented youth away from SET careers. Initiatives like the NSW aim to contribute towards the function of Human resource development and capacity building, whilst at the same time creating awareness of and support for the National System of Innovation.

The intention of the NSW is to excite youth with science at an early age by showcasing SET achievements in South Africa and by raising their awareness of opportunities available in terms of SET careers in South Africa.

The NSW has a career guidance component, providing educational material on careers in SET (published by the DST and other stakeholders) and using role models to share their journey within SET careers. Activities at the NSW also emphasises the importance of choosing pure maths and physical science as subjects at school from grade 10 to 12 as a pre-requisite to entering many of the SET careers available to our youth.

The NSW has five objectives that guide activities organised and conducted during its one-week celebration each year:

- NSW Objective 1: Contribute to the development of a society which values and appreciates SET;

- NSW objective 2: Provide a platform for scientists to engage each other and also to engage with the non-scientific community;

- NSW objective 3: Promote partnership between media and scientists;

- NSW objective 4: Profile the work of the DST and its priorities; and

- NSW objective 5: Attract learners to SET careers.

About the Department of Science and Technology

Implementation of the NSW is the responsibility of Programme 4 (Human Capital and Knowledge Systems Programme) within the DST.

"It is imperative to create a society that understands and values SET and their critical role in ensuring national prosperity and sustainable development"

White Paper on Science and Technology - 1996

The vision of the DST is to establish an efficient, well co-ordinated and integrated system of technological and social innovation within which:

- Stakeholders can forge collaborative partnerships and interact creatively in order to benefit themselves and the nation at large. NSW Objectives 2 and 3 align to the latter.

- Resources from engineering, the natural sciences, the health sciences, the environmental sciences and the human and social sciences are utilised for problem-solving in a multidisciplinary manner. The work of the DST is profiled through activities implemented at the NSW (Objective 4) that showcase achievements made in SET. The work of the DST contributes to developing a strong National System of Innovation, which is necessary for economic development.

- Stakeholders, especially those who were formerly marginalised, are part of a more inclusive and consultative approach to policy decision-making and resource allocation for science and technology (S&T) activities. As part of NSW Objective 5, previously disadvantaged youth around South Africa are the main target beneficiaries of NSW activities. The NSW implementation approach also targets Grant Holders from formerly marginalised groups who are in rural areas and able to provide activities to youth who would otherwise have limited opportunities to attend such public awareness programmes.

- Contribute to the development of a culture within which the advancement of knowledge is valued as an important component of national development. This links closely to NSW objective 1.

- Improved support for all kinds of innovation which is fundamental to sustainable economic growth, employment creation, equity through redress and social development.

It is of relevance to note that at the start of the National Science Week in 2000, the NSW formed part of the Department of Arts, Culture, Science and Technology (DACST). The DST was brought into existence in 2002 as a result of the split from DACST into the Department of Arts and Culture (DAC) and the Department of Science and Technology (DST).

About the National Research Foundation/South African Agency for Science and Technology Advancement

"SAASTA – putting the world of science in society's hands"

SAASTA booklet

The NRF is the Government's national agency responsible for promoting and supporting research and the development of high-level skills in all fields of humanities, social and natural sciences, engineering and technology. The South African Agency for Science and Technology Advancement (SAASTA) is a business unit of the National Research Foundation (NRF) with the mandate to advance public awareness, appreciation and engagement of SET in South Africa.

SAASTA has three core business units referred to as the Education, Science Awareness and Science Communication platforms. Implementation of the NSW is the responsibility of the Education Unit within SAASTA.

SAASTA's contribution to the NRF's vision is to grow the pool of quality learners today who will become the scientists and innovators of tomorrow.

More specifically, SAASTA aims to contribute to:

- Building the quantity and quality of mathematics and science outputs at school level (developing SET human capital)
- Raising the general interest in, engagement and appreciation of the public (and especially poorer communities) for the benefit of science (strengthening the SET culture)
- Communicating science to the South African citizenry (bringing science and scientists closer to civil society).

It is of relevance to note that SAASTA was formerly known as the Foundation for Education, Science and Technology (FEST). FEST was responsible for putting together the NSW programme and awarding grants to the third parties (referred to as grant holders) who organised the activities. FEST was a Section 21 company that reported back to the Department. The responsibility in terms of the NSW remained the same when FEST became SAASTA (the NSW implementing agency). Since FEST was declared a cultural institution, it was brought under the wing of the Department in 2002 and temporarily placed under the NRF. In 2003 its legal status changed.

1.2 Key stakeholders and target beneficiaries of the NSW

The NSW objectives are broad and inclusive of learners, educators, scientists, the general public, corporate sector organisations, politicians and the media. Figure 1 illustrates the stakeholders and beneficiaries affiliated to the NSW. These are referred to as boundary partners and the diagram demonstrates how stakeholders are linked to each other through the NSW.

Figure 1: Boundary partners identified for the NSW
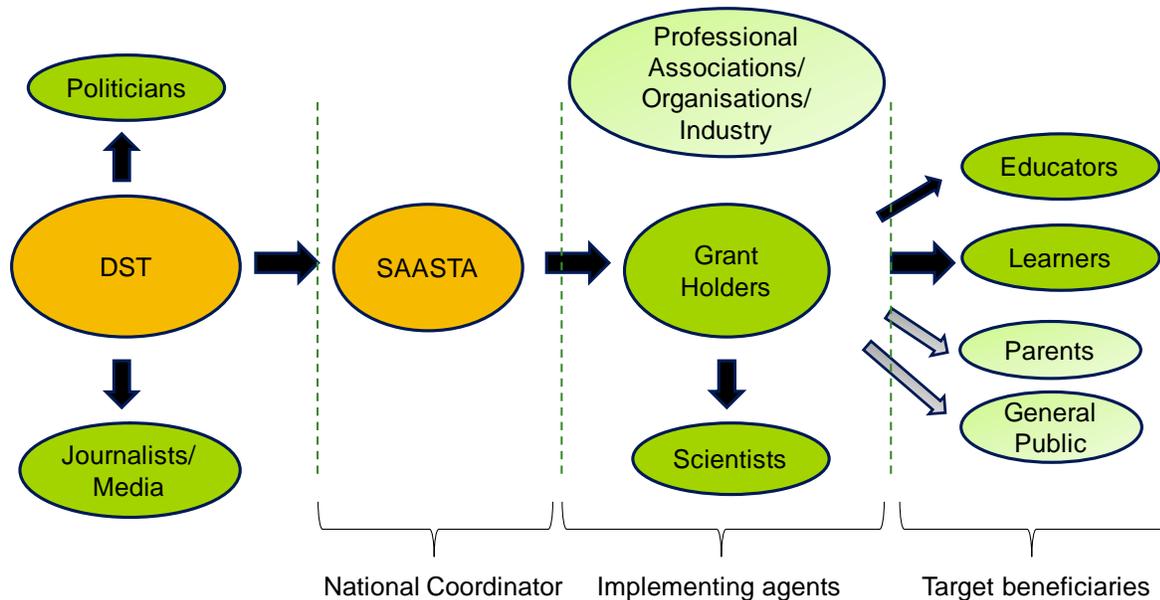
The DST and SAASTA work directly with each other. The DST is responsible for the provision of funds and implementation guidelines to implement the NSW. DST is further responsible to for communications and publicity of the NSW project to the media. This includes arranging slots on television or radio, as well as press releases. This further includes placing the call for proposals, whose payment is covered in the overall NSW budget managed by SAASTA.

SAASTA is the national coordinator of the NSW responsible for managing the selection of grant holders, support to grant holders to ensure successful implementation of the NSW, payment of grants, monitoring during the NSW as well as overall financial management and close-out at the end of the NSW annual project cycle.   SAASTA's responsibility includes communicating with Grant Holders to ensure compliance; in particular, compliance of Grant Holders to DST's branding guidelines, so that banners and posters at NSW sites, where activities are implemented, are correctly branded. Grant holders are those organisations or individuals that were awarded funding (fully or partially) by the DST/SAASTA, for organising activities or

contributing to the NSW through the development of education materials, posters or educational games[2].

Event Organisers include organisations or individuals that used their own funding to organise activities.

Implementing agents include Grant Holders who are funded by SAASTA to implement NSW activities, Scientists, who are normally part of the staff compliment of Grant Holders, most often the case for Higher Education Institutions (HEIs) and Science Councils, as well as Professional Associations and Organisations within Industry, the private sector in particular, who apply SET as part of achieving their business objectives. Professional Associations/ Organisations/Industry are shaded in a different colour since these stakeholders were engaged to a minimal extent during the ten years reviewed (2000 – 2009).

The implementation model for the ten-year review period focused on Grant Funding as the means to attract various stakeholders of the NSI. Scientists are central to showcasing innovations in SET and role modelling to attract youth to SET careers and grow an appreciation of society for SET.

Target beneficiaries include mainly learners and educators in schools. Parents and the general public are shaded in a different colour since these target beneficiaries were reached to a minimal extent during the ten years reviewed (2000 – 2009).

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[2] The majority of Grant Holders provided activities during NSW rather than developing educational materials, posters or games for the NSW

1.3 The Evolution of the NSW (theory of change)

Over the period under review, implementation of the NSW followed **a number of approaches in terms of coverage** and **one approach in terms of the funding mechanism**. The sections below elaborate on both approaches.
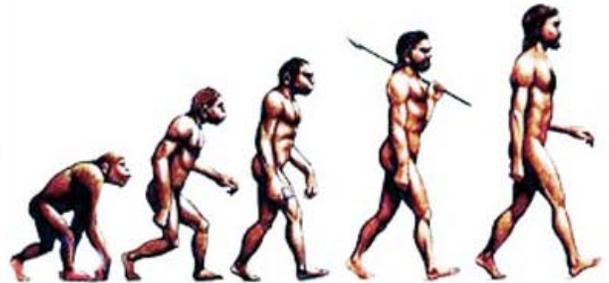
The evolution of the NSW in terms of coverage

During the first three years of the NSW (2000 – 2002), a tri-provincial approach was applied where the science week would take place in three provinces at the same time, with no focus in the other six provinces.

However, from an understanding that if the NSW services three provinces – and the first provinces serviced had to wait until the NSW makes a turn back to them, the momentum created by being there would have been lost. For this reason, in 2003, the NSW began running at a single site in all nine provinces simultaneously. The year 2003 also marked the first year where provinces began taking turns to host the national launch of the NSW. This has been rotated for each province each year, with 2011 being the last province to host the national event. A national laser show has been used at each launch to allow the general public to experience science through the event. Learners have been bussed in to the national launch event each year.

As a result of the adoption of the National Research and Development Strategy (NRDS) by the Department in 2002, an understanding grew within the DST for the need to turn around the crisis in South Africa in terms of the shortage of SET skills in the country as well as the ageing population and lack of demographic workforce. The DST identified the opportunity to build a pipeline of SET skills, with a focus for the NSW shifting to learners in schools located in both urban and rural areas around the country. The latter informed the DST's decision for a revised theme and influenced a change to a multiple sites approach per province from 2004 - 2009, with outreach activities being a big focus across the country.

Whereas the theme for 2000 – 2003 was 'taking science and technology to the people', the theme for 2004 – 2009 changed to 'tomorrow's science and technology are in the youth's hands' to draw attention to the focus on young people found within the schooling system.

The first set of guidelines was developed for the implementation of the NSW in 2004 and a Project Brief was provided by the DST to SAASTA for the period 2005 - 2009. This formed part of the annexure to the SLA signed between the DST and SAASTA and provided an indication of DST's expectations of the NSW. The year 2005 marked the start of expanding NSW to districts in each province. The NSWs made use of the geographic advantage of provinces, for example, the science behind making wine for activities in the Western Cape.

The Minister of Science and Technology launched the Indigenous Knowledge Systems Policy in March 2005, which the Project Guidelines indicated would underpin the National Science Week.

The objectives specified in the Project Brief for the National Science Week were as follows for 2005 – 2009[3]:

- To create awareness of the importance that science plays in people's lives;
- To encourage youth to consider studying and improving their performance in mathematics and science;
- To attract more of our youth into science, engineering and technology (SET) careers;
- To contribute towards initiatives to identify and nurture youth talent and potential maths, science, engineering and technology.

The theme required for DST to have a **strong backing from the Department of Education**, currently known as the Department of Basic Education, because there are no provincial Departments of Science. A collaborative agreement was signed between Ministers at the DST and DoE in 2005, which allowed SAASTA to work with schools, educators and learners. Officials in the Provincial Departments of Education were brought into the NSW, known as Maths, Science and Technology (MST) coordinators in each province.

The DST also identified other key partners for the NSW in the Project Brief, which included Provincial and Local Governments; National Departments; Science Councils; the Corporate Sector; Science NGOs; Educator Unions; Professional Associations; SET institutes; and Traditional healers and leaders.

From 2005 onwards, there was an extended effort to distribute materials carrying information on SET to educators to place in their classrooms for learners to access.

The year 2009 marked the end of a five-year period during which the NSW was dedicated to the youth of the country. Given that the ten-year review was in the pipeline, an interim implementation strategy was put in place for 2010 and 2011. Project guidelines changed to include a new set of NSW objectives – the five objectives stated in the Terms of Reference to the review against which the NSW should be measured for the period 2000 – 2009

The 2010 – 2011 Project Guidelines indicated the involvement of key participants to meet the five objectives. Those stakeholders specified include learners, scientists in HEIs and Science Councils, the general public, corporate sector organisations, politicians or decision-makers, officials of the DST and the media.

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[3] Extracted from the NSW Project Brief, 2005 - 2009

The approach to implementing the NSW – a grant-funding mechanism

The approach used was a grant-making mechanism whereby a key portion of the NSW budget was dedicated to the selection of Grant Holders who would implement activities to ensure the success of the NSW. Calls for Proposals (CFP) were made and organisations submitted a proposal presenting their ideas for how to implement activities for the NSW. The approach was to receive many proposals and select the most competent organisation identified from the evaluation process. The selected Grant Holder was provided with a grant that required all activities to be arranged and a profit margin to be made.

To ensure that capacity to stage such events was created or enhanced in all the provinces, the CFP limited respondents to their own provinces. A condition for funding from 2000 – 2003 was that those Grant Holders awarded a grant were required to make an in-kind contribution or leverage additional funding towards the NSW.

The request for proposals sent out to grant holders during 2004 - 2009 differed from previous NSW approaches in that the DST identified objectives they wanted to achieve based on guidelines written for the NSW and provided a long list of activities that organisations could consider including in 'their menu' in response to the objectives and the theme. Applicants were encouraged to include other activities not listed.

As the ten years of implementation progressed, more Grant Holders were selected through the grant-funding mechanism with the aim of increasing coverage. Later chapters highlight the administrative challenges experienced by SAASTA in expanding the pool of Grant Holders.

Figure 2: Engagement at a NSW

A picture of a Grant Holder engaging with learners during the NSW

1.4 Purpose and objectives of the ten-year review

The purpose of the ten year review of the National Science Week was to assess the impact of the NSW from 2000 to 2009. Impact of the NSW is determined through a summative evaluation that provides the extent of worth of the programme and its activities (summation). The review also required a formative (improvement) and process (implementation and operation) evaluation of aspects of the programme so that the review results guide the development of a medium-term implementation strategy for the future of the NSW (2012 – 2016) and the development of an integrated approach towards a national science and society engagement plan. The TOR required a response to over 50 questions as an output to this review.   These can be summarised at a high level in terms of the following broad study objectives:

Study objective 1:

Impact of the NSW (Results): An assessment of the **extent to which the NSW met its five objectives** and **the extent of capacity development of Grant Holders**

Study objective 2:

Implementation aspects: Identification of implementation achievements of the NSW including **coverage**, **successes/best practices** that emerged over the years, **weaknesses** of past years, as well as **international benchmarking** to inform the improvement of the NSW

Study objective 3:

Process aspects: The TOR provides various evaluation questions to be responded to in the review.

These process aspects include:

- An assessment of **value for money** of the Government-funded initiative;

- An assessment of **inclusivity** of the NSW in terms of DST/SAASTA programmes and inclusivity in terms of the National System of Innovation (NSI);

- Profiling Mathematics and **determining the synergy of the National Science Week and National Maths Week**;

- Assessing whether the NSW accommodates the **nation building and transformation agenda and cultural/linguistic diversity**;

- Determining the most **appropriate timing** of the NSW;

- Establishing whether the NSW is **a national brand**, whether **sufficient branding** occurs, target beneficiary understanding of the role played by SAASTA/DST/NSW and **whether the NSW has enhanced the image of the DST**;

- Determining how South Africa can participate itself in terms of **intergovernmental initiatives** such as SADC SET Week; and

- Identifying the **institutional arrangements of DST and SAASTA and capacity to enhance the NSW**.

1.5 Structure of the Report

The methodological design and conceptual framework underpinning this review is described in **Chapter 2**.

Chapter 3 presents a comparison of the NSW against four similar Science Weeks through an international benchmarking review.

South Africa's position in terms of intergovernmental initiatives relating to Science Weeks is highlighted in **Chapter 4**, along with the existing challenges and solutions to clarify South Africa's position and role in terms of Science Weeks abroad.

The cornerstone of this report is presented in Chapters five to eleven. Critical findings and recommendations are highlighted in black and maroon text so that these can be referred to, as required.

Chapter 5 responds to the **first study objective**. The chapter presents an assessment of the extent to which the NSW met its 5 objectives.

In **Chapter 6**, a variety of achievements, weaknesses and lessons learned are reflected upon. These findings provide the basis to inform the development of a new NSW implementation strategy for the next cycle (2012 – 2016).

Chapter 7 reflects upon the extent to which the NSW accommodates nation building and transformation as well as the cultural and linguistic contributions of the NSW.

The most relevant timing of the NSW is considered in **Chapter 8**.

Since brands encompass a holistic summary of organisational reputation in the minds of stakeholders who engage with people, organisations and programmes, an assessment of the brand experiences of Grant Holders and Learners as target beneficiaries, is considered in **Chapter 9**. The chapter also reflects upon policy in terms of branding guidelines.

Based on the understanding that scientific concepts are interconnected by the rules of mathematics, **Chapter 10** indicates how the NSW links Science, Engineering and Maths and considers the compatibility of the National Maths Week with the National Science Week.

In **Chapter 11** value for money is assessed for various aspects of the NSW.

Chapter 12 consolidates the wealth of findings provided through in-depth stakeholder interviews and primary and secondary desktop analysis and moulds together the findings presented throughout the report. The theory of next thinking and next practice is presented along with a detailed outline of what a next practice NSW looks like.

Concluding remarks are provided in **Chapter 13**.

1.6 Annexures

Annexures are provided in support of the report as follows:

- Annexure   A:
  - Terms of Reference for the review
- Annexure   B:
  - List of Acronyms
- Annexure   C:
  - List of interview respondents

- Annexure   D:
  - List of Science Councils and Higher Education Institutions in South Africa and an indication of those involved in the NSW from 2000 - 2009
- Annexure   E:
  - Five key messages that the Communication Strategy for NSW specified
- Annexure   F:
  - Examples to map out evaluation criteria to measure objectives
- Annexure   G:
  - Breakdown for the number of Grant Holders per province and breakdown of various District Municipalities included from 2005 - 2009
- Annexure   H:
  - List of NSW documents received and reviewed

- Annexure   I:
  - An overview of SAASTA's Units and DST's Programmes/Sub-Programmes, their strategic purpose, NSW objective(s) most likely to be met through their participation, Target beneficiaries focused on and their extent of participation in the NSW
- Annexure J:
  - Draft revised tool: Monitoring instrument – site visits during NSW
- Annexure K:
  - Branding Guideline Considerations
- Annexure L:
  - List of Grant Holders categorised by Type, areas of coverage, province and time period of involvement

2 Research Design
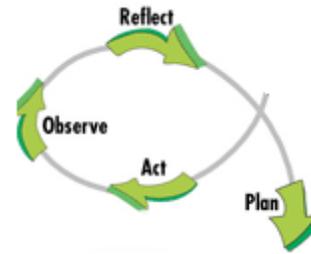
"By drawing on a variety of methods and data sources, multiple and even conflicting perspectives can be identified and explored, ultimately enhancing the data's "trustworthiness' and authenticity."

Viadro C.I.,et al (1997)

The importance of using a combination of data collection methods and data sources in any review or evaluation is well documented and cannot be over-emphasized. A combined approach provides an accurate and comprehensive understanding of the program and its components and enables cross-validation of the information gathered. This chapter discusses the three data collection approaches used to respond to the Terms of Reference (TOR) questions underpinning the ten-year review of the National Science Week. Data collection and analysis approaches are discussed in more detail in Sections 2.1, 2.2 and 2.3. The chapter concludes with a discussion of project anonymity, project challenges and limitations.

The general approach was to collect, consolidate and review primary research data. Secondary data was used to support and confirm findings of primary data.

To meet the TOR objectives of the ten-year review, Figure 3 illustrates the methodological approaches used:

Figure 3: Overarching Data Collection Methods used for the NSW

Literature Review and Desktop Analysis of Secondary Data	Document Review and Analysis of Primary Data	Primary Data Collection and Analysis

Documents included:
•Annual and post-hoc reports;
•Minutes/communication memos of various meetings;
•Newspaper clippings;
•Media relations reports;
•NSW project briefs;
•Communication strategy documents;
•An evaluation report and tracking study (HSRC); and
•Reports submitted by provinces implementing NSW.

Documents included:
•Grant Holder Documentation (archived proposals and site reports); and
•Financial Statements.

In-depth interviews with:
•DST & SAASTA officials;
•DST leadership (Minister & EXCO DG & DDGs)
•Grant Holders;
•Scientists;
•Learners at schools & students at HEI's; and
•Journalists engaging with SET

Site observations of the 2011 National Science Week

•Leadership representing Mathematics (SAMF, NMW stakeholders, AMESA, SANCIMU);
•Stakeholders implementing similar science weeks in Australia, Canada, the UK & Spain

13

The purpose of a **literature review and desktop analysis of secondary data** was to:

- Identify changes that occurred in the implementation model;
- Gain an understanding of indicators set for the NSW to measure success (impact and progress of the NSW towards meeting its overall objectives as set out in the TOR;
- Identify themes in the findings reported during the ten year review period; and
- Identify aspects that should be explored further in this review.

The **collation, review and analysis of primary data sources** included Financial Statements and Grant Holder documentation. The purpose of collating and reviewing these documents was to determine trends across the years. For this reason, data for 2003, 2005, 2007 and 2009 was collated.

Financial statements were obtained from SAASTA's NSW financial team[4]. Cost information was collated and captured into an Excel database and analysed to determine trends in the data. Qualitative data captured from Annual reports about key components of NSW (including national launch events, grants to organisers, materials distribution, project management, and reach) was also collated and analysed for themes related to value for money.

All Grant Holder proposals, site reports, attendance registers and financial data available in SAASTA's archives for the sampled years, were collated and reviewed, with relevant data being captured into a Grant Holder database for analysis purposes. Data was extracted into a database and descriptive statistics identified trends in the data presented as through tables and graphs (a user-friendly format to the reader) as part of the findings presented throughout chapters of this report. Data was captured as follows:

- **Outreach to schools** was considered in terms of phases (Foundation, Intermediate, senior phase and FET) as well as areas targeted (rural, urban, semi-urban).
- Data on **outreach to target beneficiaries** was captured on the frequency of scientists, educators, learners and the general public targeted by Grant Holders.
- To better understand the **types of activities** provided over the years (to guide interviews at later phases of the review), activities provided by Grant Holders were captured. These included learner project and presentation; lecture/presentation/ demonstration; Traditional Games; Media talks/public discussions; science quiz/ competition; role modelling; educator workshops; learner workshops; SET exhibition; science show/experiments; career guidance; interactive activities; statement of support; starting science camps; fun runs; community/educational tours; public awareness posters; and publications.
- **Financial data**: To determine whether additional funding leveraged, the Review Team collated data relating to finances.
- **Types of Grant Holders**: Grant Holders were categorised according to types through an iterative engagement process with SAASTA to determine the types of Grant Holders involved in the NSW during the ten-year review period. The six Grant Holder categories

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[4] Financial data for 2003 was unavailable

included Dinaledi Schools; Higher Education Institutions (HEIs); Science Centres; Science Councils; Government Departments; and Professional Associations/ Organisations/Industry (which consisted of all other Grant Holders not categorised above).

Table 1: Grant Holder data available for sampled years

Year	No. of Grant Holders	No. of Grant Holders for whom data was available
2003	9	7 (78%)
2005	49	42 (86%)
2007	50	44 (88%)
2009	86	77 (90%)

For the years reviewed, 78% of Grant Holder documents were available in 2003, with an increase in the number of documents for each year reviewed (totalling 90% of documents being available for 2009).

Primary data collection and analysis included the following:

- **In-depth face-to-face interviews with stakeholders at DST and SAASTA**. These included:

  o Interviews with those involved in the NSW from 2000 to 2009 who have since left the organizations, as well as those stakeholders currently at DST (Director responsible for managing the NSW) and SAASTA (Executive Director, Science Education Manager and Project Coordinator) who hold the institutional memory in terms of NSW implementation over the ten-year review period.

  o Focus group and individual interviews with DST officials in other units across DST's five Programmes[5] and SAASTA Managers in the Science Awareness and Science Communications Units.

  o Face-to-face interviews with DST leadership (the Minister, Director General and the EXCO members).

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[5] Interviews were conducted with DST officials from Programme 1: Corporate Communications; Programme 2: Biotechnology and Space, Science and Technology; Programme 4: Science and Youth; Indigenous Knowledge Systems (IKS); Nanotechnology; and Science Platforms; and Programme 5: Sustainable livelihoods

Primary data was sourced to determine experiences, perceptions and views of DST and SAASTA stakeholders in terms of various TOR questions posed in this study. Interview schedules provided guidance in a semi-structured interview process, with the discretion of the skilled interviewer determining the direction of each conversation towards the most fruitful areas of inquiry for meeting the purpose and objectives of the study. Interviews lasted between 60 minutes and four hours.

Data was transferred into a format in preparation for descriptive and qualitative analysis. Interview notes were used as primary documents for content analysis, which was used to identify key themes relevant across stakeholders.

Content analysis is a research technique for the objective, systematic, and quantitative description of the manifest content of communication[6].

- **In-depth telephonic interviews with a sample of learners** from six provinces who took part in the NSW between 2006 and 2010. For the sample of Grant Holders selected, 5% of the schools were selected where learners were sourced for interviews (the aim was to conduct two interviews with learners from each school). A total of 23 learners were interviewed telephonically using an interview schedule. The objective of the interview was to capture learners' experiences of the NSW and how they benefitted from attending, as well as what they think could be done to improve the future. Interviews were transcribed, analysed and themes are presented throughout this report. Table 2 below illustrates the total number of learners interviewed per province and type of grant holder.

Table 2: Learners interviewed per province and per Grant Holder type

Province	Science Councils	HEI	Professional Associations /Organization	Science Centres	Provincial DOE	Dinaledi Schools	Total Interviewed
KZN		2	2				4
EC							0
WC	3						3
FS		3		2			5
NC						3	3
MP				2			2
NW		6					6

[6] Guy R.F. Edgley C.E. Arafat I. Allen D.E., (1987). Social Research Methods: Puzzles and Solutions. Allyn and Bacon, Inc. United States of America.

- In-depth **focus group interviews with a sample of learners and students** from two provinces. Because focus groups harness interaction between respondents and provide a richness of data unachievable in individual interviews, six focus group discussions were conducted with learners and students who formerly participated in NSW to gain an in-depth understanding of their experiences and associations relating to NSW, SAASTA and DST. Those interviewed took part in the NSW during the latter part of the review period (2007 to 2010). Each group comprised of between six and eight participants. Learners and students were recruited from secondary schools and the surrounding neighbourhoods in urban and rural areas in Gauteng and Limpopo provinces[7] using purposive and snowball sampling methods. Purposive sampling involved the identification of relevant Grant Holders and Schools or HEIs served by the Grant Holders. This process involved three steps. Firstly, randomly selecting three Grant Holders per region from the Grant Holders sampled for interviewing. Secondly, selecting five schools and HEIs per Grant Holder at which NSW activities took place. Thirdly, collating attendance lists and contact details for these schools, where available.

Recruiters contacted the schools telephonically. However, records for schools were inconsistent and incomplete, which necessitated that recruiters go to the areas within which schools were located and directly contact teachers at the schools and students around the relevant campuses. Snowballing was used as the method to recruit the learners and students to focus group discussions. Once identified, learners and students were required to provide a form signed by their parent or guardian as consent for their involvement in the focus group discussions[8].

Key considerations for the parameters of the sample were to recruit from urban and rural areas to determine whether themes identified are as a result of the type of area in which beneficiaries are located. For this purpose, Gauteng[9] was selected as an urban area, with learner focus groups conducted in Soshanguve and Vanderbijlpark and a further two student focus groups conducted in Soshanguve. The Limpopo province was identified as a rural area for comparison, where two learner focus groups were held in Venda.

Target groups were included as follows:

  o Learners currently in grade 10-12 who have Pure Mathematics and Physical Science as subjects and who participated in NSW activities during the period when they were in grade 8-9 or grade 10-11. The purpose of selecting these learners was to determine experiences within the review period of the NSW 2000-2009 and the impact of the NSW on learners' choice of Pure Mathematics and Physical Science as subjects at school.

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[7] Sampling was limited to provinces in close proximity to Pretoria to conserve costs.

[8] Consent forms are required as per SAMRA Code of Conduct guidelines

[9] Gauteng is the financial capital of South Africa, has the highest population density of all provinces and justifiably represents the urban hub of the programme.

  o Students currently studying towards SET careers who participated in NSW activities. The purpose of selecting these students was to determine the potential influence that the NSW had on their choice and commitment to their chosen SET career.

When learners / students arrived at the various "host-home" facilities, the moderator again screened them based on the recruitment parameters set out. Group participants were mixed gender and included a variety of ages. All learners were African, reflecting that of the majority population in the recruitment area.

Once group discussions were conducted, moderators were debriefed and key observations (both verbal and non-verbal) were discussed and interpreted. Audio recordings of the discussions were transcribed and directly translated into English by experienced transcribers and translators. These transcripts were then analysed using thematic content analysis in which major themes were highlighted and interpreted and then using meta-analysis in which the project team subjected the key learning's and findings to further interpretation based on other data sources available.

- **In-depth telephonic interviews with a sample of Grant Holders**. A sample of Grant Holders who participated in the NSW over the years was drawn using stratified and purposive sampling to enable interviews across three categories, namely province, type of Grant Holder and type of area reached (rural, semi-urban and urban). A total of 24 Grant Holders (18%) were interviewed. In-depth interviews lasted between one and two hours and recurring themes were prevalent, indicating that interviews with more than 24 Grant Holders would most likely add little value.

Telephonic interviews were conducted with Grant Holders using an interview schedule developed to ascertain their experiences and perceptions of the NSW's successes and challenges, lessons learnt, best practices and value for money.

Responses from the interviews were transcribed and coded using an interpretive thematic system. The themes that emerged were used to structure the discussions in various chapters of this report to address most of the implementation and process aspects of the programme[10].

Table 3 shows the total number of Grant Holders involved in the NSW from 2003 to 2009 according to province, type of Grant Holder and type of area reached and depicts the breakdown of Grant Holders interviewed.

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[10] Themes represent a response from at least five Grant Holders

Table 3: Grant Holders involved on NSW 2003-2009 and Grant Holders interviewed

Province	Total no. of Grant Holders	Final sample	Type of Grant Holder	Total no. of Grant Holders	Final sample	Type of coverage	Total no. of Grant Holders	Final sample
KwaZulu-Natal	13	2	Dinaledi Schools	18	2	All Areas	20	3
Eastern Cape	15	2	Government	29	2	Rural	29	5
Free State	19	2	Professional Associations/ Orgs/Industry[11]	43	4	Semi Urban/Rural	52	11
Gauteng	26	4				Urban & Rural	1	
Limpopo	17	3	HEI	11	3	Urban	4	
Mpumalanga	10	3	Science Centres	16	8	Urban & Semi Urban	15	5
Northern Cape	5	2				Area not specified by Grant Holder	9	
North West	10	2	Science Councils	13	5			
Western Cape	9	4						
Multiple	6							
Total	**130**	**24**		**130**	**24**		**130**	**24**

- **Telephonic interviews with a sample of Scientists**. In the context of this study, a scientist can be defined as someone who has received formal training in SET at a University and is currently working in the field[12]. Scientists were identified within Science Councils and Higher Education Institutions for the purpose of this study.

A total of 22 scientists were interviewed. Snowballing was the method used to identify and contact scientists. Telephonic interviews were conducted using a semi-structured interview schedule. The purpose of the interview was to capture views on whether a platform exists for scientists to engage each other and the non-scientific community; whether partnerships have been created between scientists and the media; and to establish scientist's perceptions of the extent to which the NSW Week had an influence on these aspects. Responses from the interviews were transcribed, analysed and presented in thematic interpretation in various chapters throughout this report.

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[11] SAASTA's National Project Coordinator assisted the Review Team to clarify Grant Holder types. Professional Associations/Organisations/Industry include all Grant Holders that cannot be classified as a Dinaledi School, Government Department, Science Centre, Science Council, or HEI. These Grant Holders are labelled as "Other" and "Professional Associations" in NSW Annual Reports and were combined under the heading professional associations/organisations/ Industry in this report.

[12] The definition was debated and agreed upon during the Focus Group conducted with various DST units

Table 4 lists the number of scientists selected from Science Councils and HEI's that participated in the NSW between during the review period. A list of all 23 Science Councils and 23 HEI's, with an indication of which ones were involved in the NSW between 2000 and 2009, is provided in Annexure C.

Table 4: Scientists from Science Councils and HEIs interviewed

Science Councils	Involvement in the NSW	Final sample of scientists interviewed
Medical Research Council (MRC)	Yes	5
National Zoological Gardens (NZG)	Yes	4
SAASTA Johannesburg Observatory	Yes	5
South African Institute for Aquatic Bio-Diversity (SAIAB)	Yes	2
The Council for Scientific and Industrial Research (CSIR)	Yes	1
Higher Education Institutions	**Involvement in the NSW**	**Final sample of scientists interviewed**
University of Cape Town	Yes	2
University of Limpopo - Medunsa Campus	Yes	1
University of North West	Yes	2

- In-depth **interviews with two independent journalists** covering publications in newspapers, communications to radio stations or television channels. A semi-structured interview was used and the purpose of these interviews was to determine whether voluntary reporting by Journalists has increased over the ten-year review period and the extent to which the NSW influenced an increase in voluntary reporting. Responses from the interviews were transcribed, analysed and presented in thematic interpretation in various chapters throughout this report.

- **Observations** were done of activities that took place at sites during the 2011 NSW. A sample of sites in the Johannesburg and Pretoria areas were selected for observation. Although the review is from 2003 to 2009, visits to the site offered first hand observations on observing aspects around branding and the types and nature of activities. A total of four observations were conducted that included one HEI, two Science Centres and one Science Council.

Observations were initially not part of the methodology because NSW 2011 falls outside the review period. However, the research team visited the NSW cites out of interest. Findings from these visits resonated with and confirmed some findings arrived at through other approaches resulting in their inclusion in this review.

- **In-depth interviews with Stakeholders implementing similar NSWs in four other countries across three other continents:** The review of international Science Week initiatives was completed using a desktop review and telephonic interviews. A desktop review was conducted to obtain information about NSW and Science Week programmes abroad. A key word search was done to identify countries with a Science Week (or a similar science awareness and engagement program) that could be used for international benchmarking. In the second component of the desktop review, a more comprehensive search was done to obtain general programme information on the Science Week initiatives, including details on the design and implementation of the program. The information gathered in the desktop review informed the telephonic interviews.

  Representatives were contacted by telephone and e-mail and invited to participate in a telephonic interview. The country representatives were identified by SAASTA staff, desktop review, and snowball sampling, or asking participants to identify others they think should be interviewed. These participants who completed interviews were in management or leadership positions within organisations involved in the coordination of their NSW. Positions included project manager, programme manager and Director of education strategy at a government department, science association, public foundation and museum. Additionally, participants were directly responsible for national coordination, management and implementation of the Science Week. Interviewees' involvement in Science Week ranged from three to eleven years, for an average of about five and a half years.

  Telephonic interviews were conducted with three participants (Australia, Canada and Spain), while the fourth (United Kingdom) completed the interview questionnaire via e-mail. A semi-structured interview schedule was used to capture information on aspects of each Science Week programme, including the design and implementation model; challenges experienced; lessons learnt; and best practices identified. Interview data was analysed using qualitative methods to identify themes. Findings confirmed by at least two sources (interview or documents) were considered themes presented in this report.

- **In-depth interviews with Leadership representing the National Maths Week (NMW):** The method of data collection for this component of the study was in-depth interviews (either face-to-face or telephonic) with DST and SAASTA stakeholders, as well as with SAMF, NMW stakeholders, AMESA and SANCIMU. Desktop review of documents provided was also conducted by stakeholders interviewed. Organisation's opinions were solicited on combining the NMW and the NSW.

Table 5 outlines each data collection methodology employed, its purpose, the TOR to which it contributes and chapters where answers to TOR questions are found. The Table is a useful reference to confirm that all questions required of the scope of work for this study have been responded to.

Table 5: Method, purpose, TOR question and Chapters where answers are provided

METHOD 1: Literature review and desktop analysis of secondary data	PURPOSE: To gain an initial understanding in terms of changes that occurred in the NSW implementation model, themes in terms of findings reported on and aspects to explore further in the review

THE METHOD CONTRIBUTED TO RESPONDING TO THE FOLLOWING:

- TOR 4.2.4: Implementation Model (Chapter 1) ✔
- TOR 4.2.6: Challenges (Chapter 6) ✔
- TOR 4.2.9: Coverage (Chapter 6) ✔
- TOR 4.2.15: Branding (Chapter 6 and Chapter 9) ✔
- TOR 4.2.16: Establishing whether the NSW highlighted Science, Engineering and Maths links (Chapter 10) ✔

METHOD 2: Collation, review and analysis of primary data sources Review, assimilation and analysis of Grant Holder documentation and financial statements	PURPOSE: • To determine what types of Grant Holders were selected and what types of activities were provided during NSW implementation over the ten-year review period • To understand project administration processes, insights in terms of the project life-cycle and weaknesses in terms of Grant Holder reporting • To determine value for money and trends in terms of budget line items over time

THE METHOD CONTRIBUTED TO RESPONDING TO THE FOLLOWING:

- TOR 4.1: Impact of the NSW – the extent to which the NSW met its objectives (Chapter 5) ✔
- TOR 4.2.1: Assessment of activities and bias in selection of activities (Chapter 6) ✔
- TOR 4.2.3: Inclusivity of NSI stakeholders (Chapter 6) ✔
- TOR 4.2.16: Establishing whether the NSW highlighted Science, Engineering and Maths links (Chapter 10) ✔
- TOR 4.2.2: Value for money (Chapter 11) ✔
- TOR 4.2.4: Implementation Model (Chapter 1) ✔

METHOD 3: Primary data collection and analysis

PURPOSE OF DST/SAASTA AND GRANT HOLDER INTERVIEWS: • To gain an in-depth understanding of project implementation processes, perceptions and experiences in terms of project achievements, weaknesses, challenges, lessons learnt, institutional	THE METHOD CONTRIBUTED TO THE FOLLOWING: • TOR 4.1: Impact of the NSW (Chapter 5) ✔ • TOR 4.2.1: Interface between IKS and Western Science (Chapter 6) ✔ • TOR 4.2.2: Value for money (Chapter 11) ✔ • TOR 4.2.3: Inclusivity (Chapter 6) ✔ • TOR 4.2.5: Lessons learnt (Chapter 6) ✔

arrangements, value for money. • To explore process and formative aspects set out as part of the TOR. PURPOSE OF GRANT HOLDER INTERVIEWS: • To determine experiences, views and thoughts of Grant Holders in terms of the extent to which the NSW has achieved its objectives, overall achievements and constraints of the programme design, implementation and sustainability, as well as successes of the past and lessons learnt.	• TOR 4.2.6: Challenges (Chapter 6) ✓ • TOR 4.2.7: Cultural and linguistic diversity (Chapter 6) ✓ • TOR 4.2.10: General opinion of DST leadership (Chapters 6, 11 and 12) • TOR 4.2.11: Timing (Chapter 8) ✓ ✓ • TOR 4.2.12: Cooperative Government (Chapter 6) ✓ • TOR 4.2.13: Achievements (Chapter 6) ✓ • TOR 4.2.14: Nation building and transformation (Chapter 7) ✓ • TOR 4.2.15: Branding (Chapter 6 and Chapter 9) ✓ • TOR 4.2.16: Profiling of Mathematics (Chapter 10) ✓ • TOR 4.2.17: Synergy between the NSW and related intergovernmental initiatives (Chapter 4) ✓ • TOR 4.2.18: Institutional arrangements (Chapter 6) ✓

METHOD 3: Primary data collection and analysis	
PURPOSE OF SCIENTIST INTERVIEWS: • To determine whether a platform exists for scientist to engage each other and the non-scientific community. • To determine whether partnerships have been created between scientists and the media. • To determine the extent to which the NSW influenced these aspects.	THE METHOD CONTRIBUTED TO THE FOLLOWING: • TOR 4.1: Impact of the NSW (Chapter 5) ✓ • TOR 4.2.3: Inclusivity (Chapter 6) ✓
PURPOSE OF INTERVIEWS WITH INTERNATIONAL STAKEHOLDERS INVOLVED IN IMPLEMENTING SIMILAR INITIATIVES TO SOUTH AFRICA'S NSW: • To compare South Africa's NSW with other countries conducting similar initiatives	THE METHOD CONTRIBUTED TO THE FOLLOWING: • TOR 4.2.8: International benchmarking (Chapter 3) ✓
PURPOSE OF INTERVIEWS WITH NATIONAL MATHS WEEK (NMW) STAKEHOLDERS • To determine stakeholder views on the compatibility of the NMW and the NSW and the feasibility of combining the two programmes	THE METHOD CONTRIBUTED TO THE FOLLOWING: • TOR 4.2.16: Profiling of Mathematics (Chapter 10) ✓
PURPOSE OF INTERVIEWS WITH JOURNALISTS • To determine whether voluntary reporting by journalists has increased over the period of the ten-year review (2000 – 2009) and the extent to which the NSW influenced this aspect.	THE METHOD CONTRIBUTED TO THE FOLLOWING: • TOR 4.1: Impact of the NSW (Chapter 5) ✓
PURPOSE OF INTERVIEWS WITH LEARNERS WHO ATTENDED NSW	THE METHOD CONTRIBUTED TO THE FOLLOWING: • TOR 4.1: Impact of the NSW (Chapter 5) ✓

• To determine whether youth value and appreciate SET, whether they are attracted to SET careers and the extent to which the NSW had an influence on these aspects. • Gain an in-depth and comprehensive understanding of learners' and students' experiences and associations relating to NSW, SAASTA and DST.	• TOR 4.2.15: Branding (Chapter 6 and Chapter 9) ✓
PURPOSE OF SITE OBSERVATIONS • To experience the NSW. • To establish whether sufficient branding occurs at NSW sites. • To determine what types of activities are offered and clarify whether activities are engaging or form part of a deficit model of public understanding of science.	THE METHOD CONTRIBUTED TO THE FOLLOWING: • TOR 4.1: Impact of the NSW (Chapter 5) ✓ • TOR 4.2.1: Interface between IKS and Western Science (Chapter 6) ✓ • TOR 4.2.15: Branding (Chapter 6 and Chapter 9) ✓

2.1 Confidentiality

Data collected from all interviews was kept confidential and was only accessible by the Review Team. Participants (in particular, Grant Holders and DST / SAASTA officials) were promised anonymity in an effort to create a safe space for open and candid dialogue regarding their experiences. As such, all information has been summarised and reported as general themes. Names are not used in reporting findings and any quotes included are anonymous. Where quotes specify who provided the statement, permission was obtained beforehand.

It is noted that a full list of names of all those interviewed has been provided in Annexure C, with the exception of the sample of Grant Holders interviewed. Grant Holders interviewed raised concerns about the repercussions of their in-depth thoughts and experiences being shared and for this reason a list of Grant Holders sampled for interviews has been omitted.

2.2 Limitations and challenges of the study

The following limitations and challenges were experienced in the collation of data for components presented as part of this report. These should be considered when interpreting the findings of this review.

- **Annual Reports**: No documentation was available for the first three of the ten years under review (2000 – 2002). Where numbers were available, these could not be linked to a database in support of the breakdown of totals reported on. This made the task of comparisons across years difficult for the Review Team.

- **Grant Holder documentation**: Many Grant Holder documents, initially identified as missing, were located by the SAASTA team and included in the document review[13]. There was inconsistency in the way that Grant Holders reported over the years. A number of Grant Holder files included only proposals and not site reports, which implied difficulty in determining data to capture for the Grant Holder database. Where the Review team was not confident about numbers presented, these were not captured in the database. The majority of Grant Holder site reports focused on quantitative data (e.g., number of activities, attendance) and had minimal qualitative information regarding their experience with NSW. This is a limitation of the Grant Holder Site Report Template currently used.

- **International benchmarking**: Some challenges were encountered in conducting the desktop review and telephonic interviews. Firstly, the research team relied upon inputs from SAASTA and DST to identify Science Week programmes around the world. As such, programmes that are not readily accessible by internet search or known by stakeholders were not identified or included in the review. Additionally, other Science Week programmes were identified but contact details and programme information were either not available or were not provided in English, making language a limiting factor. The Austrian Science Week as identified but ended in 2005 due to lack of funding and is hence not included in the list of 15 countries identified with similar NSWs. Secondly, it was difficult to reach participants to schedule interviews. Despite multiple contacts by phone and e-mail, more than two-thirds of the sample did not respond to the interview request. Finally, one participant responded to the questions via e-mail instead of by telephonic interview. As a result, there is some variation in the depth of responses between the telephone interviews and the responses submitted electronically.

- **Cost Analysis**: Firstly, data on NSW costs was unavailable for 2003. As such, only the remaining three sample years are included in the analysis. Secondly, inconsistencies in reporting across years made it difficult to compare information on aspects of the NSW. For example, data pertaining to national launches and distribution of materials was reported on in different ways over the years which made comparison over time difficult. Given these challenges, the assessment of value for money is based on cost information in the NSW financial statements. Finally, disaggregated cost data was not available for national launches or materials distribution. As such, the assessment of value for money for these aspects of NSW are based on data extracted from NSW Annual Reports, Grant Holder reports and the perceptions of stakeholders.

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[13] Some reports were misfiled

- **Learner Interviews**: The grant holder registers did not include contact numbers of learners, which meant accessing learners through the school principal and HOD responsible for Science. A few schools were reluctant to provide details of learners despite a formal letter sent to the school and go-ahead provided by the Department of Education's MST Coordinators. In some schools, the responsible teacher was no longer at that school and in many cases the learners had left the school even though according to the attendance registers archived, they were technically still part of the schooling system (either in Grade 12 or below). The final sample of learners represents schools that were willing to participate in the interviews and learners who were available to be interviewed.

- **Journalist interviews**: Journalist contact details provided by the DST Media Communications Department were limited. Those journalist contact details that were provided were journalists who participated in the 2011 NSW. The journalists interviewed could not provide insights for the period under review (2000 – 2009).

- **Challenges experienced with incorrect programme schedules**: A challenge in terms of site observations was that in some cases, programmes that were available on SAASTA's website were different from the programmes implemented at the site. In some cases, changes in programme schedules were due to circumstances beyond the Grant Holders' control such as late arrival of busses or facilitators not arriving on the event day.

- **Analysis of print media**: The lack of media data and coherent information highlights the lack of institutional memory that exists. Print media clippings for the years under review could not be sourced from the DST media department because the media service provider used for the period under review no longer exists and raw media statistics data was not collected in a knowledge management system, hence could not be retrieved. Due to media reports not being filed in a knowledge management system, the media report for 2007 could also not be sourced as the DST person currently responsible for media communications on the NSW was not involved prior to 2009. A third limitation of the review was that media data that was available was in different formats across the review period, which implied that different types of data were available to determine trends over time. In this review, comparisons are provided over time where possible, based on data limitations.

- **Limitations of findings from Learner Focus Groups**: Given the qualitative nature of the information gathered, insight gained about the associations, images and personality of the various activities and brands related to NSW, SAASTA and DST should be tested quantitatively to confirm that findings are representative of the bigger population. In addition, when interpreting results, cognisance should be taken that the learners and students interviewed are already positively pre-disposed to SET and SET careers. The perceived influence of NSW in adding value and appreciation of SET to these learners are based on their experiences - deductions cannot be made about the NSW's impact on creating appreciation for SET to learners not already predisposed to it.

- **Limitations of measuring impact based on the five objectives of the NSW specified in the TOR**: It is relevant to note that the five objectives set out in the TOR against which the NSW should be measured, are objectives that were put in place as part of DST's 2010 – 2011 Project Guidelines. These differ from the objectives set out in the 2005 – 2009 Project Brief by the DST. Findings pertaining to the extent to which the five objectives set out in the TOR should be considered in light of this.

3 International benchmarking against similar National Science Weeks globally

Science communication and public awareness initiatives like the NSW are being implemented in several countries and cities around the world. In an effort to learn more about those programmes and how other countries' experiences could inform the future of NSW, DST requested that the ten year review include an international benchmarking component. The purpose of this chapter is to consider the NSW in relationship to similar initiatives in other countries. Four countries are used for comparative purposes in terms of their implementation model, challenges experienced and solutions identified, lessons learnt and best practices.

Table 6 lists the 14 countries that were identified from interviews with SAASTA and DST officials as well as a desktop review, where NSWs are hosted and have been in existence for at least five years. It is noted that there are SADC countries that run NSWs that are not listed in the Table below (Uganda, Mozambique, Kenya, Namibia and Zambia). Since countries in the SADC region look to South Africa for lessons learnt and best practice, these countries have not been considered as part of the benchmarking review.

Table 6: Countries Identified with a National Science Week Programme

Australia	**Czech Republic**	**Portugal**
Belgium	**Denmark**	**Spain**
Brazil	**Germany**	**United Kingdom**
Canada	**Ireland**	**USA**
China	**India**	

Of the countries invited to participate in interviews, data was collected from four countries in three continents (Australia, Canada, the United Kingdom, and Spain).

3.1 A description of four Science Week programmes in four other countries across three continents

This section provides a description of the NSWs included as part of the international benchmarking review.

3.1.1 Australia

National Science Week Australia is one of several science communication and engagement programmes within the umbrella of 'Inspiring Australia', a national strategy for science community and engagement. Held annually in the month of August, the NSW is in its 13th year of raising the profile of science in Australia, fostering understanding and appreciation for science and innovation, and more recently, sparking interest and engagement in science[14]. As described by an organiser, the NSW is intended to be the "*big bang to attract as much attention as possible to science*" and in doing so, move people along a spectrum of interest (attitudes) and engagement (behaviour) about science.

National Science Week is primarily funded by the Department of Innovation, Industry, Science and Research (DIISR), which provides about $ 1.4 million to the programme each year. About one-third of these funds are distributed to organisations through grants for Science Week activities. Government funding is supplemented with corporate sponsorship and in kind support from partners (e.g. Australian Science Teachers' Association (ASTA), Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australian Broadcasting Company (ABC), and event organisers[15].

The Australian NSW is led by a national Managing Committee (MC) and eight state/territorial coordinating committees. With guidance and direction from the Managing Committee, coordinating councils work with local organisations, groups, and individuals to design and implement regional and local Science Week activities. Activities range from school experiments, lecture series, museum exhibitions to a national speaking tour and interactive online research projects.

Evaluation findings suggest that the programme is making an impact. In 2009, 1.3 million Australians participated in more than 1,000 National Science Week events. In addition, approximately 50% of the population reported being aware of the programme, a statistic that has remained consistent over the years.

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[14] Australia's school year runs from January to December

[15] [15] Ignite Your Imagination: National Science Week: An Initiative of the Australian Government. Proposal from the National Meeting for Science Week, 17-18 September, 2009.

3.1.2 Canada

The NSW in Canada is called the National Science and Technology Week (NSTW) and is held in mid-October, shortly after the school year begins (late Aug – early September). The programme celebrated its 20th anniversary in 2011. The primary aim of the initiative is to raise awareness of the importance of science and technology in everyday life, including the economic future of the country.

The main objectives of the NSWT, according to a member of the national steering committee, are to:

- Showcase Canadian science, technology (ST) and innovation including government initiatives and projects;
- Foster national pride through exposure to Canadian ST;
- Identify and develop science champions; and
- Inspire youth to pursue careers in ST.

To accomplish these objectives, the Canada Museum of Technology, the National Lead, works with the Steering Committee (i.e., national government representative, corporations, and science communications industry groups) to plan and design a framework for the programme (e.g. dates, theme, national launch strategy, etc.). Although planning begins at the national level, NSTW is very much a grassroots effort in which organisations, community groups, and individuals have complete autonomy in the design and implementation of events and activities. NSTW was originally fully funded by the federal government but it is currently a "self-funded" initiative. The Canada Science and Technology Museum provides leadership for the programme as part of its mandate to improve scientific and technological literacy in Canada. NSTW is sustained through these efforts and other in-kind support from organisations and volunteers at the regional and local levels.

Despite the lack of funding, Canadians have collaborated to implement a variety of activities including open houses with interactive science activities, lecture series, chemistry walks, environmental clean ups, a student video contest, and a sea expedition for student groups. In the recent years, participation in NSTW activities has reportedly doubled.

3.1.3 United Kingdom

The NSW was first implemented in the United Kingdom in 1994. Since then it has been held annually in March as this time fits within school and university schedules. In the United Kingdom, the school year begins in September.

The UK's NSW is a country-wide initiative celebrating the connection of science in everyday life. In 2006, the focus of the program expanded to include engineering and the name officially changed to National Science and Engineering Week (NSEW). Sponsored by the Department of Business Innovation and Skills, the programme fosters the "celebration of science and engineering" by:

- Engaging and inspiring people of all ages (e.g., youth, adults) with science and technology and their implications;
- Promoting discussion and understanding of what science, engineering and technology can and cannot achieve;
- Promoting knowledge of the scientific method,(i.e. how scientists go about their work and reach their conclusion); and
- Promoting science, engineering and technology studies beyond the age of 16 and science, engineering and technology as career options[16].

NSEW is coordinated by the British Science Association (BSA) in partnership with Engineering UK. These national coordinators provide guidance, information and resources to local entities (e.g., organisations, community groups, individuals and schools) to assist them in implementing activities as part of NSEW.

While NSEW receives most of its funding from national government, some monies are received from Engineering UK for engineering focused activities and from the Scottish and Welsh Assemblies to support activities in these countries. Various corporate sponsors contribute to NSEW on an ad-hoc basis (Blackberry, Wellcome Trust, Sika Sarnafil, Rowse Honey, etc.).

Activities range from lectures, school competitions, to mass participation events like hands-on experiments. Through 4,500 activities like these, NSEW has reached millions of UK residents. In 2011, 1.7 million people attended events or participated in activities, while almost 70 million were reached through print and broadcast media. There is also some evidence that NSEW has increased understanding of and interest in science and engineering.

3.1.4 Spain

Science Week or Semana de la Ciencia, as it is known in Spanish, was first held in 1996 and 1997 in Cataluña and Madrid as part of European Science Week. The broad aim of the initiative was to promote science within Spanish society.

Since the late 1990's, Science Week has been held annually in November with events centralised in regions across the country to:

- Build awareness of scientific research and technological innovation;
- Promote a culture of science and innovation;
- Bridge the gap between scientists and the public;
- Increase young peoples' interest in science and research careers;
- Promote democratic debate about research, science, and innovation; and
- Inform the public about public policy related to science, research, and technology.

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[16] http://www.britishscienceassociation.org/web/NSEW/_aboutnsew.htm

In 2002, the Spanish Foundation for Science and Technology (FECYT), a unit of the Ministry of Science and Innovation, began coordinating Science Week nationally. In this role, FECYT selects the date and theme for the event, **organises pre-event conferences**, **designs the social networking and communication campaign**, **manages the general website**, and **provides funding for activities and events**.

The Spanish Science Week is sponsored by FECYT, with public funds from the Ministry of Science and Innovation. The private Sector is also vital to providing funding (e.g. banks, technology, ICT, and energy companies, etc.). As one of the primary sponsors of Science Week, FECYT provides funding to research and innovation NGOs to organise events as well as to regional organisations that provide coordination and communication support for Science Week activities.

There are a variety of activities for youth and the general public during Spain's NSW, including conferences and round tables, exhibitions, experiments, visits to laboratories, competitions, workshops, open days, science theatres and guided tours. All activities aim to promote science and society dialogue and align with the conference theme or the international focus (e.g. biodiversity, chemistry) of the year. With over 2100 activities implemented by 660 organisations in 2010, Spain's NSW is has been institutionalised by universities, science centres, schools, and science, technology and innovation entities. Stakeholders in Spain indicate that the NSW is fully integrated into the cultural agenda of Spain.

3.2 Cross country comparisons

Table 7 summarises all the NSWs and provides a comparison to South Africa's NSW on several key components of the programme model.

Comparison of Science Week Programmes by Country
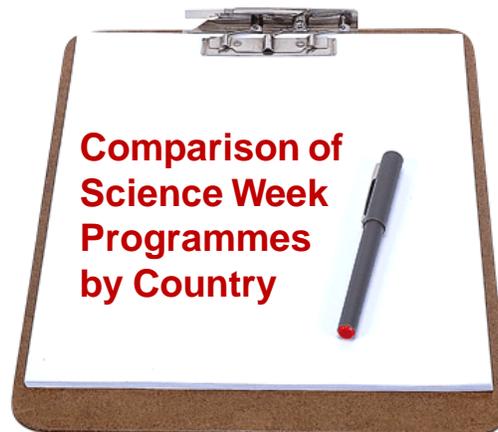
Table 7: Comparison of Science Week Programme Models by Country

Programme Model Component	South Africa	Australia	Canada	United Kingdom	Spain
Name	National Science Week (NSW)	National Science Week	National Science and Technology Week (NSTW)	National Science and$ Engineering Week (NSEW)	Semana de la Ciencia (FECYT)
Aim/Goal	• Promote greater awareness of the value and impact of science, engineering, and technology (SET) in everyday life	• To interest and engage Australians in science	• Increase awareness of science and technology (ST) in everyday life	• To stimulate and support scientist, engineers, science communicators and the public to produce science, engineering and technology (SET) events that engage and inspire people	• To build societal awareness and knowledge of science (including technology and innovation)
Funding	• Government	• Government • Corporate sponsorship • In-kind support	• In-kind support	• Government (national, regional) • Corporate sponsorship	• Government (through a public foundation) • Corporate, private sectors sponsorship
Scale	• Provincial (2000-2002), • National, central venues in each province (2003-2004) • National, multiple sites in each province (2005-2011)	• National • State • Territorial	• National, • Provincial • Territorial	• National, local	• National, regional

Programme Model Component	South Africa	Australia	Canada	United Kingdom	Spain
Key Objective(s)	• Contribute to development of a society which values and appreciates Science, Engineering, and Technology (SET) • Provide a platform for scientists to engage each other and also to engage with the non-scientific community • Promote partnerships between media and scientists • Profile work of the Department of Science and Technology (DST) and its priorities • Attract learners to SET career (including research) *(2010- 2011)*	• Celebrate Australian talents and achievements in science, innovation, mathematics, engineering and technology; • Provide an opportunity for all Australians to participate in events and activities that showcase science; • Demonstrate how science is interesting, challenging, important, and of direct relevance to our daily lives, the well-being of society and the environmentally sustainable growth of our economy; • Encourage young people to continue science studies and to pursue science-based careers • Demonstrate the links between science subjects and science-based careers; • Assist in effective science teaching and learning in Australian schools • Foster supportive partnerships among	• Raise awareness of the role science and technology (ST) in Canadians' everyday lives • Promote and showcase ST and innovation happening in Canada including federal projects • Create science champions • Promote heritage and foster a sense of pride in Canadian ST • Inspire youth to pursue careers in ST	• Increase the number of registered events • Maintain overall numbers of events, participants, and attendees • Increase the number of new registered organizations • To retain existing NSEW participants (e.g., organizations, presenters) • To widen access to science, engineering and technology to schools in challenging circumstances • To increase awareness of NSEW amongst the general public • To increase traffic to the British Association, NSEW and affiliated websites • To increase regional and national medial in print and broadcast • To increase the number of scientists/engineers involved in NSEW	• Build awareness of scientific research and technological advances • Promote a culture of science and innovation • Bridge the gap between scientists and the public • Increase youth interest in science as a profession • Promote democratic debate about research, science, and innovation • Inform the public about policy and decision-making related to science, research, and technology

Programme Model Component	South Africa	Australia	Canada	United Kingdom	Spain
		education, business and government organisations			

Programme Model Component	South Africa	Australia	Canada	United Kingdom	Spain
Oversight and Coordination	• DST, Custodian • South African Agency for Science and Technology Advancement (SAASTA) as the National Coordinator	• National Managing Council • State/Territory Coordinating Committees	• National Steering Committee • National Lead, Canada Science and Technology Museum • Informal Planning Committees at regional or local level	• British Science Association (National Coordinator) • Engineering UK (Partner)	• La Fundación Española para la Ciencia y la Tecnología

Planning and Implementa-tion	• SAASTA Multidisciplinary Project Team
	• Provincial Departments of Education (DoE)
	• Grant Holders
		• Managing Council
		• Coordinating Committees
		• National Partners
		   • Australian Science Teachers Association (ASTA)
		   • Australian Broadcasting Corporation (ABC)
		   • Commonwealth Scientific and Industrial Research Organisation (CSIRO)
		• Grant Holders
			• National Steering Committee
			• Canada Science and Technology Museum
			• Event organisers
				• British Science Association
				• Engineering UK
				• Event organisers
					• La Fundación Española para la Ciencia y la Tecnología
					• Regional Coordinators
					• Activity/event organiser (recipients of funding)

Target Audience(s)	• Youth/learners • Educators • Scientists • Politicians/decision-makers • General public	• Disinterested/unengaged (in science) person • Youth (under age 24) • Schools • Educator • Science community	• General public • Youth • Families	• General public • Youth/students • Schools • Educator • Adults • Event organisers (including	• General public • Youth/students

Programme Model Component	South Africa	Australia	Canada	United Kingdom	Spain
	• Corporate Organisations • Media Officials of the DST			scientists)	
Key Activities*	• National and Provincial Launch events • Open days • Lectures and seminars • Traditional games • Exhibitions • Publications	• **National Tour** • National Project (e.g., gimmick) • Exhibitions • Lectures • Festivals • School, classroom activities • Online activities • Entertainment activities (e.g. comedy tour, poetry competition, Pub games)	• National Launch • Festivals • Lectures • Exhibitions • Expeditions • School-based activities • Book readings • **Online resources for teachers**	• Mass participation events/experiments • **National School Competition** • **Event awards** • **Online activities** • Activity Pack Series	• Conferences and round tables • Workshops • Exhibitions • Experiments • Excursions • **Competitions** • **Open days** • Science theatre • **Guided tours**

*This is not intended to be an exhaustive list, but rather a sample of activities implemented during the SW programme.

In the following sections, the themes that emerged from the telephonic interviews are discussed, with particular focus on the similarities and differences across countries. Comparisons will be drawn with South Africa's NSW.

3.2.1 Programme Model

Table 7 demonstrates that there are many similarities in the programme models for NSWs in South Africa, Australia, Canada, and United Kingdom. Themes related to programme design and implementation are as follows:

Science Week programmes share similar goals/aims, objectives, structure and implementation approach: Across the countries reviewed, including South Africa, the overarching aim of Science Week was to highlight the role, importance and impact of science, engineering and technology (SET) in everyday life. The objectives set by each programme to achieve this aim fall into three broad categories:

- Raising awareness of SET;
- Sparking interest in SET; and
- Facilitating engagement in SET at Science Week and beyond.

The initiative structure and programming approach were identified as key to each country's ability to realize these objectives.

There is some variation in how Science Week initiatives are funded: In three out of the four countries reviewed (Australia, United Kingdom, and Spain), Science Week is mostly funded by government, including the national department(s) responsible for SET and national assembly's (e.g., Wales, Scotland). The remainder of funding for these initiatives comes from corporate sponsorship and in-kind support from partners, local organisations, community groups, and individual volunteers. Canada represents a unique case, as there is no specific funding stream for NSTW. The NSTW in Canada went through various phases of funding. The program was initially fully funded by government and then shifted to a partial government funding model. The programme is currently implemented through an organisational mandate Instead and relies on in-kind support and the resources leveraged through steering committee members' networks (e.g., media attention, and profile for events, participation, buy-in and support from influential leaders, etc.).

South Africa's funding model differs from the models reviewed globally since the other countries receive a portion of their funding from corporate sponsors. While the business sector is a target participant of NSW, it does not appear that they are engaged to provide sponsorship as is the case in other countries implementing NSWs.

Funding model promotes flexibility: Interviewees thought their funding model contributed to the grassroots approach - country representatives reported aspects of their funding model helped to give event organisers the flexibility to plan and operate activities as desired. For example, in Australia, United Kingdom, and Spain the availability of grant funding enabled applicants to propose a variety of events and activities. Generally any activity that related to SET and fit within the theme was acceptable. On the other hand, in Canada the lack of funding gave organisers the freedom to design activities and fund them independently or seek other resources. Within South Africa, DST and SAASTA outlined a programme delivery approach and stakeholders and organisers also have some degree of flexibility to propose activities.

Funding models present challenges for participation and sustainability: Despite the slight differences across countries, all participants suggested that their funding model presented some challenges. For Canada, the lack of a primary funder makes it impossible for some groups and individuals to participate. In other countries the reliance on one source for funding makes it less likely that programmes will actively develop and cultivate relationships with potentials funders. While participants all indicated the potential value of having greater corporate sponsorship, two highlighted the barriers to engaging corporate sponsors. One Science Week organiser described the challenges in securing industry sponsors. As quoted, *"We don't have the right to give sponsors recognition at an event. I can't tell an organisation that they must highlight a specific corporate sponsor or give them visibility. It's difficult to get sponsors without providing them with visibility".*

However, for Spain, having corporate sponsorships has reportedly resulted in the national coordinator (FECYT) having less independence and control over the content and implementation of activities.

South Africa's NSW allows branding as part of the branding guidelines, as long as the DST logo remains larger and at the top left hand side, with all other relevant logos at the bottom.

Science Week initiatives evolve over time: Findings indicate that aspects of the Science Week programme models have changed since the beginning of the initiatives. In two countries, there was a shift in program focus (i.e. aim, objective, approach and structure). In recent years, the primary objective of NSW Australia has changed from raising awareness of science to sparking interest and creating pathways to engagement in science. In 2002, Spain changed from only regional coordination to having a national level coordination/leadership entity which has improved the consistency of activities/events across the country. The focus of the initiative in the United Kingdom was broadened to include engineering. Similarly, NSW South has evolved in the last 11 years. The programme expanded its scope and reach from a provincial initiative with rotating implementation to a national initiative with implementation in multiple sites in all nine provinces.

Spain has seen some changes related to the funding of Science Week. In the past, FECYT, the national coordinator for Spain Science Week provided funding for activities and marketing/communications. However, beginning in 2011, they only provide financial support for Science Week activities, as they found that communications funds were being used for non-Science Week activities.

Planned implementation approach: Two countries reported enhancements in their branding and communications. The United Kingdom engaged a **public relations firm to generate more media coverage**, while Australia provided standard **'collateral' items** (e.g., t-shirts, banners, tattoos, stickers, coasters, posters, etc.) to promote a clear and consistent brand.

Science Week activities are similar, but vary in their implementation by country: Australia, Canada, the United Kingdom, Spain and South Africa implement a wide variety of activities for Science Week designed to raise awareness, provide information/education, and stimulate interesting in SET. With the emphasis on allowing organisers the required control in planning events, the possibilities for activities to implement were endless, as one organiser noted, "*It's really up to the creativity of the people…as long as it attracts interest to science, but meets people where they are, we'll give it a go*".

Table 7 includes a list of the types of activities implemented in the each country. These activities could be loosely placed into one more of the following categories:

- School based;
- Mass participations;
- Educational;
- Entertainment;
- Arts/culture;
- Social networking;
- Interactive; and
- Promotional/marketing related.

In Australia, the United Kingdom, and Spain schools are a major target. Resources are provided for teachers to plan events/activities. Activities are targeted at learners but sometimes these activities are for the broader community (e.g. an open day, mass experiment). In these countries there are not really official sites - any person or entity can implement a NSW activity/event. A key difference is that in South Africa, teachers and learners are targeted strategically with activities. Outreach activities are provided at schools during the NSW or learners are bussed to NSW sites.

National level coordination and leadership coupled with grassroots action helps to facilitate programme achievement.   Three out of four countries identified a layered "grassroots" approach to programme implementation and suggested that it was critical to their success. Science Week representatives generally described the structure and organisation of their country's programme as having a national level leadership and oversight body that was complemented by local event planners and organisers. In two countries, a set of intermediate coordinating bodies existed at the regional level (e.g., state, province, territory). While, the overall strategy and direction of the programmes come from national leadership, the crux of activity is driven by people on the "front lines."   Science Week leaders reported being deliberately careful to allow local event organisers liberty to develop and implement activities as they see fit. One interviewee described their grassroots approach to leading Science Week as "*providing guidance without demands*".

One country described a similar programme structure with a national coordinating agency providing funding and general direction while regional coordinators support event organisers with planning, coordination and communication. However, the country representative did not describe their programming approach as "grassroots" or link it to the success of their Science Week.

South Africa's NSW shares the same general aims and objectives as the four review countries. In addition, the management of NSW reflects similar national, regional, and local levels of coordination and implementation. Finally, similarly to review countries NSW activities are planned and implemented by stakeholders at the local level.

Providing support, resources, and relationship-building will facilitate stakeholder engagement: Another challenge identified by participants is engaging various stakeholders in Science Week. Countries have reported difficulties engaging the following stakeholders:

- Corporations;
- Government officials;
- Youth and young adults, and
- Locally focused organisations that don't have a mandate to work at the national level.

The primary challenge in getting these groups to engage is the inability to demonstrate the value of participating in the Science Week. For example, as previously noted, corporations are less interested in supporting Science Week programmes because they perceive very little benefit or returns on their investment. In Canada education is not federally funded. As a result, NSTW often faces barriers convincing provincial education organisations to become affiliated with a national science and technology initiative.

Solutions to this challenge as highlighted by those interviewed internationally, include:

- **Building relationships**;
- **Securing buy-in support from high profile people**;
- **Engaging in dialogue** and using the art of "persuasion";
- Providing **resources and support to facilitate programming** (e.g., resource guides for planning events, media and promotions support);

- **Implementing fun, creative, and unique activities**; and
- **Providing relevant incentives** (e.g., Awards for events, school competitions).

In South Africa, SAASTA is the pivotal agency of support provision at grassroots level. The NSW has succeeded in reaching high school learners through the mechanism of school groups visiting NSW sites. This has worked to the extent of focusing on specific schools. Primary schools are still not as much a focus as they should be.

South Africa has succeeded in securing support from high profile people including DST's Minister and provincial Department of Education MEC's. Where South Africa could improve is building further relationships with Government Departments, NSI stakeholders and especially the private sector corporate who source SET skills as part of delivering on their business mandate.

Evaluation is important and the tools and mechanisms for measuring success should be improved: Country representatives highlighted the importance of evaluating the impact of Science Week. Although they are actively engaged in evaluating their efforts, they indicated room for improvement. In each country there is evidence that awareness of SET and participation in Science Week has increased. However, the impact of the programmes on attitudinal and behavioural outcomes is less clear and more difficult to measure. While current measures of these outcomes are primarily anecdotal, one country is proposing a new evaluation strategy that includes the development of baseline indicators for attitude and behaviour related to science interest and engagement[17]. Participants interviewed suggested that this level of evaluation is vital to measuring overall success.

The evaluation of NSW South Africa to date has focused on assessing the progress on the initiative in several areas such as:

- Political and provincial buy-in and support;
- Communication and publicity;
- Project management;
- Collaboration;
- Participation; and
- Distribution of materials.

While these areas of measurement are sufficient to assess the process and implementation of the initiative, there is very little focus on the impact of the initiative on the participants' attitudes, knowledge and behaviour.

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[17] Ignite Your Imagination: National Science Week: An Initiative of the Australian Government. Proposal from the National Meeting for Science Week, 17-18 September, 2009.

3.2.2 Lessons Learnt and Best Practices
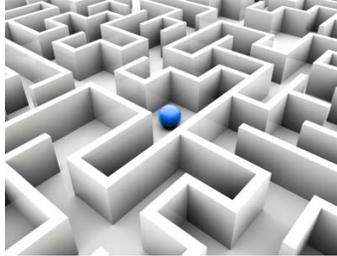
While there were no common themes in lessons learnt or best practices across countries, participants highlighted the following:

- Given the lack of interest and limited return on investment, corporate sponsorship should not be the sole funding model for Science Week as this is not sustainable. It is critical to identify multiple avenues of funding to maintain the programme.
- Grassroots initiatives require multi-faceted approaches to marketing and promotions. Aligning with national media partners/promotion partners can increase participation and reach of the initiative.
- To attract and engage the "disinterested" in science, it is critical to develop and implement innovative, cutting-edge activities.
- Replacing paper-based events programmes with an online events system is more cost effective and allows for reallocation of resources to other areas of the initiative.
- Having a national coordinating body (e.g. steering committee) that has influence but not control is an ideal structure for enabling local level organisers to easily develop programmes and activities that fit the overall programme framework.
- It is of critical importance to start the planning process as early as possible. Activities should be planned and positioned based upon the target audience/beneficiaries.
- Having consistent branding provides a uniform look and feel for initiative. Clear branding, communication, structures and responsibilities are fundamental to smooth implementation.
- Many organisations are unable to participate in Science Week due to a lack of capacity. The solution is to provide as much support (technical, logistical) as possible to event organisers (especially if funding is not available) to make participation easier.
- Using a Science week champion that the public can easily identify with and relate to may have more impact than a highly skilled professional (e.g. astronaut).

4 Formalising South Africa's participation in Intergovernmental Initiatives

South Africa is a member of both regional and continental intergovernmental bodies such as the South African Development Community (SADC) and the African Union (AU). As a result, the DST participates in science and technology activities that are part of these bodies' agendas, including the promotion of science awareness.

The SADC SET week was launched in Mauritius in 2010. Other African countries within SADC and beyond have started following the way South Africa celebrates SET week and South Africa has supported NSWs in Mozambique, Uganda, Kenya and Namibia, with plans to go to Zambia and Somali.

On an annual basis, South Africa is approached by other countries to participate in their NSW events. The current challenge is that South Africa has no strategy in place to participate in cross-border activities. With each invitation by other African countries, South Africa races around to see what can be put together to participate. The DST deals with the situations as they arise - which is proving to be a difficult approach to sustain.

DST and SAASTA stakeholders were interviewed to explore the best way for South Africa to organise itself to participate in intergovernmental activities and impart knowledge with other countries in the region and in Africa. As a result of this review, the following was found[18]:

- **Ad-hoc support is provided**: There is currently no planning in advance. It would be important to pull key dates for intergovernmental initiatives into a calendar early so as to budget and plan accordingly.

- **Dedicated funding for cross-border initiatives** is not in place.

- **Limited information sharing**: Countries with their own NSW's who were contacted during this review, showed keen interest on South Africa sharing their lessoned learned. It is recommended that information and research results be shared with other countries, beginning by sharing the results of the ten-year NSW review.

- **No intergovernmental cross-border guidelines or strategy exists for public awareness programmes**: There is currently no programme of action in terms of what

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[18] This Section responds to TOR 4.2.17

South Africa wants to do or guidance on how to respond effectively to requests made by other countries to observe our NSW or for South Africa to showcase a sample of SET achievements in other countries. Concerns were raised by DST's Programme 3 DDG that there is not yet a clear understanding of the purpose of the NSW and the reasons for identifying international partners for the NSW. Once clarity is sought on the intention of the NSW, a policy framework with a cross-border strategy for Science Weeks can be developed and agreed upon by SADC member states. Establishing cross-border guidelines could be an effective way to demonstrate how South Africa can assist other countries implementing similar initiatives, especially SADC countries. Since South Africa takes part of its NSW to other countries upon request, the cross-border guidelines/strategy should include ways to identify activities annually that could be selected to take to SET weeks in countries who request South Africa's participation.

The DST could enhance the synergy between the NSW and related intergovernmental initiatives in the following ways:

- Establish cross-border guidelines or a cross-border strategy for public awareness programmes. A cross-border strategy could be implemented through an MOU and an intergovernmental science awareness implementation plan developed at the start of the new NSW project life cycle.

- Provide mentorship to delegates who visit Grant Holders and Service Providers through a hands-on experience of a NSW. As part of the delegation, include a pre-visit needs assessment interview to understand their expectations and a post-visit round table session to share valuable lessons learnt and experiences of the event.

- Dedicate a small portion of the NSW budget to support efforts of cross-border initiatives.

- Identify information sharing opportunities and communicate regularly to share findings and experiences of the NSW with other countries. This is a cost-effective way of building relations and marketing South Africa as a leader globally in terms of National Science Weeks.

- There are many international public engagement platforms where knowledge can be shared. However, no international platform where stakeholders meet to share about NSWs exists currently. Establishing such a platform would benefit all NSWs across the globe and would provide South Africa with an opportunity to be recognised for the work done in terms of SET in our country.

5 An assessment of the extent to which the NSW met its 5 objectives

"Career guidance to learners especially in SET careers and encouraging learners to SET careers is one objective. Raising awareness to the public to the importance of science and technology is another…"

Grant Holder interviewed

This chapter reflects on each of the five NSW objectives and presents the results of the NSW over the ten-year review period in light of each objective. The NSW objectives are assessed to determine the extent to which they are being met. This chapter begins by reflecting on the two different sets of NSW objectives (Section 5.1) that were provided for during the NSW (as per DST's Project Brief specifying objectives for 2005 – 2009 and objectives for 2010 – 2011 as per DST's Project Guidelines). The chapter then assesses whether the objectives have been met by responding to the TOR in the following way:

- Section 5.2 assesses NSW's contribution towards the development of a society that values and appreciates SET (Objective 1);

- Section 5.3 weighs the NSW's contribution to providing a platform for scientists to engage each other and to engage with the non-scientific community (Objective 2);

- Section 5.4 assesses the extent to which NSW has contributed to promoting partnership between the media and scientists (Objective 3);

- Section 5.5 examines the contribution of the NSW in profiling the work and priorities of the DST (Objective 4);

- Section 5.6 will assess the influence of NSW on attracting learners to SET careers (Objective 5); and

- Section 5.7 considers the NSW's role in capacity development of Grant Holders.

Each section explores the level of progress made in achieving each objective based on findings from a desktop review of programme documents and interviews with stakeholders' and target beneficiaries' (i.e., DST, SAASTA, Grant Holders, learners, students, scientists, and journalists). Relevant literature is also introduced and considered as appropriate to contextualise the findings. The analysis of NSW's impact also highlights the factors that facilitated or hindered the achievement of intended objectives.

5.1 Contextualising the extent to which the NSW met its 5 objectives through a reflection of the shift in objectives from 2005-2009 to 2010-2011

Grant Holders interviewed were asked what they thought the objective of the NSW was. Table 8 provides an indication that the majority of Grant Holders repeatedly referred to objectives 1 (to contribute to the development of a society that values appreciates SET) and 5 (to attract learners to SET careers) as the only objectives of the NSW.

Table 8: Objectives of the NSW according to grant holders

NSW Objective	Number of Grant Holders who referred to the objective
1. To contribute to the development of a society that values and appreciates SET.	21
2. To provide a platform for scientists to engage each other and also to engage with the non-scientific community.	0
3. To promote partnerships between media and scientists.	0
4. To profile the work of DST and its priorities.	1
5. To attract learners to SET careers.	14

The five objectives listed above were introduced as part of the 2010/2011 Project Guidelines by the DST. The 2005 to 2009 Project Brief included the following four NSW objectives:

1. To create awareness of the important role science plays in people's daily lives;

2. To encourage our youth to consider studying and improving their performance in Mathematics and Science;

3. To attract more of our youth into SET careers; and

4. To contribute towards initiatives to identify and nurture youth talent and potential in Maths, Science, Engineering and Technology.

It is understandable then, because of the emphasis of the objectives during the period 2005 to 2009, that NSW objectives 1 and 5 were the main objectives identified by Grant Holders interviewed. Table 8 shows that **most Grant Holders (n=21, 87.5%) believe the objective of the NSW is to contribute to a society that value and appreciates SET**. The most popular response to this question was that the objective of NSW is to raise awareness of science and to showcase the role of science in people's daily lives, which was the first objective set for NSW from 2005 to 2009. The following quotes illustrate what Grant Holders believed is the objective of the NSW:

"Highlights science to learners, teachers and the public and the role of science in our life" "Popularises science" "Promote science...to get people to stop and explore the possibility of science and demystify the mystery of science and to increase interest"

Grant Holders regarded NSW to be a fun week of science which is targeted at the community at large with the aim of raising awareness of science, making people more interested or excited about science, showcasing or highlighting science, showing the importance of science in daily lives, popularising science and demystifying myths about science as an exclusive issue. Responses tied to objective one included creating science awareness.

More than half of Grant Holders interviewed (n= 14, 58.3%) also **considered attracting learners to SET careers as a key objective of the NSW**, which responds to NSW Objective 5 (attracting learners to SET careers). This objective was carried though from 2005-2009. As quoted:

"So career guidance to learners especially in SET careers is one objective" "It is about inspiring....More specifically to learners...inspiring them so that they can follow careers in SMET. It's about impacting on them the importance of doing science and maths in schools"

It is interesting to note that **only one Grant Holder indicated that profiling the work of DST is an objective of the NSW**. However, when directly asked their understanding of the objective to profile the work of DST, most Grant Holders referred to the activities that they provide during NSW as a way of profiling the work of DST because NSW is a programme of the DST. Some Grant Holders pointed to the branding on their site as a way of profiling the work of DST as it clearly showed that DST was responsible for the NSW with the prime position of its logo on materials. Other Grant Holders asserted that in their talks and presentations they always explain to the participants that the NSW was made possible by the DST, thereby profiling its work.

None of those Grant Holders interviewed identified NSW Objective 2 (to provide a platform for scientists to engage each other and to engage the non-scientific community) as an objective of the NSW. Many of the scientists that participated in the NSW events say they have not had the opportunity to engage with their peers. Interviews with the Minister and Exco at DST highlighted that providing a platform for scientists to engage each other is not an appropriate objective of the NSW this objective may be better placed within another initiative of the DST.

Scientists and Grant Holders indicate that the NSW encourages networking opportunities and provides the platform and resources that make it easy for such an engagement between scientists and the non-scientific to take place. It is a good space to know and see what others are doing in other science fields and to share ideas and knowledge. However other scientists question if this is necessary, because they have their own conferences.

The NSW platform is for learners and the activities are focused around engaging them. Scientists feel that the NSW provided them with a good platform to engage with the non-scientific community. It is a great opportunity to share ideas, discuss and engage with the public, especially learners. Scientists interviewed indicate that there is a need to take the NSW to another level and engage more broadly on wider topics and activities. The current programme is more representational and does not seek to truly engage the community. Nonetheless, it also an effective approach of promoting the various fields in science and provides study and career guidance to the learners. Many scientists agree that the NSW brings confidence in scientists to share their knowledge and insights with learners. However, more engagement with the community is needed to reach out to them as users of SET.

5.2 Objective 1: Contribute of the NSW to the development of a society that values and appreciates SET

As a central science awareness initiative of the DST, the NSW is envisaged to play a key role in promoting the appreciation of SET in South African society. According to the TOR, value and appreciation for SET within society is reflected in increased popularity of NSW participants' recognition of the role SET plays in their lives, and an understanding of SET issues by the non-scientific community. Using similar indicators, this section assesses the extent to which the NSW has resulted in a greater value and appreciation for SET.

According to the Grant Holders, **the NSW has to some extent contributed to the development of a society that values and appreciates SET.** Finding from interviews and focus group discussions with learners suggest that **while the NSW has not led to the development of a new appreciation for SET, the initiative has reinforced or enhanced learners and students' existing values and appreciation for science**. The NSW has exposed learners to new information about SET and changed their opinion about the role of SET in their lives. Scientists interviewed believe that **the NSW provided scientists with a good platform to engage with some segments of the non-scientific community.**

Factors that demonstrate the achievements around this objective include the following:

- **Implementation of activities to raise awareness and interest**: More than three quarters of Grant Holders interviewed believed that the main objective of the NSW is to raise awareness about the importance of science in everyday life as well as to build interest and excitement about science by showcasing SET. As such, Grant Holders implemented a variety of activities for learners, educators, and the general public to meet these objectives. These activities provided an opportunity for participants to develop a greater value and appreciation for SET. Apart from providing services, a number of Grant Holders believe that their involvement in NSW and their collaboration with other SET service providers has also enriched their value and appreciation of science.

  All learners interviewed (n=24) expressed a feeling of appreciation and excitement about the opportunity of being exposed to new information through the NSW. Many learners (70%) had not been exposed to science experiments before NSW, so they valued seeing science "live" in real time. **NSW activities also exposed learners to the broader landscape in science and technology beyond what is covered in school**. As one learner pointed out, through NSW, "we realised that science in more than what we're learning at school." Participation in the NSW provided an important 'out of the classroom experience' for learners that showed them the relevance of science and the opportunities that exist in each field.

Finally, all learners who were interviewed agreed that the NSW changed their overall opinion of the role science plays in their everyday life. Half of those learners interviewed (n=12) pointed out that after participating in the NSW, they realised that science was not as difficult as some suggest.

It is important to note that about 90% of the interviewed learners were already taking science as a subject before they first attended the NSW. Given this, learners participating in NSW reported already having a greater appreciation for science than their peers not taking science. Nonetheless, all learners still believed that the NSW broadened their perspective on how science relates to their lives at home and school. They also indicated that the NSW provided exposure to career opportunities.

- **Activities implemented were well matched to the objective**: The most common NSW activities were lectures/presentations/demonstrations, exhibitions, career guidance, workshops, and educational tours–activities that provide information and exposure that can lead to greater appreciation and value for SET.

- **Institutionalisation of the NSW by Grant Holders**: The extent to which **the NSW has become part of the Grant Holders' yearly/annual plan** is also an indicator of its contribution towards SET appreciation. Of the 24 Grant Holders interviewed, 21 have built NSW into their yearly plan. Some even described the NSW as one of their "main" programmes or events of the year, suggesting that Grant Holders recognize the value of NSW as a platform for showcasing and promoting SET.

  The few Grant Holders who were not able to integrate NSW into their yearly plan most often cited uncertainty about the dates of NSW, the focus week changing from May to August and an inability to plan without confirmation of funding.

- **Leveraging additional resources**: Grant Holders' ability to leverage additional funding leveraged towards the NSW (other than SAASTA's grant amount) also indicates the value that the funders/sponsors place on SET. Almost 80% (n=19) of the interviewed Grant Holders reported leveraging an additional R10,000 to R1.3 million from their own organisations but also from the DOE, DST, Science clubs, the private sector, and other organisations. These funds supplemented grant awards from SAASTA and were mostly used for materials, transport, catering, printing, and activities.   This shows that the NSW has been able to promote the value of SET by prompting other stakeholders to support the initiative.

  Leveraging additional resources would not have been possible without buy-in and support for the NSW from organisational leadership. Having Grant Holders endorse the NSW initiative and allocate further resources demonstrates organisational value and appreciation for SET.

- **An opportunity for networking, to share ideas and engage**: The focus week is viewed as a great opportunity for scientists to share ideas, discuss and engage with the public, especially learners. Twenty per cent (20%) of the 22 scientists interviewed reported that **the NSW encourages networking opportunities** for scientists and provides a platform and the resources needed for such engagements. All scientists interviewed also assert that NSW facilitates information sharing and transfer of knowledge about key activities and developments across SET fields. Additionally, it is an effective approach for promoting various fields as potential study and career options for learners. Another benefit of NSW for scientists is the opportunity to build confidence in sharing their knowledge and insights with learners.

Factors that hindered the achievements around this objective include the following:

- **A predominant focus on Grade 10-12 learners**: While the NSW has reinforced learners' awareness and appreciation of SET and inspired them to consider career opportunities in SET, more than half of the learners interviewed suggested that the initiative failed to spark *new* interest and value for SET among most participating learners. **Learners identified a barrier to fully achieving this objective as the predominant focus on Grade 10-12 learners already studying science**. According to learners the organisers of NSW can do more to make learners eager to attend the NSW. Chief among this is to invite more Grade 8 and 9 learners, as this will showcase science to them before they choose their subject stream.   A further concern highlighted by learners interviewed was the need to include all learners in these grades, not just those taking science, so as to attract them and increase their value and appreciation for the field.

- **Transportation to venues**: Other barriers identified by more than half of those learners interviewed were transportation challenges to get learners to venues. Transport to NSW activities was a major barrier for learners, especially in rural areas where access to science information is limited. **If some learners are unable to participate in the NSW due to costs or lack of transport, the opportunity to influence their values about science is lost**. It is worthwhile considering other ways of implementing the NSW for learners to enjoy the experience where they live.

- **A lack of innovation in NSW programmes from year- to-year**: This barrier was identified by learners and journalists as a barrier. Journalists interviewed indicated that **the NSW is not framed in a way that provides a "new story"**, hence making it difficult to attract interest from the media to publish interesting content that will attract the general population to the event.

Learners who attended the NSW in the period 2008 to 2011, they found the repetition of programmes each year to dampen their experience. They commented that even though interesting, the same experiments and demonstrations get repeated every year. As a result, a few of them no longer attend the NSW.

- **Low participation of the general public in the NSW**: **The NSW has had limited success in promoting value and appreciation for SET among the general public**. As a primary beneficiary of NSW, a variety of activities and events during the focus week are targeted to this group.   However, participation is low.   Additionally, while it is assumed that participation in NSW activities influences one's values and attitudes about science, the exact benefits of participation in the NSW to the general public is unknown due to limited monitoring and evaluation of this population. Better engagement of the general public including more targeted activities, could go a long way in contributing towards their appreciation of SET.

5.3   Objective 2: Provide a platform for scientists to engage each other and also to engage with the non-scientific community.

Another key objective of the NSW is to foster engagement and relationship building among scientists as well as between scientists and the broader society. Such engagements are expected to further the overall goal of the NSW, to raise awareness of science and promote SET careers. Findings from interviews with scientists indicate that **while the NSW enables scientists to engage with some beneficiaries of the non-scientific community, scientist-to-scientist engagement is very limited**.

Factors that either demonstrate or facilitate the achievements of **scientists engaging with the non-scientific community** include the following:

- **Inviting scientists to participate in NSW activities**: Scientists noted that in most cases they became involved in the NSW when they were invited to facilitate an activities or when their organisation hosted events. Under these circumstances the scientists were more likely to engage because their participation in the NSW was viewed as part of their regular duties. Additionally, organisations that have a specific mandate related to the public (e.g. National Zoological Gardens) were viewed as better equipped to foster engagement with the non-scientific community.

In general, scientists perceive the NSW as a good vehicle for spreading science awareness and increasing learners' present and future interest and participation in the field. With the broad exposure it provides, NSW is a great initiative for changing young peoples' mind-sets regarding science and its applicability within society (e.g. health, economy and technology, etc.). All 22 scientists interviewed mentioned being involved in one or more NSW activities (e.g., motivational talks, presentations, demonstrations; career guidance and role modelling, community tours, exhibitions, and experiments) as facilitators or representatives of the host organisation. **These experiences provided scientists with a good platform to engage with the non-scientific community and share information and ideas about their respective disciplines.**

- **The ability for scientists to contribute to the subject matter**: Scientists reported being compelled to participate in the NSW when they had something to contribute to the topic/subject matter.

A factor that hindered the achievement of scientists engaging with the non-scientific community includes the following:

- **Limiting most activities to learners hindered engagement with the general public**: Scientist identified several factors that limit scientists' engagement with non-scientists and each other. Although the NSW has specified educators and the general public as target beneficiaries, the majority of activities and events are focused on learners. As a result, scientists that do participate in NSW, for example as facilitators of workshops or lectures, only have opportunities to interact and share their expertise with learners. The overemphasis on learners limits opportunities for scientists to engage with other segments of the non-science community (e.g., general public, parents, educators, etc.). Some scientists believed that NSW organisers must expand their efforts if the initiative is to promote further engagement with the greater non-scientific community (i.e. the general public).

Many of the **scientists interviewed reported that NSW did not provide an opportunity for engagement with their peers.** Factors that hindered the achievements of **scientists engaging with each other** include the following:

- **The NSW is not an appropriate forum for scientists to engage with each other**: Eighty per cent of scientists interviewed believed that the NSW is primarily focused on engaging learners in science related activities and there isn't a space for scientists to meet and engage with each other on a formal or informal basis. It is important to point out that **some scientists do not think it is necessary for NSW to foster peer engagement as scientists have existing avenues for engagement.** This was a sentiment shared by the Minister and some DDGs at the DST. Scientists currently engage in dialogue, information sharing, networking and collaboration at conferences, workshops and other forums specific to their fields. Scientists indicated that if the NSW provides another venue for such engagement, it may place scientists in a difficult position of having to choose between competing platforms. Fostering competition for space to facilitate scientists' engagement would not serve to benefit to the NSW.

- **Engagement increases when topics are relevant to people's daily lives**: Scientists identified public disinterest in their work as a barrier to further engagement. Their ability to engage with the public is heavily influenced by the focus and stage of their endeavours (e.g. research) and its perceived importance to the non-scientific community. **Some scientific work does not appeal to the mainstream because its importance or relevance to peoples' daily lives is not immediately clear**. In such instances, engaging with the non-scientific community is not useful or productive.

- **Engaging with the non-scientific community is not part of Scientists' scope of work**: Scientists interviewed highlighted the lack of incentive as a barrier to engaging with the non-scientific community. **Some scientists suggested that engagement with non-scientists was outside of their scope of work**. As scientists their performance is measured by publications, presentations, teaching, and mentorship of post graduate students. With all of these responsibilities, there is limited time to participate initiatives like the NSW. Similarly, with other established avenues for engaging their peers, many scientists interviewed did not perceive any value in trying to connect with other scientists through the NSW.

  They seem to prefer traditional methods of networking and engagement such as conferences and forums. As an outcome of interviews with DST leadership, it is suggested that MOUs and/or agreements with Science Councils and HEIs specify sharing of innovations and achievements in STEM with the non-scientific community through the NSW as part of a Scientist's performance measures.

- **Lack of early engagement in planning the NSW**: Factors relating to the structure and implementation of the NSW were also cited as hindrances to better scientist-non-scientist' engagement. Firstly, **scientists felt that they were not adequately involved in the planning of the NSW and are only recruited to participate in activities**. Interviewees thought that as scientists they could provide valuable insight on the theme and topics for the programme. Secondly, many scientists believed that one week was not enough time to raise awareness about SET. Some suggested that the NSW be extended to a month to allow for more activities, however, this was noted as not feasible. Other stakeholders interviewed (including DST leadership) suggested that the NSW is positioned to acknowledge the achievements of the year across the private and public sector (the Minister would acknowledge achievements of a variety of initiatives at the event), celebrate successes of young scientists (by inviting finalists of competitions to showcase their work) and kick-off long term initiatives.

5.4 Objective 3: Promote partnerships between media and scientists

The media has a key role to play in maximizing the impact of the NSW's efforts to raise awareness and promote SET in South Africa. The DST envisages that journalists and scientists partner to help translate research findings into relevant and accessible information for public consumption. This section seeks to determine whether the NSW enhanced scientists' public communication skills, whether it has achieved its objective of promoting partnerships between media and scientists and the factors that have facilitated and hindered the achievement of this objective.

Journalists have not been a focus in the NSW over the review period and as such, communication and publicity has been focused on press releases and information provided to journalists. Information on the NSW programme was released just before National Launch events each year, which gained the interest of science, education and news reporters to report on mainly the launch and sometimes activities. Journalists indicated that NSW venues should be confirmed with programmes well in advance (at least two months) so that they can have episodes/articles leading up to the event. The media release should be approved earlier to ensure maximum impact.

Journalists further state that having the same theme over five years has created dis-interest since they are looking for new and exciting events to report on.

5.4.1 Has the NSW assisted in improving the skills of non-specialised journalists to report on SET?

Based on findings from engagements with the DST media department and journalists, **the NSW has not assisted in improving the skills of non-specialised journalists to report on SET.**

There are specialised education and science journalists in the country, however, there is little evidence to show that the NSW has contributed to building their capacity to report on science, engineering, and technology related information. Findings from the media review revealed that most reporting on the NSW is based on press releases are provided to journalists by the DST media department or public relations consultants. This fact raises questions about the quality of SET reporting and suggests a need for further capacity development.

5.4.2 Has the NSW enhanced public communication skills?

In general, **the NSW has had limited impact on enhancing scientists' public communication skills.** All scientists interviewed report being involved in disseminating science information to non-scientists through participating in NSW activities such as demonstrations, presentations and science experiments.   Scientists also reported having done radio and television interviews.

Overall scientists' involvement in the dissemination of science information to the general public through the NSW (e.g., activities, radio/TV interviews) was minimal. Given that NSW activities mainly target learners and teachers, scientists had few opportunities to engage with the general public. Therefore, opportunities to enhance their public communications skills are also limited and as a result, their public communication skills have not been enhanced through the NSW.

Factors that facilitate the enhancement of public communication skills for scientists include the following:

- **Scientists being interviewed by journalists for articles or through radio and television**:   Twenty per cent (20%) of **scientists** interviewed indicated that they **participate in the NSW through radio and television interviews** shortly before the NSW focus week. However these opportunities are limited to short interviews in which little content can be covered and they only take place during the month of NSW. Nevertheless, a few scientists identified these media opportunities as experiences that enhanced their public communication skills and enhanced engagement with the media.

  Scientists also highlighted that the highly sensational manner in which scientific breakthroughs are reported in the media has directed reporting on science to publicity and communications departments.   This has hindered opportunities for scientists' to enhance their public communication skills as they rarely engage directly with those who are receiving the information.

5.4.3 Has there been an increase in general SET reporting in the media stimulated by the NSW?

Journalists indicated that **there has not been an increase in SET reporting in the media, stimulated by the NSW**. The primary reason cited is that the NSW has to compete with other stories and news perceived to be more interesting by journalists. The only newspaper cited to request for an article on the NSW is the Mail and Guardian. In terms of radio, a number of radio stations call to ask for interviews with scientists around the NSW, which is an achievement.

Journalists indicated that they found it difficult to identify an increase in reporting due to the NSW, since it is a weeklong event that comes and goes quickly.   Reporting by journalists is largely influenced by current events of the year, for example the 2011 Local government elections and 2010 Soccer World Cup.

Journalists further noted that more science reporting takes place during quiet periods of the year, in December and January when journalists need stories and news to report. December and January may not be opportune times for reporting on the NSW since it is held in August and it is seen as 'stale' news.

5.4.4 Is there an increase in the number of specialised science journalists in South Africa?

While there are specialised journalists who report on education, crime, sports and news in South Africa, journalists interviewed suggest that **very few journalists specialise in science reporting and this number has not increased as a result of the NSW.** The radio and television journalists engaged for this review indicated that they have done stories on SET topics outside of the NSW. However, the impetus for these stories was reportedly their own curiosity and passion for sharing science with the public in interesting ways.

They did not identify the NSW as a catalyst for their science journalism. Findings also suggest that there are a limited number of articles being published about science topics in print media. Despite the interest in science reporting mentioned by the two journalists interviewed, there seems to be very few science specialised journalists in the country, and even fewer focused on print media.

Furthermore, journalists suggested that there is no baseline from which to measure whether there has been an increase in the number of science journalists in the country.

5.4.5 Are there any programmes or stakeholders that have stimulated an increase in SET reporting during the NSW (2003-2009)?

According to journalists, stakeholders **that have stimulated an increase in reporting in SET during the past ten years include science centres and universities**. National science festivals, such as the annual Grahamstown Science Festival, were identified as stimulants of increased SET reporting.

5.4.6 Has the NSW promoted partnership between the media and scientists through media coverage of the NSW?

There are some partnerships between journalists and scientists that have been developed independently of the NSW. Unlike scientists, journalists indicated that they frequently engage with scientists to obtain expert opinions as part of their radio, print, or television reporting on key issues and important breakthroughs or for on-going science media programmes. The following factors hindered partnerships between the media and scientists being developed through the NSW:

- **The majority of adverts and press releases are because of bought space rather than voluntary reporting by journalists**: The DST media department indicated that they have not created a sound relationship between the science world and the media. **The relationship between the DST and the media is limited to advertorials which are highly dependent on bought space across different media sources** (print, radio and TV). Interviews with the DST's media communications officials as well as journalist interviews highlighted that the NSW is not framed in a way that provides a "new" story for journalists. For example, the theme for NSW has been the same for the past few years, making it difficult to attract interest. There is potential for the NSW to highlight interesting content that will attract the media to report on NSW in future.

- **Ownership of the NSW is by Government as opposed to scientists**: Despite engagements between scientists and journalists through the NSW, they have not managed to develop lasting partnerships as a result of NSW coverage. This lack of partnership is attributed to **the initiative being owned by government as opposed to scientists and academia**. Secondly, within the NSW science communication is directed to the primary beneficiaries (i.e. educators, learners and the public) resulting in less communication targeted to the media and scientists.

- **Current media coverage of NSW is not broad enough in terms of content**: Current media coverage of NSW events is regarded by scientists as not being broad enough to share important information with the public. Both journalists and scientists indicated that there is a need for more emphasis to be placed on sharing NSW activities and learning with the public.   The lack of breadth in reporting is attributed to the time constraints of the NSW. Given the one week time frame, the NSW hinders journalists from reporting long after the event as it is seen as 'stale news'. Furthermore, planning of the NSW around media, publicity and communication was not done early enough for journalists to prepare efficiently.

The NSW has prompted engagement and communication between scientists and journalists but has not increased partnerships between these groups. Over 80% of scientists interviewed indicated that they do not generally seek opportunities to work with the media on science reporting, as they generally share information about their fields through science journals. Some scientists (approximately 10%) report engaging with the media as part of a government sponsored campaign or an organised event. Limited interaction with media reportedly restricts the reach of their research findings and adds to the distance of science as a public-interest topic.   Nevertheless all scientists interviewed see the importance of engaging with the media to "de-mystify science" (i.e. making it more understandable to the general public) and to increase public awareness of key science developments. As such, scientists report being willing to engage with the media whenever the opportunity is made available.

5.5   Objective 4: To profile the work of the DST and its priorities

Another expectation of the DST is that the NSW should serve as a mechanism for profiling the work and priorities of the DST.   As key actors in the implementation of the NSW, the DST, SAASTA, and Grant Holders all have a role to play in communicating the work and priorities of the DST through the NSW. Based on findings from interviews with stakeholders, **the NSW was able to serve as a vehicle for profiling the strategic objectives and interests of the DST**.

Grant Holders saw the work of the DST including (but not limited to) communicating the importance of science in everyday lives, creating science awareness, showcasing South African science initiatives, identifying and addressing science skills shortage, and promoting the uptake of SET as study subjects and career paths. Grant Holders alluded to a variety of topics in science as DST's research priorities.   Examples cited include space research, IKS, nanotechnology, marine management and climate change research.

Factors that facilitated the achievement of stakeholders to **profile the work of the DST and its priorities** include the following:

- **Activities implemented**:   The mandate of the DST was directly reflected in the objectives of the NSW when Grant Holders provided activities raising awareness of SET and promoting SET careers.   In other words, the activities implemented by Grant Holders to meet the objectives of the NSW indirectly **contributed to the overall objective of the DST**.

    Some Grant Holders reported that they profile the work of DST by talking about the Department during the NSW. The following Grant Holder comment illustrates this:

    "We always tell people a bit about DST, what it does and its involvement in the NSW"

    Some Grant Holders use other methods of communication such as radio and print publications to disseminate information about the DST and its priorities.

- **Dissemination of information (educational materials) and promotional materials**: The NSW provides a space for Grant Holders to disseminate information about the DST to a captive audience, including learners, educators, and the general public. **Promotional and educational materials that were distributed throughout the years were branded using the guidelines provided in DST's Project brief**.   Promotional materials ranged from foam peaks, water bottles, Empty belly posters and yellow t-shirts. A key finding from the review is that T-shirts, school bags and other gifts as branded items that are kept by students, seem to have the ability to carry the brand and brand associations beyond the execution period.

- Educational resources that were distributed included posters, storybooks, booklets CDs and games, career booklets and brochures, posters, IKS booklets and policy documents.

- **Branding:** A mechanism that facilitated to profile the work of the DST at NSW sites was the use of branding through **promotional and educational materials**.

"There was vibrant and successful publicity and branding for NSW 2009"

Annual report

The **logo placement** profiles DST and depicts the NSW as a DST initiative, thereby showcasing DST's priorities and work. According to some Grant Holders, the **branding guidelines** instituted by DST for NSW materials, provided an opportunity to communicate the role and importance of the DST in the leading the NSW to a wider audience. Branding helped to profile the work of DST, as put by one Grant Holder:

"We use branding to help people see this as more of a DST of initiative"

Many Grant Holders suggested that branding helps to clarify who is responsible for the NSW, as some people believe it is a DoE initiative.

Since there is no measure in place to determine whether materials were placed at sites and distributed to participants during the review period. **An assessment of the extent of branding at NSW sites was done retrospectively** through pulling photos provided by stakeholders for the period 2000 to 2009. The sample of Grant Holders interviewed as part of this study were requested to provide photographs of branding that took place at sites during the review period. Six grant holders sent photos varying from as little as 3 to as many as 51. However, very few of these photos showed the branding on the sites. Of the photos sent through, only five photos received showed branding at NSW sites or activities. An analysis of the photographs in terms of whether branding requirements were met indicates that:

Branding at sites was correctly done as seen in the picture

Figure 4: Banners at NSW Sites

The Review Team visited NSW sites during the 2011 focus week to ascertain whether sufficient branding occurred. Branding was visible at all the sites visited. However, it was not consistent across sites with some sites having very few posters and/or banners posted and others having many posters, banners and signage.

Where branding was available it was for the most part done well. However, there are instances where branding was done incorrectly.

It was also noted that posters and banners form previous NSWs were displayed at some sites as shown in the picture below.

Figure 5: Banners were used from previous years' NSW events

5.6   Objective 5: Attract learners to SET careers

One of the overarching objectives of the NSW is to address shortages in science fields and contribute to the development of a skills based economy by motivating learners to take up careers in SET. A prerequisite for learners to assume careers in science and technology is to take pure Maths and Physical Science and do well in these subjects. Tracking NSW participants' enrolment in pure Maths and Physical Science subjects is one way to determine the impact of this and other initiatives on attracting learners to SET careers. While the ten year review did not track learners over time, qualitative data was collected to measure stakeholders' perceptions of the learners' uptake of Maths and Sciences subjects and interests in SET careers.

This section assesses the influence that the NSW has had on learners (who were exposed to the initiative by direct participation in organised activities) in their choice of pure Maths and Science subjects and pursuit of SET careers. The section begins with a literature review on factors influencing learners' subject choices to provide a contextual background. Next, findings related to the impact of the NSW on attracting learners to SET careers are presented.

5.6.1 Review of the literature on factors influencing learners' career choices

A variety of factors are known to influence learners' career decisions. Although economic downturn and the labour climate are major determinants of career choices, personality and access to information also play a role. Kerka[19] suggests that career choice and development are influenced by multiple factors including:

- Personality (including vocational interests);
- How individuals perceive themselves and the world (self-concept, identity, world view);
- Socialization;
- Resources (financial, information, role models, social supports);
- Experiences of sexism, racism, and classism; and
- The salience of various life roles and identity.

Career choices are also often dependent on career maturity, or ones readiness to make appropriate career decisions. Rojewski[20] found that adolescents from low-income backgrounds score lower on career maturity tests. Their low scores can be attributed to "lack of access to occupational information, role models, and the perceived lack of employment opportunities, all of which influence career choice". Although low-income youth often have high aspirations, the "influence of inadequate guidance and lack of information, high school preparation, or role models" often also contribute toward a lower level of career maturity[21].

Furthermore, the literature on young people's career and tertiary education decision making suggests that certain parental characteristics are significant variables influencing further education and training. Parents' income appears to be less of a factor in whether youngsters choose to pursue tertiary education as compared to parents' educational levels. Knighton and Mirza[22] found that while economic constraints within a household can impede educational progress, parents' levels of education is far more influential. Parents who completed higher education are found to be more involved in their children's school activities, academic attainment, choice of schools and subjects. They also take an active involvement in helping their children pursue post-secondary education.

[19] Kerka, S. (1998). "Career Development and Gender, Race, and Class", in *ERIC Digest* No. 199. Available at http://www.ericdigests.org/1999-2/career.htm, Accessed 15 January, 2009.

[20] Rojewski, J. W. (1994). "Predicting Career Maturity Attitudes in Rural Economically Disadvantaged Youth" in *Journal of Career Development* .Vol. 21 (1): 49-61.

[21] Kerka, S. (1998). "Career Development and Gender, Race, and Class", in *ERIC Digest* No. 199. Available at http://www.ericdigests.org/1999-2/career.htm, Accessed 15 January, 2009.

[22] Knighton, M. and Mirza (2002). "Postsecondary Education: The effects of parent's education and household income" in *Education Quarterly Review,* Vol. 8 (3) 2003

Gender also plays a role in parental influence on young people's decision making. Studies conducted in South Africa and abroad indicate that mothers' education level is a stronger determinant in her children's' tertiary education and career decisions than is the father's level of education[23]. Amongst all social classes, mothers who have postsecondary qualifications are more likely than mothers who have only high school level qualifications to motivate their children to obtain postsecondary education.

Findings from a British study indicate that female students appear to make decisions about careers and tertiary education differently to that of male students[24]. Girls tend to collaborate with their friends and mothers over choosing universities.

Mothers similarly, discuss their children's choice with other mothers to share knowledge and advice. Mothers are by far more involved in their children's decisions for the future than are fathers. On the other hand, fathers and sons tend to make decisions individually and findings indicate that fathers often impose their choice on their children without mutual discussion.

Parental involvement is clearly a strong factor in how make decisions about their futures, yet family life in South Africa is not necessarily characterised by strong parental involvement. In social contexts where poverty is rife and resources are scarce, youngsters often do not have access to the necessary parental/adult support and resources needed for personal development or decision making. The problem is compounded by dramatically changing family and household dynamics and the effects of HIV and AIDS and migrant labour.

The South African Institute of Race Relations suggests that only *17%* of families in the country represent a nuclear structure with father, mother and child/children present. Instead, single parent households are the most common – roughly 40% of South Africa's eighteen-million youth are being raised by single mothers. Other household arrangements, where children reside with grandparents or extended relatives, for example, are also on the increase.

Fathers may be absent as a result of death, neglect, or migrant working patterns but the reality remains that nuclear families are on the decline, whilst single parent, sibling-headed, grandparent-headed and combination styled households are becoming far more common. Children raised in such single parent households are often economically, emotionally and socially disadvantaged because the household's income potential is smaller, siblings compete more for their parent/guardian's attention, and the risk of being left orphaned is greater. When considering investment in education to further skills development and fill gaps in specific industries, it is imperative that investors and programme developers factor in the risk posed by the South African family, HIV and orphan crisis because parental involvement is such a crucial factor in youngsters tertiary education decision making processes.

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[23] Sender, J. (2000). "*Struggles to Escape Poverty in South Africa: Results From a Purposive Rural Survey*". Working Paper #107 (November 2000), Department Of Economics, University of London: School of Oriental and African Studies. David, M. E., Ball, S. J., Davies, J. and Reay, D. (2003). "Gender Issues in Parental Involvement in Student Choices of Higher Education" in *Gender and Education*, Vol.15 (1) 2003

[24] David, M. E., Ball, S. J., Davies, J. and Reay, D. (2003). "Gender Issues in Parental Involvement in Student Choices of Higher Education" in *Gender and Education*, Vol.15 (1) 2003

Career maturity, individual personality, access to resources, parental involvement and familial support all contribute towards the future life course of young people. Because South Africa is such a culturally diverse nation, future pathways for young South Africans are not easily defined and differ by racial, cultural, gender and socio-economic profile. However, some broad activity pathways can be identified, even though movement from one activity to the next may not necessarily be linear or fluid. Ahutiv, Tienda and Hotz divide youth of all ages into various mutually exclusive activity states[25]:

- School only
- Work and school
- Part-time work
- Full-time work
- Unemployed/idle

In the South African context, the movement from school or study to full-time work is hardly normative and activities are by no means defined by age or time period. For a variety of reasons already mentioned, learners leaving high school are ill-equipped to enter the market place and employees often site a lack of both hard and soft skills as reasons for not taking on young school graduates into full-time employment. Having a tertiary qualification (3 year diploma or higher) significantly increases an individual's chances of employment[26].

Authors[27] point out that even where jobs are available youth without a higher education qualification characteristically lack the basic and vocational skills necessary to find these jobs or to secure permanent employment. The types of jobs available to youth with only a secondary school qualification tend to be in high turnover employment and are less stable than jobs available to individuals with even rudimentary tertiary certificates and marketable soft skills – such as discipline and dedication to work.

The HSRC Student Pathways Study found that having a higher education qualification significantly increases chances of finding a job and of increasing job status and wage earnings. Clearly in the South African context, possession of a higher education qualification is the most effective way to ensure pathways that lead to increased employment opportunity and higher wages. The challenge is to equip secondary school learners with the academic skills and other resources and support necessary for them to pursue tertiary study.

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[25] Ahutiv, A., Tienda, M. and Hotz, J. (1997). Pathways from school to work among Black, Hispanic and White young men in the 1980s. Cited in Cosser, M. (2009). *Studying ambitions: Pathways from Grade 12 and the factors that shape them.* Cape Town: HSRC Press

[26] Cosser, M. (2009). *Studying ambitions: Pathways from Grade 12 and the factors that shape them.* Cape Town: HSRC Press

[27] Baily T. R. (1991). "Jobs of the future and the education they will require: Evidence from occupational forecasts" in *Educational Forecasts*. Vol. 20: 11-20. Levitin, S. and Gallo, F. (1991). "Preparing Americans for work" in *Looking Ahead*. Vol. 13: 18-25

Many generation Y's hold strong aspirations to better their lives and improve the quality of life for all South Africans. In order to do this they need to be empowered with the capacity to compete in a global workforce that demands a range of strong theoretical, technical and applied skills. Evidence suggests that there is a significant mismatch between learners who aspire to enter higher education and their actual enrolment in South African institutions. Surprisingly, the single biggest factor *preventing student enrolment* in higher education is not a lack of financial resources, but rather academic ill-preparedness[28]. Furthermore, amongst those that do enrol a combination of financial problems, academic failure, poor career guidance and lack of family and social support are the major contributors to drop-out. In other words, academic ability may be a crucial variable in individual ability to enrol for tertiary education but it is a combination of solid vocational guidance, sound life skills, and reliable financial and relational support that are essential for *completion and attainment* of the qualification.

Educational investment initiatives that aim to capacitate youth and equip them with the necessary skills and resources to enter tertiary education levels should consider the importance of how the above mentioned variables work in combination to help students complete their tertiary training. Investment that is specifically focused on directing youth into the SET disciplines should also account for what aids youngsters to successfully pursue further education and careers in such fields in order to mitigate risk and maximize outcomes.

Why students choose to pursue SET disciplines and careers

An on-going HSRC Student Pathways Study examines the main factors that influence South African learners' choice in field of study. Although findings differ somewhat by racial group the following three factors are listed as most influential for Black and Coloured citizens:

- Interest in the field of study;
- Opportunities of finding a job in South Africa with a qualification in the field; and
- Ability to use a qualification in the field to contribute towards the development of the country.

In order to explore why young people choose to study in Science, engineering or technology fields, as well as what causes them stay and progress in the sector, the National Advisory Council on Innovation (NACI) conducted a study to track women and men in the SET sector. The research shows that factors limiting study and career development in the SET sector can be attributed to historical socio-economic effects and academic educational barriers[29].

On the whole, Black students are more adversely affected by financial and academic inadequacies and are more likely to struggle to adapt to urban institutional environments. Cultural obstacles, gender discrimination, stereotyping, and a lack of role models and mentors are additional barriers that female youngsters have to overcome when wanting to pursue SET disciplines.

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[28] Cosser, M. (2009). "The skills cline: higher education and the supply-demand complex in South Africa" in *Higher Education* Vol. 59: 43-53

[29] NACI (2006). *Creating the Future: Gender, Race and SET Sector Policies for Capacity Building and Innovation*, for the Ministry of Science and Technology: August 2006, South Africa

Students choose to enter the SET sector because of the positive influence of educators, parents, relatives or friends in the field; they wish to make a difference in their communities, they hope to overcome backgrounds of poverty and so to empower themselves; and finally, they wish to enter an interesting and challenging field perceived to offer good job opportunities, remuneration, job satisfaction, respect and status in the community. Such findings are congruent with the generational theory that Generation Y youngsters are ambitious and committed to self-improvement, but are also driven by a sense of social responsibility.

Apart from financial, logistical and academic barriers that students from previously disadvantaged backgrounds face, findings from the NACI study highlight that many students experience difficulties with time management, self-discipline and self-confidence. Evidently, these soft skills or life skills are essential for successful participation at tertiary education levels and for pursuing SET careers. The NACI study highlights some further key factors determining success in completing a SET degree[30]:

- Personal enablers, such as hard work and self-motivation, staying focused and positive, determination to succeed;
- Support from friends, family, educators and fellow students;
- Ready access to books, computers, internet and shared learning opportunities;
- Financial stability for duration of studies and;
- Suitable accommodation, reliable transport and adequate funds.

Undoubtedly, academic preparedness is an important factor determining whether South African youth pursue further education and training or not, but their actual ability to persevere and complete a tertiary qualification is determined by a multiplicity of variables such as financial support, social and emotional support, sound life skills and good career guidance.

South Africa's colonial legacy has left a segregated schooling system flawed with pockets of inadequately prepared teachers, poorly resourced schools and dysfunctional management structures that result in low academic achievement at all levels of schooling. Consequently, secondary school matriculants from previously disadvantaged schools are seldom equipped academically to enter tertiary and higher education levels. However, in order to address under-development and reach transformation goals young black South Africans need to gain critical skills – especially in the Science, engineering and technology disciplines – pursue higher education qualifications and be adequately prepared with the essential life skills necessary to compete in a global job market.

5.6.2   Did the NSW attract learners to SET careers?

From the literature it is evident that when investment in education is targeted towards satisfying the demand for sector specific skills it should focus on various points in the supply pipeline. It is difficult to establish causal influences between the NSW and career choices. The ten-year review identified some factors of many that contribute to selecting subjects and careers related to SET. Factors that contribute to the selection of maths and science subjects in schools and consequently to the selection of career choices in SET are listed.

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[30] NACI (2006). *Creating the Future: Gender, Race and SET Sector Policies for Capacity Building and Innovation*, for the Ministry of Science and Technology: August 2006, South Africa

Factors that facilitated this NSW objective (identified through themes that emerged from interviews across stakeholder groups) include the following:

- **Participating in the NSW influences learners to take Maths and Science**: Although most learners interviewed were already enrolled in Maths and Science subjects when they participated in the NSW, a few learners indicated that the NSW encouraged them to take these subjects. The following quote for a learner in the focus group echoes this sentiment. "*For me it did encourage me...I never thought I would do science but when I got there it changed my mind. I was interested and amazed at the things I saw there.*" Learners also highlighted the following as influences on their decision to take Maths and Physical Science:

  o Siblings studying Maths and Physical Science;
  o Parents advising of the career prospects in science;
  o Support and encouragement from teachers;
  o Performance in Maths and Physical Science;
  o Personal desire to pursue a subject perceived as challenging; and
  o Personal aspirations to be a scientist.

  Of the learners already taking these subjects, some reported being motivated by the NSW to continue studying these subjects and to work hard to improve their marks. Learners and students interviewed described the NSW as being very interesting and they liked the fact that they could learn about different career options and receive guidance on how to pursue these careers. They felt that the event had a direct impact on their future and indicated that the NSW also changed their attitudes about Maths and Science.

- **NSW provided information and exposure to science through activities that encouraged learners to pursue careers in SET**: The majority of Grant Holders believed that NSW has been effective in attracting learners into science, engineering, and technology related careers. More than half of Grant Holders interviewed (n=13, 54.1%) suggested that NSW has successfully stimulated learners' interest in and excitement about science. Learners, Grant Holders, and others involved in the NSW all highlighted the importance of activities being fun, interactive, informative and motivating in order to increase interest in science and science related careers. The activities seen as most impactful include role modelling, career talks, educational tours and experiments because they provided learners with real world exposure to the subject and its related careers. Learners noted that the NSW provided practical exposure to science that was not always available in school.

  For learners attending schools that do not have science labs and apparatus, the experiments and demonstrations attended during the focus week were helpful in showing them the practical side of the subject.

  Through participation in NSW activities, learners received information about science and SET careers and were exposed to careers through educational tours and role modelling activities with current scientists.

  The NSW Objective 'to attract learners to SET careers' is achieved by providing learners with information on the available careers through **career guidance and the use of role models**.

Occupational information and role models have been cited as one of the possible contributors to the selection of science subject and career choices. It is clear that the NSW cannot on its own attract learners to SET careers but can only contribute to the attraction. A simultaneous focus on educational enrichment, social and life skills development that prepare and encourage youngsters with the required skills and the desire to pursue and remain in specific career paths, should be explored.

Role modelling, educational tours, radio shows, and career booklets and brochures were cited as instrumental to draw learners' interest to science and SET careers. The DST suggested that the development and dissemination of career booklets was invaluable in attracting youth to SET careers. The career booklets included information on SET careers in the public sector and industry, HEIs and their application processes, and available bursaries.

According to tracking studies and anecdotal evidence received by the DST from past participants of the NSW, the career booklets influenced some learners' tertiary studies in SET.

Despite these positive opinions of the NSWs influence on learners going into SET careers, findings from the Youth-Into-Science Strategy Tracking Study conducted by the HRSC revealed a somewhat different picture. Grade 11 and 12 learners (n = 664) who participated in NSW 2007 were tracked to determine the impact, if any, of the NSW on their career choices. More than 90% of learners indicated plans to pursue tertiary education at university or a Technikon. However, at the time of follow-up in 2008, only 26% (total n=199) of the former Grade 12 learners were enrolled in a tertiary institution and 34% were unemployed. Of the 52 learners studying after matric, only about 44% were enrolled in SET related courses, namely engineering (29%) and IT (14.5%). While these figures do not appear promising, they should not be seen as shortcomings of the NSW. These findings are likely a reflection of the plethora of personal, economic, and social factors cited in the literature that impact a learners' career choice, as well as enrolment, performance, and completion of post-secondary education.

- **Target beneficiaries' existing interest in SET**: Another factor that may have contributed to attracting learners to SET careers was their existing interest and current studies. The majority of learners attending the NSW were already enrolled in Maths and Physical Science and already interested in the sciences. While the NSW may not have sparked their interest, some learners reported that their participation in the focus week reinforced their interest in SET careers and provided them with valuable information about the many career options available.

Factors that hindered attracting learners to SET careers (identified through themes that emerged from interviews across stakeholder groups) include the following:

- **A focus on quantity and not quality**: Stakeholders felt that there was **too much focus on getting the quantity of learners to attend the NSW and not enough focus on quality of activities**. A DST stakeholder expressed the following:

"Well there was only Einstein and one Newton. We can't produce so many scientists. Even if you graduate 2000 scientists maybe only one will be of importance. If we get one scientist out of NSW then it will be worthwhile. Sometimes you send 10 rockets into space and only one is able to launch the satellite. It's important that we do this but you can't always quantify everything because sometimes there is only minor impact."

Some logistical and programming issues with the NSW were cited as barriers to promoting SET careers among learners. Firstly, some venues were too small and didn't allow learners adequate space to see demonstrations, exhibits and experiments. **Large numbers of learners at these events detracted from the quality** of the presentations given that learners were unable to either properly see demonstrations or hear presentations due to noise and physical barriers in their way.

The structuring and organisation of activities may need to be considered to allow for quality engagement. Activity organisers indicated that ten minutes per group for learners to observe, engage and experience an activity before being moved to the next activity, may be insufficient for the level of quality engagement some learners are seeking.

Some of the exhibitors were described by learners as "unfriendly" and rushed learners away from their stations. Others seemed not to be knowledgeable about the content they were sharing. Stakeholders indicated that is critical that exhibitions are manned by knowledgeable people otherwise learners tend to throw away pamphlets or become disinterested in the area as was the case with the IKS exhibitions.

Many learners interviewed reported that the NSW programme content was the same a few years in a row. Repeating the same programme made the activities less interesting to learners.

- **Targeting mainly Grade 10 – 12 learners**: According to learners and Grant Holders a major drawback of the NSW was the focus on Grade 10-12 learners. Targeting the initiative to older learners who have already selected subjects, lessened the likelihood that NSW could influence subject choices. The majority of stakeholders interviewed believed that learners should be invited to participate in the NSW beginning in Grade 8 and 9 or earlier. **Targeting learners earlier in their education will provide more opportunities to expose them to SET through the NSW to enable an influence on their career choices**.

- **Limited monitoring and reporting**: **NSW's progress in attracting learners to SET careers is unclear**. Some Grant Holders felt it was not clear what impact NSW is having on learners' interest in and pursuit of SET careers. When asked if NSW had met this objective one Grant Holder said, *"I haven't a clue—would love to know. It's a major focus but I don't know if were achieving a thing."* The primary reason for this lack of clarity is the limited evaluation of NSW activities against this objective.

Determining the impact of participation in the NSW on learners' future career paths will require systematic tracking of learners similar to the HSRC study referenced above. However, give the multiple influences on career choice, positive findings could only be attributed in part to the NSW. **To determine NSW's influence on career choices, more comprehensive data must be collected from participating learners**. One Grant Holder suggested developing questionnaires to capture information on learners' experience at NSW activities and their influence on career interests.

6 Achievements, weaknesses and lessons learnt to inform the development of a new NSW implementation strategy for the next cycle

"It's a fantastic program with great potential. One of my concerns is that in all the years I have been involved, it hasn't changed much and hasn't learned from mistakes or things that have gone well. It has great potential but could be far better actualised if it was a bit more responsive."

Grant Holder interviewed

This chapter discusses the variety of achievements of the NSW over the years and identifies some weaknesses and mistakes made that could be turned into best practices in the next cycle of the NSW. Current best practices that should be repeated in future implementations of the event are also highlighted. Sections covered in this chapter include the following:

- **Coverage of the NSW** in terms of reach across South Africa, coverage in the media and inclusivity of NSI stakeholders and retention of these stakeholders over the ten-year review period (Section 6.1);
- **Political support** received by leadership (Section 6.2);
- The **implementation approach** (Section 6.3). The extent of collaboration, incentives for performance and roles of SAASTA and DST are also discussed;
- **Institutional Capacity** to deliver (Section 6.4);
- **Planning** is considered an important aspect of the NSW (Section 6.5);
- **Capacity development** and exposure of Grant Holders (Section 6.6);
- **Enhanced cooperative Government** (Section 6.7);
- The development of a **communication strategy** (Section 6.8);
- Establishment of the NSW as **a national brand**, with branding guidelines, branding at sites and brand association (Section 6.9);
- **Knowledge management systems** (Section 6.10); and
- **Monitoring and feedback** (Section 6.11).

6.1 Coverage of the NSW

Coverage and reach was determined in terms of the number of districts and target beneficiaries, media coverage and in terms of National System of Innovation Stakeholder involvement. Findings that reflect accomplishments, weaknesses and lessons learnt are provided in the sections below

6.1.1 Coverage and reach to target beneficiaries across South Africa

"It started off being a small programme with less than 10 grant holders with a small spread. By this year, a grant holder meeting could fill a room with 150 people or more…"

High-level interviewee

Since the DST does not have provincial presence, **being able to reach provinces** was regarded as a milestone by DST and SAASTA stakeholders. The multi-sites approach saw a tremendous **growth in the number of the sites** hosting the NSW as well as the growth of **Grant Holders**. The NSW reached parts of South Africa that had not been touched before. As quoted, "*I have seen the growth of the project and the growth of the community and that for me has been a good thing*". During this period, **Provincial Departments of Education claimed ownership** of the NSW, which would not have been the case had the collaborative agreement between the DST and the then DoE ministers not been signed. This achievement of the NSW is illustrated through the following quotes: "*The fact that as a country we are able to – and all provinces are able to – celebrate the NSW, is an achievement*". "*I have seen the mobilisation of provinces around this project - and provinces almost coming with a provincial pride about their own contribution*". During this period, leading provinces such as the Eastern Cape started to organise themselves in a way that major Grant Holders in the area form an alliance and structure themselves so that more experienced Grant Holders look after those who are less experienced.

Analysis, assessment and comparison of this data over the years assisted in showing the growth and distribution of NSW sites nationally and within District Municipalities. The list of Grant Holders varies for each year, which made it impossible for the Review Team to accurately plot the number and types of locations reached across the years. However, data from NSW documentation could be extrapolated to determine the number of Grant Holders and the number of districts that hosted sites over the period 2000 to 2009.

By 2009, 86 Grant Holders had been contracted to implement NSW activities, reaching 32 of the 52 districts across all nine provinces and 1,023,132 participants who were reported to attend NSW activities. There was coverage to previously disadvantaged areas by 70% of the Grant Holders, a significant achievement of the NSW for the ten-year review period.

Table 9 illustrates the growth in coverage of the NSW over the ten-year period.

Table 9:   Summary of Number of Grant Holders and District Municipalities that hosted the NSW[31]

YEAR	Number of Grant Holders for which locations have been sourced and mapped	Number of District Municipalities that have hosted sites
2000	3	3
2001	3	3
2002	3	3
2003	9	9
2004	9	9
2005	46	22
2006	44	20
2007	46	21
2008	64	25
2009	82	32

Table 10 shows the breakdown in reach for 2005, 2007 and 2009 in terms of the number of schools and the number of target beneficiaries reached[32].

Table 10: Number of schools and citizens reached in 2005, 2007 and 2009[33]

	2005	2007	2009
Foundation Phase (Grade 0 – 3)	0	252	103
Intermediate Phase (Grade 4 – 7)	1	962	535
Senior Phase (Grade 8 – 9)	13	2,205	663
FET (Grade 10 – 12)	31	2,719	965
TOTAL	45	6,138	2,266
Learners	139,014	145,442	172,471
Educators	6,031	8,672	10,706
General public	27,850	21,791	20,997
TOTAL	172,895	175,905	204,174

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[31] Extracted from NSW Annual Reports and Annexures to ReportsThose Grant Holders located in multiple provinces (n=6) were not categorised by district.

[32] Grant Holder documentation included data for learners, educators and the general public, not for scientists. Numbers for school phases was captured in different ways by Grant Holders and was confusing. As such, the reader should not be too concerned about the decreased number of schools for 2009. Focus should rather be placed on the proportion of schools in each phase.

[33] Extracted from the Database, which was set up as a result of reviewing all Grant Holder documentation.

Figure 6 illustrates the distribution of 2009 NSW Grant Holders across District Municipalities:

Figure 6: Distribution of Grant Holders across District Municipalities

Distribution of 2009 NSW Grant Holders across District Municipalities

LIMPOPO (5)
1. Vhembe – 5
2. Mopani – 2
3. Capricon – 1
4. Greater Sekukune - 1

NORTH WEST (4)
1. Central – 1
2. Southern – 3
3. Bojanala – 1
4. Bophrima - 2

MPUMALANGA (3)
1. Gert Sibande – 3
2. Ehlanzeni - 3
3. Nkangala - 2

GAUTENG (5)
1. City of Tshwane – 8
2. City of Jo'burg – 6
3. Sedibeng – 1
4. Metsweding - 1

LEGEND
- Provinces
- District Municipalities
- Sites

FREE STATE (5)
1. Motheo – 5
2. Fezile Dabi – 1
3. Lejweleputswa – 2
4. Xhariep – 1
5. Thabo Mofutsanyane - 1

NORTHERN CAPE (5)
1. Frances Baard - 3

KZN (11)
1. eThekwini – 5
2. Uthukela – 1
3. Uthungulu – 4

EASTERN CAPE (7)
1. Alfred Nzo – 1
2. Amatole – 5
3. Cacadu – 2
4. O.R Tambo – 1
5. NMM – 2
6. Capricon - 4

WESTERN CAPE (6)
1. Overberg – 2
2. City of Cape Town – 6
3. Cape Winelands - 1

Scale 1:10337440

0   50 100   200 km

There was a steady increase in the number of district municipalities that hosted NSW sites from 2005 to 2009. In 2009, 32 District Municipalities were reached, compared to 22 District Municipalities in 2005. The NSW was consistently hosted in the following 10 District Municipalities across seven of the provinces:

- North West - Bophrima;
- Western Cape - City of Cape Town;
- Eastern Cape - Alfred Nzo, Cacadu;
- Kwa-Zulu Natal - Uthungulu, eThekwini;
- Free State – Motheo;
- Gauteng - City of Tshwane, City of Johannesburg; and
- Limpopo - Vhembe.

The majority of these districts are metropolitan areas and consist of urban centres like Rustenburg, Mafikeng, Cape Town, eThekwini, Tshwane, Bloemfontein, Phalaborwa and Empangeni. These 10 District Municipalities are centres of growth for NSW sites and the majority of Grant Holders are based in these areas[34].

Over the period 2005-2009 there were 17 district municipalities across five Provinces where Grant Holders were not located:

- Northern Cape – Siyanda, Pixley ka Seme, Kgalagadi, Namakwa;
- Western Cape - Central Karoo, Eden, West Coast;
- Eastern Cape - Chris Hani, Ukhahlamba;
- Kwa-Zulu Natal – Umkhanyakude, Ugu, uMgungundlovu, Umzinyathi, Sisonke, Ilembe, Amajuba, Zululand; and
- Limpopo - Waterberg.

These district municipalities are mostly rural in nature as compared to those districts where Grant Holders are located.

The increase in Grant Holders over the period 2005 to 2009 is visible, with more rural and semi urban Districts that came on board (Amajuba, Bophrima, Capricorn, Greater Sekhukhune, Lejweleputswa, Metsweding and Nelson Mandela Metro, O.R Tambo, Sedibeng, Southern and Nkangala) situated in seven of the nine provinces (Kwa-Zulu Natal, North West, Limpopo, Free State, Gauteng, Eastern Cape and Mpumalanga provinces). There was not much of an increase in coverage in the Northern Cape and Western Cape provinces. Annexure F provides a breakdown of when the various District Municipalities were included as part of NSW outreach from 2005 to 2009.

The total number of Grant Holders providing activities in each province for 2009 included 16 in Gauteng, 11 in Eastern Cape, 10 in Free State, 10 in Kwa-Zulu Natal, 9 in Limpopo, 8 in Mpumalanga, 8 in Western Cape, 7 in North West and 3 in Northern Cape. An additional 4 Grant Holders provided activities in multiple provinces in 2009.

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[34] Refer to Annexure F for a detailed breakdown of sites per province

6.1.2 Coverage in the media

This section focuses on accomplishments in terms of media coverage of the NSW and whether this has increased and improved over time. Where data is missing for years under review, it is because the data was not collated or provided and hence could not be included.

Four mediums were covered during the ten year period ranging from broadcast media (radio and television), print media that included newspapers (national and local), magazines including advertorials and articles, as well as online/electronic media (e-newsletters, articles etc.).

Table 11 illustrates that there was an increase in media coverage of the NSW over the years.

Table 11: Total volume of Media coverage from 2005-2010

Years	Total Media Coverage	
	No.	% increase/decrease
2005	30	-
2006	54	80%
2007	54	0%
2008	74	37%
2009	73	-1%
2010	79	8%

The total numbers of editorials and broadcast slots increased from 30 in 2005 to 79 in 2010.

The improvement of media coverage in 2006 was because of a closer collaboration between SAASTA and the DST (as a result of the Communication Strategy)

Analysing the extent of media coverage in terms of circulation (numbers reached) and across provinces, is useful. Data on circulation across provinces was only available for 2005 and 2006, but the data provided proves useful (as seen in the text box to the right). It is recommended that such data be collected in the future as an annual reflection of coverage per province and per type of media, provides an indication of where greater focus should be placed. This in turn will inform the communication plans to build relations with journalists and reporters to ensure coverage across various types of media spread across the country.

A community radio station campaign in 2005 targeted 47 community radio stations with 63 radio slots that covered three different languages and a total estimated number of listeners reached 3,969,000. Five provinces received 30 articles published with a circulation of 1,280,698.

In 2006, 54 articles were published, reaching approximately 6,069,537 readers. The majority of these (n=24) were concentrated in the Western Cape – North West, Limpopo, Mpumalanga and Northern Cape had little or no coverage

Over the years under review, ratings improved, with the number of positive ratings increasing. Table 12 illustrates the increase in positive coverage and Figure 7 provides an example of a media tracker used for 2008

Table 12: Value of coverage: Positive, Negative and Neutral

Years	Positive (No)	Negative (No)	Neutral (No)	Not rated
2005	19	0	10	1
2006	33*[35]	0	13*	-
2008	73	1	0	-

Figure 7: An example of data available to track media coverage

NSW 2008 Media coverage

1	4 May	Zoutpansberger	N	Positive	Schools participate in national science week
2	5 May	The skills portal	O	Positive	Science Week to encourage youth to pursue science
3	6 May	Daily Sun	N	Positive	Hey, science can be fun
4	6 May	Talk of the town	N	Positive	Science: light at the tunnel's end
5	8 May	Isolezwe	N	Positive	Kumenywa izingane kowesayensi
7	8 May	Grocott's Mail	N	Positive	Scientific Theatre: **Tamsyn Duncan**
8	8 May	Ofm	R	Positive	Minister Mangena opened the 9th NSW
9	8 May	Mopani News	N	Positive	Fun science and technology week
10	8 May	SABC News Online	O	Positive	Science Week stars
11	9 May	SABC News Online	O	Positive	National Science Week kicks off at NW University
12	9 May	The Echo	N	Positive	NSW on the right track
13	9 May	Motsweding	R	Positive	It is National Science Week again
14	10 May	Volksblad	N	Positive	SA leerlinge se wiskunde, wetenskap te moeilik: Sapa
15	11 May	SA FM	R	Positive	Science centres , observatories and acquarium open doors for Science week
16	12 May	Sowetan	N	Positive	Dispelling false myths: **Victor Mecoamere**
17	12 May	Lesedi FM	R	Positive	Minister Mangena encourages students to pursue science careers

Different sets of data provided from 2004 to 2010 allowed the Review Team to gain a better understanding of the breakdown of media coverage by types of media. Although data from 2004 – 2007 is from different sources to data from 2008 – 2010[36], there clearly seems to be no consistency in the increase of any one type of media across the years, as shown in the fluctuations in Table 13. Planning outreach, in future, through types of media will provide opportunities to create a greater impact as a result of NSW coverage.

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[35] *For 2006 only print media was rated as positive and neutral. Therefore the number of media does not add up to the total for 2006, which is 56

[36] Data was sourced from Provincial coordinator reports (2004); from SAASTA's evaluation report (2005); SAASTA's Media Relations Report (2006); Media Analysis Information (2007) and Annual Reports (2008 – 2010)

Table 13: Fluctuations in NSW coverage (on volumes) across the four different types of media from 2004 – 2010

Fluctuations in NSW coverage (in volumes) across the different types of media over the period 2004-2010

——Radio ——TV ——Newspapers ——Online
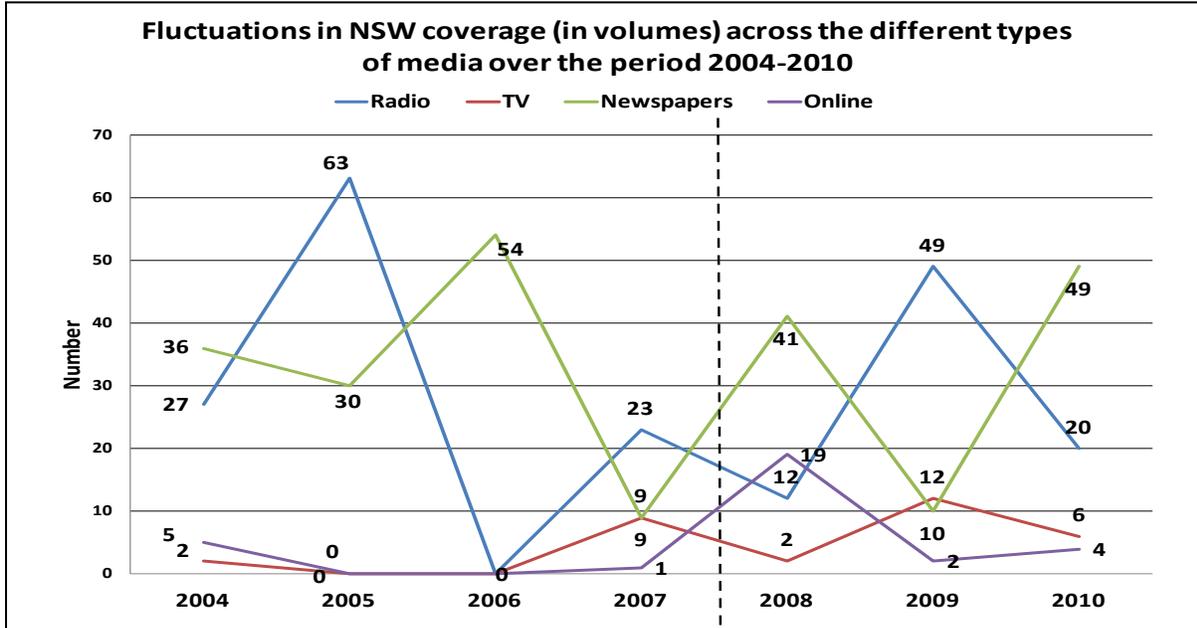
It is apparent from the review that media and publicity has mainly been within a month leading up to the NSW and during the focus week. The document review highlighted that provincial coordinators were instructed by the DST to wait for the national press release to be published before making contact with the media, which led to little coverage during the focus week as the press release from DST is not published far enough in advance of the event. This impacted on publicity and advertising of the NSW in the run up to the focus week as there was insufficient time to engage with identified media.

6.1.3 Inclusivity of National System of Innovation (NSI) stakeholders

Innovation and technical progress are the result of a complex set of relationships among actors producing, distributing and applying various kinds of knowledge

Guided by the definition of a National System of Innovation adopted by the DST or the Organisation for Economic Cooperation and Development (OECD), the TOR requested that the review establish the stakeholders of the NSI that have participated in the NSW, the extent of their participation and factors responsible for some stakeholders who have not been involved in the NSW or have not participated consistently.

> **Box 1**
>
> **National innovation systems: definitions**
>
> A national system of innovation has been defined as follows:
>
> - " .. *the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies.*" (Freeman, 1987)
>
> - " .. *the elements and relationships which interact in the production, diffusion and use of new, and economically useful, knowledge ... and are either located within or rooted inside the borders of a nation state.*" (Lundvall, 1992)
>
> - "... *a set of institutions whose interactions determine the innovative performance ... of national firms.*" (Nelson, 1993)
>
> - " .. *the national institutions, their incentive structures and their competencies, that determine the rate and direction of technological learning (or the volume and composition of change generating activities) in a country.*" (Patel and Pavitt, 1994)
>
> - "*.. that set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies and which provides the framework within which governments form and implement policies to influence the innovation process. As such it is a system of interconnected institutions to create, store and transfer the knowledge, skills and artefacts which define new technologies.*" (Metcalfe, 1995)

According to the OECD's National Innovation Systems (1997), the concept of national innovation systems rests on the premise that understanding the linkages among the actors involved in innovation is crucial to improving technology performance.

The innovative performance of a country depends to a large extent on how these actors relate to each other as elements of a collective system of knowledge creation and use as well as the technologies they use.

There is no single accepted definition of a national system of innovation. What is important is the web of interaction between stakeholders in the system, as reflected in the definitions to the right.

The following sections determine the extent to which stakeholders of the NSI have participated in the NSW; factors that have played a role in some NSI stakeholders' non-involvement in the NSW; and how to encourage NSI involvement.

6.1.3.1   The extent of NSI stakeholder involvement in the NSW

The presence of Government Departments, Dinaledi schools[37] and Professional Associations is visible in all nine provinces. Science Centres are present in eight provinces (with the exception of the Northern Cape).

Involvement of **Provincial and District Departments of Education** was pivotal in facilitating school participation in the NSW. The majority of Government stakeholders included District Education Departments across provinces. These also constituted Education Research Centres (ERC) and Education Development Centres (EDC). Over the review period, three National Departments were also involved but not consistently.

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[37] Dinaledi schools are dedicated Maths and Science schools that are designed to significantly contribute to the number of learners passing Higher Grade Maths and Science in Grade 12

The Department of Minerals and Energy (DME) partook in the NSW as a Service Provider (providing their own funding) in 2008 but were no longer involved in 2009. The Department of Rural Development and Land Affairs (DRDLA) was involved as a Service provider in 2008 and 2009 and the Department of Agriculture (DOA) became involved as a Grant Holder in 2009.

The good geographical representation of **Science Centres** across the country may be due to the Science Centres initiative of promoting a Public Understanding of Science and Technology (PUSET). The good geographic representation of Dinaledi schools in all provinces may be due to the Framework for Adoption of Dinaledi Schools published by the Department of Education in 2007.

Higher Education Institutions (HEIs) participated in seven provinces. It is noted that two science centres that form part of the University of Zululand (in KwaZulu-Natal) and the University of Venda (Limpopo) are not reflected in Figure 8[38]. No HEIs in the Northern Cape and Mpumalanga were part of the NSW during the ten years under review. The participation of HEIs across the years was generally low. Out of the 23 HEIs in the country 11 (48%) participated in the NSW. Participation in each year was between six and seven HEIs.

Science Centres' participation fluctuated across the years and gradually increased from 2005 when five of them partook in the NSW, to 2009 when 12 of them were involved in NSW activities. The Science Councils that participated in the NSW are concentrated in only three provinces (Gauteng, Eastern Cape and Western Cape).

Participation of **Professional Associations/Organisations/ Industry** increased from 2005 (n=8) to 2009 (n=19). This number is low considering the role the private sector plays in SET.

Figure 8 shows the distribution of NSI stakeholders across the provinces.

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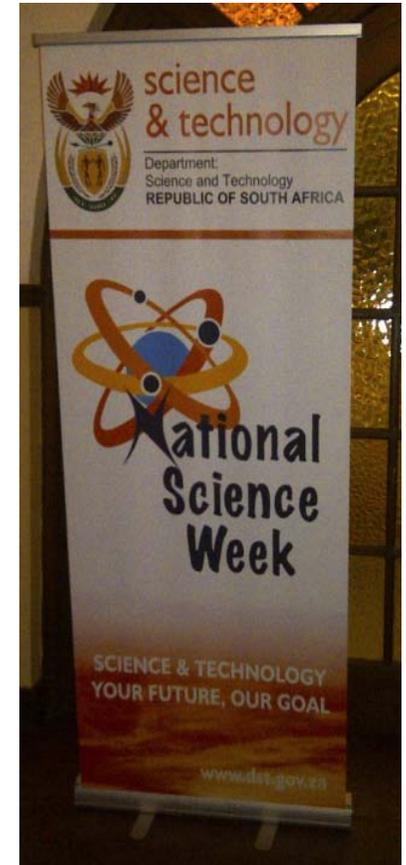
[38] Unizulu Science Centre and Vuwani Science Centre form part of their respective Universities. However, these were grouped as Science Centres when categorising Grant Holders. It is noted that other Science Centres affiliated to Universities have been categorised as both a Science Centre and an HEI.

Figure 8: Types of Grant Holders across provinces
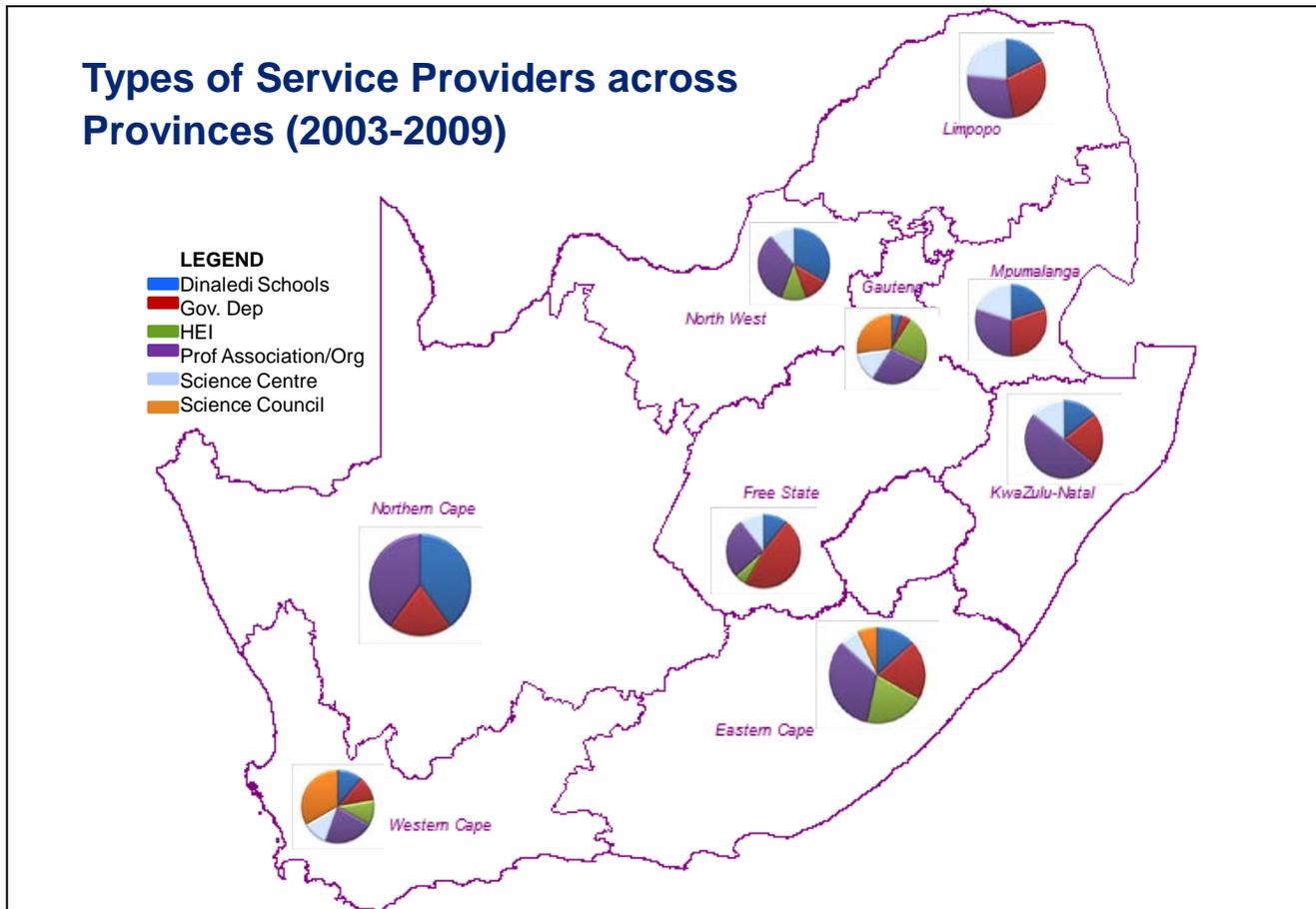
Ideally, a representation of all NSI stakeholders is desired in each province. To enhance the NSW in its next cycle, it is proposed that NSI stakeholders with the strengths to add value in terms of showcasing and presenting quality content at the event, be identified. **Mapping out and tracking NSI stakeholder involvement across various NSI stakeholder groups across the country, will be a valuable measure in terms of reach for each NSW event and progress made with each year of implementation**.

Stakeholders of the NSI have participated in the NSW, mainly as Grant Holders, as follows:

- **Professional Associations/Organisations/Industry[39]** hosted excursions for learners and in some instances provided some sponsorship.

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[39] Professional Associations include private companies across industries that were included as Grant Holders, as well as Organisations such as SAASTE, SANBI, SAYNPS and Sea World

- **Higher Education Institutions (HEIs)** contributed to the NSW through educator workshops; assisting with the development of posters on content issues; and through their outreach programmes where they were trying to attract learners to come and enrol at their institutions.

- **Science Councils** assisted through the provision of science shows at National Launches and through their outreach activities, which to some extent aimed at raising awareness about the career opportunities that exist in these organisations.

- **Science Centres** showcased science through their different activities such as interactive science exhibits, science shows, games and presentations.

- **Government Departments** provided outreach activities such as teacher and learner workshops and logistical support such as transport and communication channels mainly to schools within their districts.

- **Dinaledi schools** took part in science activities at their schools during the focus week.

6.1.3.2 Consistency of Grant Holder participation in the NSW

The time period of involvement by Grant Holders over the years was collated, analysed and grouped into three categories, namely, short, medium and long-term participation in the NSW. This data was analysed to assess Grant Holder participation over the years. Table 14 illustrates the length of time Grant Holders have participated in the NSW.

Table 14: Period of time Grant Holders have participated in the NSW from 2003-2009

Length of time (time period)	Number of Grant Holders	Percentage of Grant Holders
Long period of time (5 – 7 years)	21	16%
Medium period of time (3 – 4 years)	29	22%
Short period of time (1 – 2 years)	80	61%
Total	**130**	**100%**

Figure 9 is a graphical representation of the time periods that the different types of Grant Holders participated in the NSW.

An achievement of the NSW in its first ten years is the retention of Science Centres, Science Councils and HEIs that have been involved in the NSW. Figure 9 illustrates that 50% of Science Centres, 31% of Science Councils and 18% of HEIs have been involved in the NSW for the longest period of time (5 to 7 years). It is noted that 94% of the 18 DST adopted Dinaledi schools participated for a short period of time because DST's drive of adopting Dinaledi schools for participation on the NSW only took off in 2009 (the last year of the ten-year review period) with the collaborative agreement between the DST and DoE.

Figure 9: Type of Grant Holders & Service Providers who participated in NSW from 2003-2009 for a Short, Medium and Long time
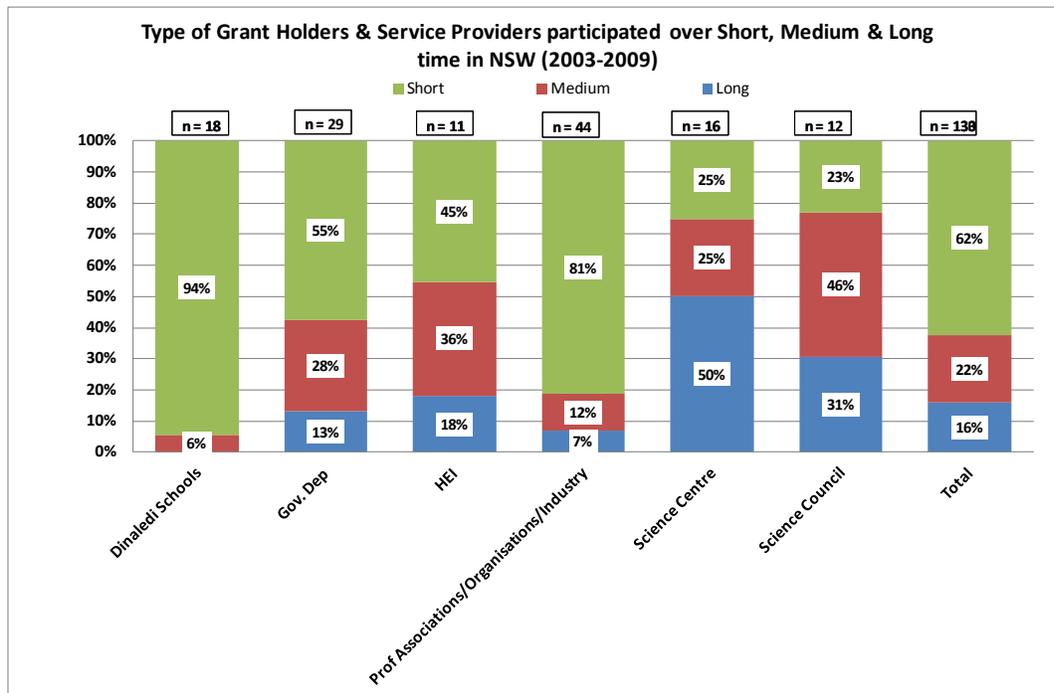
There is potential for Science Councils and HEIs to consistently participate in the NSW in future as the percentages of those that have participated for a medium time are high.

Key findings from the review that should be considered as lessons to take forward in the next cycle include the following:

- **More can be done in future NSWs to strengthen participation of short-term Grant Holders**. Special effort needs to be placed to encourage Professional Associations/ Organisations/Industry to continue participating in the NSW. A high dropout rate exists for Associations/Organisations/Industry - new participants partake each year but are not retained.

- Medium-term participants who withdrew from participating in the NSW were not followed up with to determine reasons why. As an example, medium- and long-term Government Departments as Grant Holders were extrapolated from the database of Grant Holders created by the Review Team. It was found that one District DOE in the Free State, one in Northern Cape and three District DOE's in Limpopo withdrew from the NSW during 2008 and 2009.

  Tracking retention of stakeholders will provide valuable insights. It would be worthwhile to identify those Event Organisers who provide quality content and implementation of the NSW and to communicate with those who withdraw, as this type of information would help to identify challenges that could be mitigated and improve aspects that hinder further participation.

Some **factors identified in this review for why NSI stakeholders are not involved or inconsistently involved** in the NSW include the following:

- **Absence of a National Strategy on Science awareness**: In terms of policy, there are no guidelines in place for NSI stakeholders in terms of how they could plan their involvement in the NSW. Stakeholders are of the opinion that if there was a National Strategy on science awareness, Science Councils and HEIs would take guidance from it, could budget accordingly and plan their contribution to the NSW.

- **NSI stakeholder groups are not included in planning the event**: The implementation model applied for the NSW has so far not extended the planning of the event beyond the core implementation team at DST and SAASTA. This has resulted in less content being recognised, acknowledged and showcased at NSW events.

- **Lack of guidance on how to get involved**: Findings suggest that Grant Holders such as HEI's and Science councils do not know how they should get involved in the NSW. Specific guidance in terms of this is necessary to raise awareness of the contributions that Grant Holders and other organisations could make to the NSW would be useful. Setting such guidance in marketing terms in an attempt to leverage further public funding (through other Government Departments) and private sector funding (Corporate Social Investment funding for example), may assist to further grow the NSW and its impact.

- **A clear message is not provided for the strategy, purpose, objectives and target beneficiaries targeted by the NSW**: The DST and SAASTA have successfully increased the participation of those NSI stakeholders who focus on youth in schools.

- Empowering educators, raising public awareness and exposing learners to science and SET careers, providing resources and creating a platform for science engagement, are some of the motivators that the Grant Holders cited. **Almost all stakeholders engaged with indicated that the current focus of the NSW is predominantly on youth in schools**. In 2010 the NSW objectives changed to include the media, scientists and the general public is other key stakeholders to be included.

Although some efforts were made to include these stakeholder groups, the perception of the NSW is that it is still a youth public awareness programme.

A lesson learnt from the review is that it is integral to the growth and improvement of the NSW to incentivise NSI stakeholders who could showcase SET and reach the various target beneficiaries focused on as part of the event. Clarity should be sought on the strategy and objectives of the NSW and there should be communication efforts to various NSW stakeholders to inform them of the inclusive nature of the NSW. This is critical so that NSI stakeholders who are committed to driving science can easily identify the links between the NSW objectives and their own business mandates.

The review found that **stakeholders participate** in the NSW (currently as Grant Holders) **when their mandates tie in with the objectives of the NSW**. As asserted "*I think ....in terms of the organisation, this is one of our responsibilities to make sure we improve performance in* (name of organisation not mentioned). *We see NSW towards making a contribution to this. This is what motivates us to be a part of NSW"*.

- **The benefits of being involved in the NSW have not been communicated to NSI stakeholders**: It is integral to the growth and improvement of the NSW to incentivise NSI stakeholders who could showcase SET as part of the NSW by specifying the type of recognition they will receive from the Minister, through the press, radio or TV, etc. Currently, Grant Holders recognition is provided by the Minister at the launch and through their logos added to posters and banners used for the NSW. **NSI stakeholders** (in particular Professional Associations/Organisations/Industry) **need to see the benefits in spending the time and capacity to plan and implement NSW activities**. **If the benefits of being involved in the NSW are large enough, NSI stakeholders will be piling up to be part of the NSW.**

- **Lack of knowledge and awareness of how to become involved in the NSW**. This factor links up to a **shortcoming of the implementation mechanism** and is discussed next.

- Grant Holders refer to the **small grant amounts awarded** as too little or insufficient and which they indicate is a key factor behind the non-participation of other stakeholders. One Grant Holder alluded to the fact that large organisations (such as HEIs) would like to execute big projects but the grant awarded by SAASTA does not suffice. Another Grant Holder stated that the grant is not always sufficient for smaller Grant Holders who do not have additional budgets that they can source money from.

6.1.4 An assessment of activities conducted during the NSW

"Science is not a talk and chalk subject...the child must experience science..."

Grant Holder interviewed

A requirement of the review was to assess various activities that were conducted during the NSW in terms of their contribution to the objectives of the NSW. This section provides an in-depth assessment of activities in terms of the extent to which Grant Holders applied a deficit or engaging approach to enhancing public understanding of SET amongst learners and students. The mix of activities amongst different types of Grant Holders is considered as well as what types of activities are regarded by learners as most beneficial and challenges experienced that hinder activities meeting NSW objectives.   The section also explores Grant Holders' understanding of Indigenous Knowledge Systems (IKS), the types of activities provided and the challenges in interfacing IKS and Western Science.

6.1.4.1 NSW – engagement with SET or traditional deficit model of public understanding of SET

The traditional deficit model of public understanding of science stems from the assumption that the lay public is ignorant of science. For this reason, attitudes towards science are said to be negative based on the assertion that the more one knows about science, the more favourable one's attitude towards it will be and vice versa. A number of studies have shown that the public possess low levels of scientific knowledge with not more than a quarter of the public in Europe and the United States being scientifically literate[40].

A South African study on scientific literacy of matriculants entering Tertiary Education found that 36.2% of the respondents were scientifically literate, even after being exposed to the more than 12 years of education [41] Low scientific literacy has been cited as the main cause of science cynicism which is evident in the uneasiness and hostility shown towards science in general and the lack of a culture of science in many countries, including South Africa[42]. An example of distrust and uneasiness is shown in the reaction of the general public to nuclear science. In the deficit model the public are assumed to be 'deficient', while science is 'sufficient'.

Consequently, the drive for the deficit model is to transfer Science knowledge to the public that is scientifically illiterate to improve their attitudes towards Science and to increase the value they place on science. The deficit model of public understanding of SET implies that information flows from one direction only, similar to a traditional style of teaching where a teacher presents information to learners who only listen. For many years this was the view taken in South Africa and as such, interventions have been aimed at '*filling the deficit'*. However, little or no change has been shown in the way that the public relates with Science. As a result, the deficit model of public understanding of Science has received some criticism. Criticisms include the deficit model viewing individuals as empty containers that react to information with no regard of the context that this reaction occurs in relating to social, cultural and personal experiences and circumstances[43]. As a result, a new model evolved, which is referred to as the public participation or public engagement model of understanding. This model implies that SET requires two-way communication and is grounded in the need to build trust between the science sector and the public and include them in Science policy, research and decision making.

South Africa's National Science Week Project Brief provided the guidelines for the delivery approach, specifying the types of activities to be included by Grant Holders selected to present NSW activities. The guidelines does not specify as a requirement in terms of a focus of these activities being presented and provided that a public engagement approach should be used.

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[40] Source: Sturgis & Allum, 2004

[41] Source: Reddy, *et al.* 2009

[42] A number of stakeholders reviewed spoke about the culture of South Africa. South Africa is recognised for its sporting culture, in particular, the culture of rugby and soccer amongst the general population. It is not currently recognised for having a culture of scientific enquiry or science amongst the general population.

[43] Source: Lewenstein, 2003

A requirement of the TOR was to assess whether the overall design of the NSW allows participants to engage with SET, or whether it encourages a traditional 'deficit model of understanding of SET'[44]. With an understanding of the characteristics of each approach (deficit versus engaging approach), the Grant Holder database [45]was analysed in terms of the activities offered during the NSW over the period under review.

The various types of NSW activities implemented by Grant Holders (as noted in Table 15) were categorised into either a deficit or engaging approach in terms of a public understanding of SET based on the nature of these types of activities. Some activities that exhibited characteristics of both models were categorised as "engagement or deficit".

Activities identified as either 'engaging or deficit' were categorised as such because, in theory, they are designed to be engaging, however, the extent to which they are actually engaging in practice is dependent on a variety of implementation/contextual factors e.g., the presenter, audience, topic, etc.

Table 15 provides a breakdown of activities by type.

Table 15: Categorisation of NSW Activities in terms of a deficit model or engagement model of public understanding

Engaging (n=9)	Engaging or Deficit (n=3)	Deficit (n=3)
Learner project and presentation	Science shows/ experiments	Lecture, presentation publication
Games	Public lecture/workshop	Public awareness posters
Science quiz/competition	Career guidance	Publications
Role modelling		
Educator workshop		
Learner workshops		
Interactive activities		
Starting science camps/clubs		
Fun runs		

Grant Holders are of the opinion that both engaging and deficit activities are important and that they serve different purposes within the NSW. Deficit activities (e.g. presentations, publications) are useful for educating or raising awareness about a particular topic or subject and its role in everyday life. However, encouraging learners to pursue careers in the various SET fields requires more interactive and engaging activities to be effective.

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[44] Section 10.1 responds to TOR 4.2.1 (a)

[45] The Grant Holder database was pulled together as a result of analysing all Grant Holder documentation for the years 2003, 2005, 2007 and 2009

Figure 10 illustrates the types of activities implemented by Grant Holders across the year[46].

Figure 10: Engaging and deficit activities Implemented by all Grant Holders in Sample Years
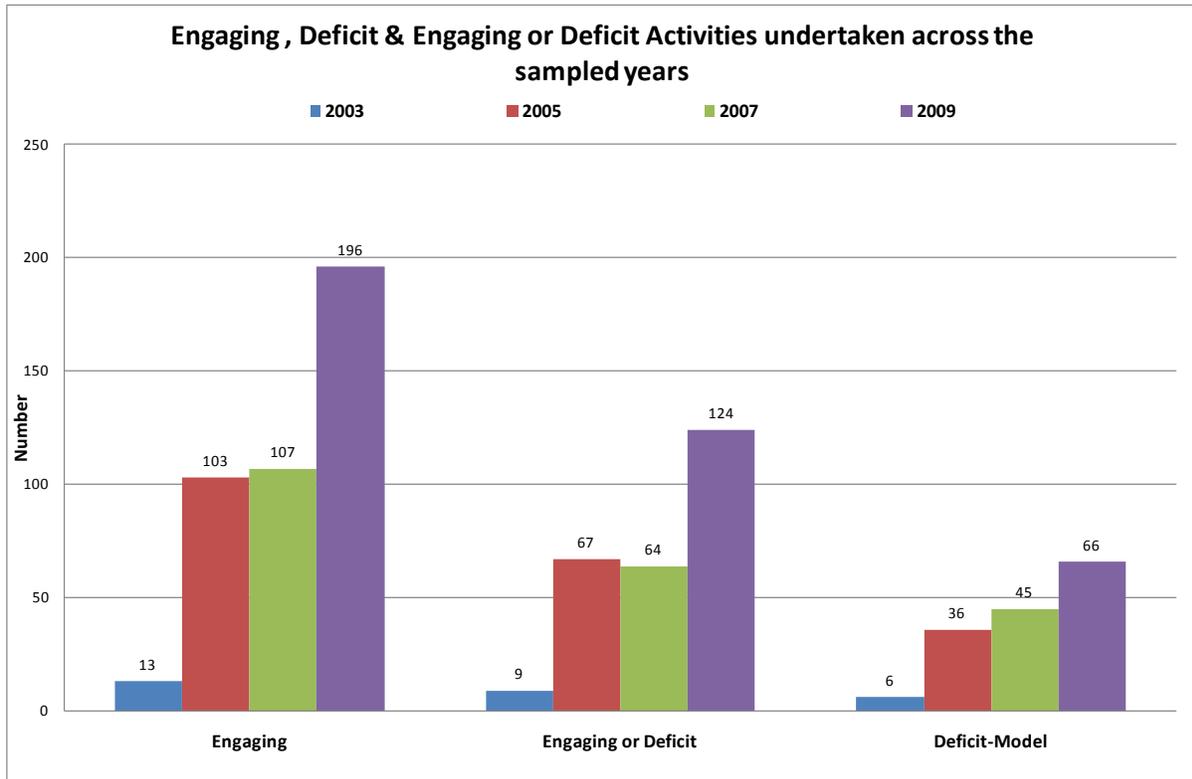
As shown in Figure 10, Grant Holder activities reflect both engaging and traditional deficit models. Across all years, Grant Holders undertook each type of activity, with considerably more engaging activities being implemented. Deficit activities were the least common across all years, which imply that the NSW's approach followed a more engaging model of public understanding in terms of SET. Grant Holders interviewed were in agreement in terms of the categories presented.

An analysis of the various activities provided by Grant Holders indicates that Lectures/presentations or demonstrations were implemented most often, followed by science shows, experiments and career guidance activities, which were implemented by more than 50% of the Grant Holders. Focus areas highlighted during the NSW are depicted in Table 16.

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[46] Data was sourced from the Grant Holder database, based on an analysis of all Grant Holder documentation for selected years

Table 16: Focus areas highlighted during the NSW

Engaging	Engaging or Deficit	Deficit
Biological sciences	General science	Medicinal plants/IKS
Chemistry	Nuclear science	Early childhood development
Astronomy	Telecommunications	Agriculture
Technology	Physics	Recycling
Space science	Mining	Sex education
Mathematics	Environment/conservation	Zoology
Lasers	Fibre optics	Science awareness

Analysis of the results of Grant Holder interviews in collaboration with analysis of the Grant Holder database developed as a result of extracting data from Grant Holder documentation for the years 2003, 2005, 2007 and 2009, revealed the following findings:

- **More types of activities were implemented than those listed in the NSW Project Brief** (2006 – 2009).

- The **NSW activities most often implemented** by Grant Holders included Educator and learner workshops, interactive activities, community/educational tours, Science shows/experiments, career guidance and lectures/presentations/demonstrations. The latter activity (deficit model) was the most popular activity implemented by Grant Holders.

- Grant Holders regard **role modelling, community and educational tours, interactive activities, and career guidance** as more effective in encouraging learners to select Maths and Science subjects and pursue SET careers. One Grant Holder emphasised the importance of going beyond deficit activities saying, *"The activities must make learners feel they can do it. They must be actively doing things [such as] working with blocks, puzzles or experiments…we want to empower the individual using interactive activities".*

- **The only type of activity that decreased from 2005 to 2009 was 'starting science camps/clubs'**. The aim of starting science clubs as outlined in the project brief is to assist organisations with resources that are already involved in or have existing science clubs. The reason for the decrease in this activity may be due to fewer organisations being involved in science clubs over the years.

- Generally Grant Holders interviewed believed activities aimed at learners and young people must be **hands-on, fun, motivating** and **stimulate interest**.

- The **context** in which people engage with knowledge cannot be dismissed. An example provided is the NSW's drive to incorporate the Indigenous Knowledge Systems (IKS) into fun runs (a type of activity). NSW is a multi-dimensional initiative with a variety of objectives that require different strategies for achievement. As a result, a programme model that can accommodate a blended approach to public understanding of and engagement in SET is likely to be most effective.

- In the case of NSW, **the need for transfer of knowledge from professionals skilled and experienced in SET to less experienced people cannot be overlooked**.

- **Biasness exists in the selection and/or inclusion of activities[47]**:   Activities implemented by different types of Grant Holder groups are a reflection of their resources, capacity/expertise and their core business. Characteristics of Grant Holders impacted on the focus of activities in terms of subject matter and content: HEIs have researchers and laboratory facilities which are ideal resources for lectures and Science experiments. Additionally, as educational institutions they are well positioned to provide training to educators on SET. Science Councils, Science Centres and Professional Association/ Organisers have more resources, funding and the technical expertise to implement a variety of activities. Government Departments implemented different types of activities such as media talks and public discussions on radio talk-shows and the publication of press releases around the NSW. Departments also provided activities linked to their focus areas. Grant Holders interviewed indicated that the "special fields" focused on in their NSW activities are directly linked to their core business or mandate as an organisation/institution or geographic location. As quoted, "*We are a Physics research institution so we are biased towards physics but of late we have tried to incorporate chemistry*" and *"We focus on the environment because we are close to Kruger National Park and the mining industry…we have three mines around us"*.

- **Quality of facilitators and presenters manning activities:** Some stakeholders stated that career guidance is not impactful enough the way it is being done. As quoted, "*The students manning stalls and stands were not necessarily gifted in communicating requirements for those skills*".

Analysis results of learner and student interviews revealed the following about activities:

- **Most useful activities for learners**:   Learners found engaging activities such as Science experiments; games; Science quizzes; and career guidance useful. Most learners found the career guidance activities beneficial as they could find out what marks they needed for their subjects and what careers were available to them. Other activities found useful included competitions; learner projects; lectures; as well as Science and Technology exhibitions.

- **Challenges that limited the effectiveness of activities to learners**:   Three main complaints with regards to the activities attended by learners and students included the following:

  o There was **not enough time allocated to NSW visits and activities**. As quoted "*The negative thing was that they didn't give us enough time – our questions could not be answered"* and "*By the time we reached the top floor they said the time was up, so we didn't get to see everything".*

  o **Many venues were too small and over-crowded**:   Because halls were crowded, learners could not see what was happening. As quoted, "*At the exhibitions there wasn't enough space because there were too many of us*

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[47] This finding responds to TOR 4.2.1 d

wanting to go to the same place", "There was not enough space, the hall was too small – I could not see the experiments" and "You find there are too many students in one place and you can't even see what is going on in front, and there are other people not paying attention and making a noise"

o **Language was a barrier to engagement[48]**: Activities presented in English as well as some of the terminology used, made it difficult to understand activities. As quoted, *"The terminology was difficult as well as the English"* and *"I was too shy to ask my questions and make mistakes in English".*

6.1.4.2 NSW – interface between African Indigenous Knowledge Systems and Western Science

"South Africa has a very rich history of information that has been passed down through generations and some of the information can be linked to scientific research. I know that's not what it (IKS) is but it's where it fits in…..it's why you would use it. It's not just about focusing on traditional western knowledge system"

Grant Holder interviewed

In 2005 Grant Holders were informed that their NSW programme should include some focus on Indigenous Knowledge System (IKS) within their community. IKS was one of the thrusts of the NSW, which provided a platform to bring together the two knowledge systems (Western Science and IKS) and show South Africans how indigenous ideas that have a scientific basis could be enhanced to create economic opportunities. Common examples of IKS include the use of remedies for disease and traditional methods for dealing with contraceptives.

Stakeholders from DST, SAASTA and Grant Holders indicated that there is still a general lack of clarity about how to appropriately profile IKS within the NSW. When asked about difficulties in implementing IKS activities, the overwhelming response was a lack of clear guidance (including informational resources) from DST and SAASTA.

As one Grant Holder iterated, *"We had some presentations at the national meetings about IKS and we walked away more confused than when we started. We found that presenters are not very clear".*

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[48] Language as a barrier is explored further in Chapter 9

While these findings confirm reports of IKS support being available to Grant Holders, Grant Holders' opinions indicate that this support has not been sufficient to ensure the successful implementation of activities around IKS by Grant Holders who are not specialists in the focus area. Barriers and challenges in linking IKS to Western Science include the following[49]:

- Limited knowledge and understanding of IKS;

- Lack of clarity of how to appropriately position IKS within NSW; and

- IKS is not held up to general scientific standards – IKS has not been proven and therefore must be subjected to scientific scrutiny. It is a in its oral phase and its scientific basis of support still needs to be built up.

The following was found as an outcome of reviewing Annual Reports from 2005 to 2009, in conjunction with themes identified as a result of analysing stakeholder interviews:

- **Difficulties in implementing IKS activities** included limited regional resources related to IKS and an inability to clearly link IKS to their core business area or subject expertise.

- **IKS activities provided during the NSW** included radio programmes featuring IKS practitioners and presentations/talks on various topics related to IKS. These include: what South Africans can do with IKS (i.e. uses of IKS); the institutions Government has put in place for that purpose, educating the public about issues of royalties; protecting IKS knowledge holders from exploitation and encouraging them to come forward and make indigenous knowledge available in a protected environment and through the right channels.

  Most Grant Holders satisfy the requirement of including IKS in the NSW through presentations on topics that include medicinal plants or mining, and exhibitions (e.g., how to make traditional beer, Indian spices, or beadwork), traditional games (e.g. Ingendvo, Umuralarala), community and educational tours, and demonstrations.

- Some individuals invited to speak about various topics under the IKS umbrella (e.g. traditional healers) are not trained in IKS, and therefore do not provide clear connections between their field and IKS. This raises concerns about adequate knowledge of the topic to raise public awareness. Stakeholders recommended a workshop conducted by experts to gain a better understanding of IKS and what is expected in terms of activities during the focus week.

- The **NSW promoted the positive aspects of IKS**, which discouraged people from completely rejecting IKS.

- Only **one of the 16 fields of IKS was applied in the NSW**. To enhance the NSW in terms of IKS in the next phase, IKS should be implemented holistically across the whole value chain. IKS is a new relatively new concept and is still in a phase of becoming established in terms of a science discipline.

From Grant Holders' perspectives, NSW can only properly address the interface between IKS and Western science once (i) all stakeholders have a clear understanding of IKS and the expectations for implementation, and (ii) IKS is treated with the same scrutiny as all science.

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[49] This finding responds to TOR 4.2.1 b

It is recommended that in the next cycle of the NSW, those stakeholders who specialise in IKS (including the IKS Sub-Programme at the DST) should facilitate activities during the NSW that showcase efforts and accomplishments in IKS, rather than requesting that Event Organisers who do not specialise in the focus area, provide activities. This recommendation should be considered for all focus areas across STEMI.

6.2 Political support

The **political support was a great achievement**. Stakeholders at DST and SAASTA indicated a high level of political commitment in the NSW, as stated, "*The Minister puts everything away and says he is coming to launch the NSW – the Deputy Minister is available throughout the NSW. The political leaders come to ask where they should be deployed. They make themselves available for interviews at short notice*".

DST and SAASTA Stakeholders interviewed indicated the shortcoming of **not raising public awareness of the importance of science with a broader range of politicians and cabinet**. An interviewee recommended involving "*the rest of the cabinet ministers".*

The **political support received by DST Leadership (the Minister, DG and some DDGs) as well as provincial Ministers (MECs) was a great achievement**. Stakeholders at DST and SAASTA indicated a high level of political commitment in the NSW, as stated, "*The Minister puts everything away and says he is coming to launch the NSW – the Deputy Minister is available throughout the NSW. The political leaders come to ask where they should be deployed. They make themselves available for interviews at short notice*".

Interviews with DST's leadership (Ministry and EXCO) established that in their minds, the NSW is an initiative worth continuing. In its next cycle, a shared vision is for the NSW to "*retain its public awareness character*" and **ensure that it possesses a multi-disciplinary character inclusive of the range of focus areas (Science, Technology, Engineering, Mathematics and Innovation), as well as inclusive of a broad range of stakeholders**. Space used for activities should be much more structured, dealing with a story (such as space) rather than small parts of the story (a theme per area representing the value chain). Activities should be presented by professionals who can communicate and engage well at the level necessary for the target group of beneficiaries they present to. There should be an emphasis on coherence, coordination and collaboration, with stakeholders working together. A key focus should be on youth but it should be inclusive of as many stakeholders as possible (the ones that matter). The NSW should be:

> "*.. the type of high stakes programme that everyone is tearing down the wall to be part of"*
>
> *Minister Pandor Naledi, interviewed on 12 September 2011*

DST and SAASTA Stakeholders interviewed indicated the **shortcoming of not raising public awareness of the importance of Science with a broader range of politicians and cabinet**. An interviewee recommended involving "*the rest of the cabinet ministers*".

6.3 The implementation approach

The mechanism used to select Event Organisers over the ten-year review period was mainly through a grant-funding mechanism. For most years under review, an open tender process was used where an advertisement was placed in national newspapers and SAASTA sent an invitation to all existing Grant Holders (with a request that they pass the invitation on to anyone else in the field should it be an open-tender process). Invitations were also sent to all Science Councils – however, they did not always apply.

The implementation approach (a Grant-funding mechanism) limits the number and type of NSI stakeholders from becoming Event Organisers. The current approach does not take into account various role-players, which is seen as a shortcoming. DST officials and scientists feel that not enough noise is made about the NSW - they believe that the private sector and higher education institutions are not being targeted in a sufficient way. Lack of knowledge and awareness of the call for proposals was identified as hampering the involvement of organisations in the NSW - organisations were not part of NSW because they were not aware of the funding opportunity awarded by SAASTA and DST.

The review identified some factors that detract stakeholders from participating as Grant Holders, including project management aspects such as proposal writing, project implementation, project reporting and financial reporting. Some Grant Holders are deterred by the fact that there is a lot of project management required for little money in order to participate. As quoted, "*Excessive bureaucracy for a small amount of money*". Proposal writing was mentioned the most as a reason why other organisations are not part of NSW. Some Grant Holders viewed reporting procedures to be time consuming and the reporting time frame to be inadequate. The greatest concern raised by Grant Holders was in terms of the financial report - Grant Holders referred to the difficulty of accounting for all the money spent, as some costs cannot be proved but are necessary to implement the programme. This requirement results in Grant Holders either being cut off from NSW the following year because of lack of proof to support financial spending or in Grant Holders putting in their own money to cover the miscellaneous costs (which is most often the case).

An inclusive approach was used with the grant-funding mechanism to accommodate as many Grant Holders capable of running activities and located across districts to ensure reach. The **multi-sites approach was used, focussing on including all applicants** rather than turning organisations away. The **budget per organisation diminished significantly**, which meant that the strong organisations, previously worked with, saw little gain financially and started withdrawing one by one. Grant Holders who continued their involvement emphasised that although their proposals were accepted, they did not receive the total amount requested. A SAASTA interviewee indicated that "*People need more money than is available – they start to ask if it is worth the effort to apply for R60, 000.00 considering all the reporting and financial reconciliations*".

A requirement of the model in the early years was for grant holders to leverage additional private sector funding or provide in-kind contributions. This was not very successful - a reason provided from a stakeholder interviewed is that "*you need a specific skill to raise sponsorships*"

Prior senior officials from DST and SAASTA emphasised the concern that Government does not provide sufficient funding to ensure a significant impact. **With less funding, organisers indicated that they often decreased the scope and reach of the activities, limiting the number of citizens who were able to experience** the NSW as well as the quality of activities in some instances.

From engagement with DST leadership, a key recommendation is for there to be **a ministerial directive to partake in the NSW**. One DDG proposed a forum for the NSW with business a few months before the event hosted by the Minister. Some DDGs interviewed were also willing to make it a requirement as part of their contracts with Service Providers that they take ownership to be part of the NSW as part of their scope of work.

6.3.1 Silo-syndrome

The review found that within SAASTA, a high level of support for the NSW was provided by the Science Awareness Platform. The unit takes responsibility for the exhibitions at the National Launch and engages with Science Councils, Universities, students doing different research projects, those who won competitions, some of whom showcase their accomplishments at the launch.
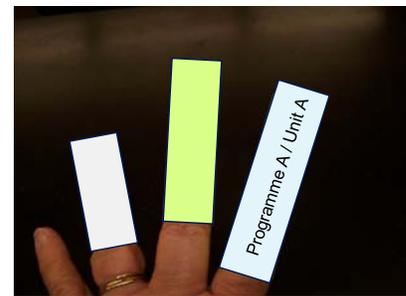
The term "silo" is a metaphor suggesting a similarity between grain silos that segregate one type of grain from another and the segregated parts of an organisation. In an organisation suffering from silo syndrome, each department or function interacts primarily within that "silo" rather than with other groups across the organisation. This manifestation of silo syndrome breeds insular thinking, redundancy, and suboptimal decision-making.[50] As systems fail to interact and data becomes trapped and unavailable to decision-makers outside the silo, people are less likely to interact. When people are culturally inhibited from interacting across departments and functions, they avoid sharing data and information outside of their silos. It's a vicious cycle, one that can cost an organisation in agility, productivity, and responsiveness.

The Science Awareness Platform combines activities done across the year and celebrates these within the NSW. As quoted, "*We profile at the launch what the Minister has funded and showcase what DST is doing, which is to highlight and bring out the things that are happening throughout the year under one week*". **The companies they work with display their work during the week and everyone in the unit puts aside all other project work to focus on activities during the week.** They put their own funding (not funding from NSW

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[50] Evan Rosen http://www.businessweek.com/managing/content/feb2010/ca2010025_358633.htm

grants) towards the NSW and through their efforts, they reach more learners during the week than any other time of the year. **This type of ownership by stakeholders who are not part of the management team who implement the NSW is a best practice to be continued into the next cycle**. Taking responsibility for a key component of the NSW and being involved in conceptual planning and implementation of activities, are key factors that increased level of ownership by the Unit.

The Science Communications Unit was not involved in the NSW from a conceptual or implementation perspective. Their involvement was limited to providing staff to assist in monitoring the NSW through site observations, mainly because of capacity constraints and manpower within the Science Education Unit (mandated to manage the project) to reach all.

What currently happens within the DST is that officials responsible for their portfolios do not influence the content of the NSW or if they do, they do so to a minimal extent by showcasing a small portion of their contributions to SET. This implies that the priorities of Government are not communicated collaboratively, sufficiently and effectively within the NSW.

"The National Science Week is not yet in practice seen as a DST-wide initiative"

DST stakeholder interviewed

In terms of planning from year to year, currently at DST each Sub-Programme has its own science awareness activities and most do not include the NSW in their annual plans. Silo-syndrome hindered the possibility of having key experts provide content inputs and expanding the possible network of organisations to partner with. These other units / Sub-Programmes within SAASTA and the DST have their own networks and expertise that are relevant to the NSW. All stakeholders interviewed indicated that content guidance would be valuable from other units to complement the current team in selecting quality activities that respond to all the objectives of the NSW.

Silo syndrome

Silo syndrome which occurred inside both organisations resulted in a shortcoming, not only of improving the content of the NSW, but also by a limitation to **network with appropriate organisations to enhance content and broaden experiences**. As cited:

- In DST and SAASTA, little effort was made to communicate with other units and identify organisations grant holders could network with to improve the NSW in their region

"*There are certain networks that should have been facilitated by those of us who are closer to some organisations – for grant holders to network in order to improve. Grantees didn't have a way of securing a network with those who had quality scientific content*".

"*We are not taking enough advantage of the existing service offerings within our country to raise the necessary SET awareness*"
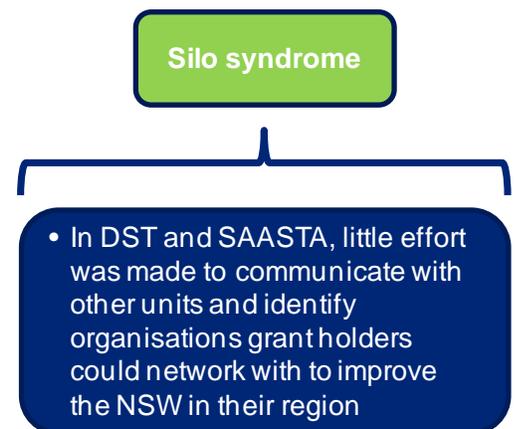
There is willingness across the DST to collaborate. For example, the DDG at DST leading Science and Technology for economic impact identified that as a Programme they can modify their plans to accelerate or delay their accomplishments and showcase them at the NSW – "*provided planning is done early*". Since they work a lot with industry, they are willing to build into agreements and contracts with implementing agencies the mandate for them to be involved in the NSW and they themselves are willing to collaborate, bringing ICT-based technologies and innovations to enhance the NSW.

Annexure I presents an overview of SAASTA's units and units within DST's five Programmes and indicates the units/programmes engaged with during the review as well as their participation and collaboration in terms of the NSW over the ten-year period. The Table also specifies the Strategic Purpose of each unit/programme/sub-programme, indicates the target beneficiaries currently focused on as well as the NSW objective most likely to be met by their increased involvement in the next cycle of the NSW. The information presented **provides an initial platform from which a detailed implementation plan can be developed**.

6.3.2 Collaboration with NSI stakeholders and particularly with the private sector

What has **not** been achieved in the review period is linking the NSW as a key **Corporate Social Investment (CSI) activity** where corporates such as Eskom, Shell, Sasol, Woolworths, Anglo, etc. carry a NSW message to employees through work-based activities. There is some mention of working with the private sector in documents reviewed for this period, though there is no clear programme strategy for this partnership.   Several evaluation reports mention this in their recommendations: a relationship with the private sector should be built.

As an outcome to this review, the DST and SAASTA should develop a strategy for working with the private sector which indicates why the *private sector* should be involved. As an outcome of interviews with DST leadership, the suggestion to develop a task team that serves as an advisory panel was introduced to encourage collaboration. The task team should allow for a reflection of inefficiencies and ensure quick turnaround to rectify these as they occur and to report back on all risks mitigated through pro-actively responding timeously to challenges as they occur.

6.3.3 Identifying and nurturing talent

A shortcoming of the model is the **lack of continuity and lack of focus to identify talent** through the NSW **and then to nurture** that talent. To ensure continuity beyond the NSW, mobile labs were recommended. SAASTA has four mobile labs that were launched as part of NSW 2011 and these could be used for this purpose.

6.4 Institutional capacity to deliver the NSW

In terms of the ability to deliver the NSW, the NSW implementation team have the necessary expertise to successfully manage implementation of the NSW. As the NSW has broadened its coverage, the current Implementation Model and approach, which relies on calls for proposals, becomes an administrative challenge because there is insufficient human resource capacity. The current team successfully manage implementation of the NSW but not without very long hours and a commitment to the excellence which they strive for.

The review established that all three business units of SAASTA could contribute to the NSW objectives in terms of their mandates and services offerings. The content knowledge exists across the Units to respond to all five current NSW objectives:

- With a consideration of the focus areas of the Science Education Unit (school science support; SET careers and Science resources), NSWs fifth objective (attracting learners to SET careers) is most likely to be achieved.

- With a consideration of the focus areas of the Science Communication Unit (science and media; science promotion; and science communication and capacity building), NSW's third objective (promote partnership between media and scientists) is most likely to be achieved.

- With a consideration of the focus areas of the Science Awareness Platform (festivals and events; Science and Technology Centre Networks; in-reach, outreach and mobile programmes; and exhibits), NSW Objective 1 (contributing to the development of a society that values and appreciates SET) and Objective 2 (provide a platform for scientists to engage each other and the non-scientific community) are most likely to be achieved.

- NSW's fourth objective would be met through showcasing the work done.

Almost all Grant Holders interviewed claimed that SAASTA had the appropriate knowledge and appropriate experience to support the NSW. Grant Holders refer to the number of years that SAASTA has been running NSW as a measure of the experience they have gained. The knowledge SAASTA has is observed by the assistance that they offer to Grant Holders. Grant Holders allude to varying assistance that include proposal writing, advice on project implementation, assistance with managing finances and advice on ad hoc queries and questions that the Grant Holders might have. As quoted:

*"If there are issues of clarity, materials or we need contacts
they are always there to assist. I think they are very helpful. If
they can't they go out of their way to find assistance for us.
They are very accessible and always available"*

Grant Holder interviewed

SAASTA as an organisation has grown in the past six years in terms of the various projects implemented on behalf of the DST - the number of multi-million rand projects implemented by the same NSW team has also significantly increased over the years. However, the staff complement has not sufficiently increased to provide enhanced service delivery.

The current staff complement compels them to fully deal with the administrative part of project delivery where they are "*pushing hard to fully comply – it does not leave them with enough capacity to make necessary intellectual inputs to enhance the project*". There is currently insufficient human resource capacity (the number of hands to do the job) at SAASTA to implement an enhanced NSW. With three resources to manage nine Grant Holders in 2004 and four resources to manage more than ten times the volume of Grant Holders in 2011 in addition to managing an array of other multi-million rand projects, it is highly possible that institutional capacity to deliver enhanced programmes is less attainable.

To ensure that organisational policies and strategies support the proposed Implementation Model for 2012 – 2016, it will be necessary to identify inefficient policies and processes within SAASTA and **establish a formal process to regularly revise inefficiencies through revisions to policies**. This can enable efficient implementation of the NSW and all other public awareness programmes by SAASTA on behalf of the DST. To enhance organisational processes and procedures and reduce bottlenecks that currently exist within the organisation, it is worthwhile for SAASTA to conduct a more thorough assessment across all three Units.

6.4.1 Incentives for performance

A learning highlighted earlier in the chapter is the need for NSI stakeholders to see the benefits related to their involvement as part of the NSW. A finding worth highlighting as an outcome of this review is that for the earlier years of the NSW benefits and incentives for some team members resulted in the **success to leverage private sector funds** that contributed to the NSW and further public awareness activities beyond the NSW. As quoted, "*While we were still FEST we managed to raise nine million rand from CHETA for a programme focused on school girls. CHETA funded some schools' transport to travel to NSW sites. We also got into a partnership with Eskom where they made an allocation of two million rand per province to refurbish schools, give computer labs and science labs and have extra lessons on Saturdays with teachers provided. Eskom had the money and SAASTA had the know-how*".

One of the findings from engaging with past SAASTA employees who were involved in the NSW in the first few years of its implementation is that during that time, there was an incentive created to leverage additional money for the NSW through bringing on board stakeholders other than Grant Holders. When this incentive was discontinued, there was a turnover in the staff complement soon after that. This is not to say that the incentive-based approach was the sole reason for turnover rate identified.

What is worth considering is an incentive for all the NSW team members who leverage partnerships in the next cycle of the NSW. The type of incentive and how/when it is disbursed is something to be determined by both DST and SAASTA. One suggestion is to introduce a competitive environment where the development of relationships and partnerships that leverage an enhanced NSW can be monitored in a transparent way where top performers can be identified who have 'gone the extra mile' to enhance the NSW. This could be done through the introduction of a rubric (a concept of performance measurement discussed in the concluding chapters of this report).

6.5 Planning the NSW

Although a project brief provided for the NSW from 2005 onwards is seen as an achievement, limited planning in terms of how to meet the NSW objectives impacted on some objectives not having been met.

A challenge in terms of planning was SAASTA's **uncertainty that they would run the NSW in the next year**. "*Every year we went through the same challenge of whether we would be involved in the next NSW – uncertainty was always there*".

This was due to one-year contracts being signed between the DST and SAASTA. This was improved in the later years of implementation –the first multi-year contract was signed in 2009, which comes to an end in 2011. A long-term contract between the DST and SAASTA and between other partners would be necessary to support early planning of the NSW.

Interviewees stated that a slow turnaround time "has a domino effect on time available to plan". Delays mentioned include timing of educational and promotional materials, t-shirts, calls for interest and awarding of grants.

In terms of planning, Deputy Director Generals (DDGs) at the DST indicated that they need to begin making budget provisions during October for the next fiscal year and planning early for the next year's NSW would be required to anchor activities in the yearly calendar.

6.6 Capacity Development and Exposure

The value of SAASTA's role extends beyond duties as project management of NSW. According to several Grant Holders, **SAASTA has played a key role in developing people in organisations and expanding their networks.** Capacity has been built in several areas, including project management (i.e., planning and coordinating large scale activities/events), proposal writing, and financial management. Involvement in NSW has also provided Grant Holders more exposure as organisations that promote SET and in turn exposed them to like-minded groups.

A small number of interview participants indicated that their involvement as a Grant Holder had led to professional growth for themselves and other key staff. The appreciation of the relationship with SAASTA and the impact made by SAASTA on Grant Holders is echoed in the following quotes:

A number of achievements have been made relating to capacity development and networking. Good practices to be continued in the next cycle of the NSW include the following:

- **Increased personal development** was cited by Grant Holders, DST and SAASTA officials implementing the NSW.

  As quoted, "*Speaking for myself, I have seen a growth in ideas, the ability to distinguish between good and bad things – having been part of this for so long*".

- **Grant Holder meetings**: An achievement of this era lies in **Grant Holders** across provinces that have been **capacitated and up skilled** (their ability to apply for grants, design activities, events management, simple bookkeeping, etc.). A beneficial part of the current implementation approach is bringing together all grant holders before the actual event and then afterwards (**Grant Holder meetings**). "*Grant holder meetings expose people to ideas and conversations*". "*This has built a sense of community – new grant holders are introduced to the family – and people are brought together to talk about the objectives of the week and what they are doing*".

- **Exposure: A key achievement of the NSW has been the exposure provided to Grant Holders by participating in the NSW**. This was identified by Grant Holders as a motivating factor to continue participating. Exposure identified by Grant Holders included media exposure received, acknowledgement of their efforts by the DST and the ability to brand posters, banners and print materials with their logo.

The effect of the predominant focus of SAASTA on administrative support to Grant Holders has raised questions by some Grant Holders about SAASTA's capacity to provide science and technology expertise. Through the Review Team's engagement with Managers across SAASTA's three units (all Managers were interviewed), it is evident that the content expertise exists to enhance the NSW in the next cycle, provided that those with various expertise across STEMI become more visible.

6.7 Enhanced cooperative Government

South Africa is a constitutional democracy, which is run on a system of cooperative governance. Chapter 3 of the Constitution of the Republic of South Africa (1996) provides the principles of cooperative government and intergovernmental relations.

The ten-year review of the NSW assessed the extent to which the implementation of the NSW has enhanced the principles of cooperative government and intergovernmental relations[51]:

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[51] This section responds to TOR 4.2.12

Stakeholders interviewed identified that **relations built with Provincial Governments** enhanced respect for constitutional status, institutions, powers and functions of government. Even though the DST does not have a presence in provinces, it has been possible for the DST to implement the NSW in provinces due to relations built with Provincial Governments, specifically Provincial Departments of Education. Rotating the National Launch in provinces each year, has assisted in enhancing relations between the DST and provincial spheres of Government, since preparation committees for the National Launch include officials from the DST and province involved for that year.

Provincial Governments have begun embracing the NSW by including it as part of their annual plan and budget. Provinces started having their own provincial launches, which they drive through their own funding. The growth in the involvement of provincial Government has been satisfactory, as demonstrated in the involvement of provincial political leaders such as a District Mayor or MEC opening a provincial launch.

The NSW also enhanced organisations and people cooperating with one another in mutual trust and good faith by fostering friendly relations. However, this is limited only to those Grant Holders and Service Providers whom SAASTA have succeeded in bringing on board. As quoted:

"Where we have succeeded to bring on board individuals and organisations, we did it very well without anybody feeling undermined. Where we succeeded, we have succeeded to do it well in a way that enhances the integrity of everyone involved"

DST stakeholder interviewed

Cooperation, assistance and support between organisations and people have been enhanced by the following aspects of the NSW:

- **Exposure and personal branding and marketing opportunities**: The ability for those stakeholders involved in the NSW to co-brand, has been advantageous in terms of Cooperative Government. The opportunity for those stakeholders involved in the NSW to talk about their own activities (marketing) and distribute their own brochures, has also been beneficial.

- **Collaboration and networking**: Grant Holders applauded the NSW for fostering and strengthening working relationships between Grant Holders and other stakeholders involved on the NSW. These include Government Departments, schools and the community as well as other Grant Holder Organisations participating in the NSW.

  Cooperation, collaboration and sharing of ideas were the most commonly cited attributes that the Grant Holders professed. As quoted, *"Mostly there is no competition except encouraging each other, we collaborate, we share and we learn from each other. NSW enhances our working relationship; we are seen as a family. We have developed a good working relationship in NSW"*.

To further enhance Cooperative Government through the implementation of the NSW, there should be a dedicated marketing drive to National, Provincial and Local spheres of Government.

The review also found that the MOU signed in 2006 between the Minister of Science and Technology and the Minister of Education, may have lost its power three to five years later, as evidence in this chapter from the withdrawal of a number of Provincial Departments of Education in 2008 and 2009. To this end, it is suggested that an MOU be signed more regularly to solidify partnerships formed.

6.8 The development of a communication strategy

Over the ten year period of review the publicity and communication of the NSW was the responsibility of SAASTA from 2001 to 2006 and the responsibility of the DST from 2007 onwards. An accomplishment of the NSW in its first ten years is a communication strategy which was developed in 2006 and revised each year[52]. This strategy incorporated the objectives, media plan, advertising and marketing strategy for the NSW. The strategy outlined that communications are coordinated by a core communications task team that includes the DST, service providers and SAASTA. This review did not explore how functional the task team was.

A best practice identified was that for each of the years, the revised media and communications strategy took into consideration the project brief and recommendations that emerged from the previous years' NSW, thereby demonstrating a feedback loop to inform the improvement of the NSW over time.

The communication strategy specifies the five key messages of the NSW that must be communicated. An implementation plan (sometimes referred to as a business plan by media stakeholders) was also in place (called channels for communication) that proposed how this is to be done. The plan included the phased approach, namely, build-up: Pre-Event Publicity through advertising and stakeholders; NSW Launch; NSW Event Communication; On-site branding; and NSW closure and follow-ups. It also specified the publicity channel, frequency, content and costs associated with proposed communications for each phase). However, its shortfall is that it did not specify what the NSW aims to achieve as an output or outcome of each phase and each message specified in the communication strategy for each target group of beneficiaries. The strategy also did not place direct emphasis on the requirement for the NSW to contribute to South Africa's national building and transformation agenda or the country's cultural and linguistic environment (coverage to all 11 languages).

A key finding in the review is that the budget for media communications was not aligned to the business plan, which implied cutting costs and focusing more on certain media channels of communications. A lesson learnt to be taken forward is to ensure collaborative planning and development of a communication strategy with a business plan and implementation plan aligned with a budget to allow coverage with maximised impact for each target group of beneficiaries so that there is a high return on investment for the money spent.

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[52] Note: A communication strategy was not provided as part of Annual reports in 2008 or 2009.

It is proposed that once the NSW objectives are revised, a communication strategy be considered that provides a roadmap to guide the development of communication implementation plans for each objective, detailing the outputs and outcomes aimed for over the next five years.

6.9 The NSW is a national brand amongst learners and their direct boundary partners

Establishment of the NSW as a national brand can be deducted from those learners and students interviewed who attended NSW events. From insights gathered during the review, it seems as though brand awareness of the NSW is limited to those Grant Holders, Service Providers, Government Department officials, Scientists and Journalists who participated in the NSW, as well as the general population who were fortunate enough to read about the NSW in newspaper articles or hear about it through radio or television.

But the NSW is **a brand limited to those stakeholders involved, to parents and friends of learners who attended the NSW and to a lesser extent, to the general population who saw, read or heard about the NSW.** There is little insight about whether the NSW is a national brand. What can be said based on informal engagement with learners in urban areas who were not involved in the NSW, is that they are aware of the programme. White learners in urban areas raised the aspect of being excluded from the NSW as "*their school wasn't invited to participate*".

There is a **low level of brand awareness of the NSW within the general population**. Some members of the general public were asked whether they knew about the NSW and in most instances, stakeholders did not know about the programme.

The following sections describe the achievements of branding in terms of brand identification and associations that are already established, branding guidelines that have been established and branding at sites.

6.9.1 Brand identification and associations are established

The identification and associations with the NSW brand in the minds of stakeholders are strongly established.

However, some work still needs to be done to ensure the appropriate behavioural responses to the brand. This means that the population and sub-segments of the population targeted with the initiative should be clearly defined and explored to ensure that activities are made specific to

each stakeholder and sub-segment. Greater effort should be made in the promotion of NSW as brand amongst education practitioners like teachers and counsellors. These stakeholders are vital to raising awareness of NSW in schools and communities. Inter-Departmental collaboration through networking initiatives arranged by DST could enhance the positive image of DST and raise awareness of its priorities at Grant Holder level.

6.9.2 Branding guidelines

The development of branding guidelines for the NSW is a good practice that should be continued in the next cycle of the NSW.

The Grant Holders' descriptions show that they are **aware of the branding requirements,** which are set out in the guidelines issued by SAASTA. When asked to provide an example of the guidelines the majority of the Grant Holders were able to do so swiftly.

"The DST logo is on the only one put in the middle of the page. At the bottom right is the NRF/SAASTA and the bottom in the middle/centre is the NSW. The bottom left is our school logo"

Grant Holder interviewed

On the whole, most of the Grant Holders do not have any challenges with implementing the logos and comply with the guidelines. When asked whether the logo placement helps with brand recognition the Grant Holders affirm that it does.

The majority of the Grant Holders declared that the guidelines were easy to follow and implement because the prescribed guidelines are simple to follow and the logos are readily available and accessible on SAASTA's website. It is especially easy to implement when dealing with individual organisations that only have one logo to incorporate.

Complications with regards to branding arise when a number of organisations are collaborating and want to fit in all their logos. Implementation difficulties also arise in the event that organisations other than SAASTA provide funding for activities on the NSW. Such organisations have preferences of where their logo must be positioned. As quoted,

"We do have difficulties because we get sponsors who want their logos in a specific place. They have even threatened to remove their sponsorship"

Grant Holder interviewed

The existence of branding guidelines is in principle a best practice that should be developed and continued to optimise the development and leverage of the various brands involved in the NSW. The key in establishing a high impact brand policy and guideline document is to understand the relationship between the various brands involved, especially the 'driver role' the specific brand plays in influencing decision making and behaviour of the target audience.   This should be embedded in a clear understanding of the target market, organisational strategy and environmental dynamics.   Further detailed analysis and review of the branding guidelines is recommended in order to fully incorporate the identified role that the various brands play amongst the target groups in influencing decision making and behaviour.

The branding guideline as it stands seems to suggest a broad approach to the branding of the NSW (general guidelines). It will be worthwhile for the NSW to establish clear marketing and communication objectives for its next cycle. Within this framework, cognisance of the difference in needs, attitudes, motivation, perception and decision making processes in the target groups should be translated into a coherent but radically different message and branding requirement for each target audience.

It is recommended that the branding guideline also specify the minimum number of posters/banners with logos to be visible at NSW sites. It will be worthwhile apportioning part of the NSW budget to developing and distributing banners/posters to all Event Organisers celebrating the NSW each year. Developing NSW banners/posters without dates will imply that they can be used for years to come – this will add great value for money spent on developing and distributing them.

6.9.3 Branding at NSW sites

Overall, branding at sites is considered an achievement and a good practice to be continued in the next NSW cycle. However, the level at which it is sufficient or not cannot be determined.   The distribution outreach in terms of sites that did receive promotional and educational materials is not indicated.
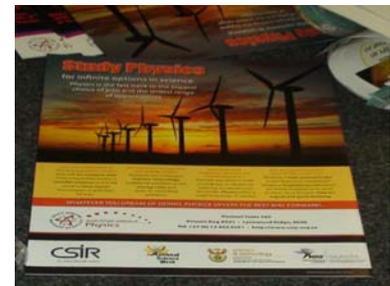
The amount of branding varied across sites. At the science council visited, there was a lot of branding. There was a big poster at the entrance and signage that indicated where NSW activities were taking place on the site. At the HEI, the empty belly poster seemed to be the only NSW branding that was present. Branding at the two science centres visited was minimal and had no direct links to NSW. The organiser at one science centre said they had received materials late and did not have time to put them up.

The following photos provide an indication of the type of branding visible at NSW sites observed during 2011:

Figure 11: Branding visible at NSW sites (2011)

The Science Council visited
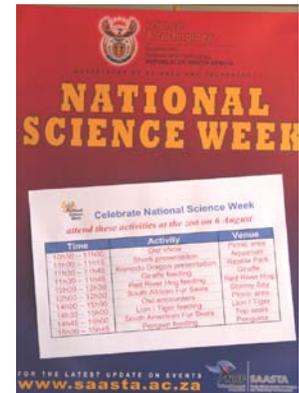
The HEI visited

6.10 Knowledge Management Systems for data collection and reporting

The review found that **knowledge management systems are not in place in areas that are critical** for the continuation of a successful NSW.

A risk to continued excellence in terms of supporting and building capacity of Grant Holders: Some Grant Holders raised concerns around SAASTA's capacity to support the NSW, should the few individuals within SAASTA who are well equipped to deal with Grant Holders become absent from the organization. Should this happen, it could prove to be detrimental to the NSW. As quoted by a Grant Holder:

> *"It's just a few people that organise NSW and they could really use more capacity. If something happens to (name not specified), the NSW will not happen"*

Along with a knowledge management system capturing how best to support event organisers, **it is recommended that a guideline be developed and shared amongst all stakeholders who will take responsibility in the next cycle of the NSW to support event organisers**.

The Review Team could not source key media data from DST's communications unit because the person responsible did not have access to or know where to source relevant media reports and data for years prior to 2009, which is when she came joined the team. Because various public relations companies were used over the years (data from News Clip in 2004, from Monitoring SA in 2005, from Radio media secured by GCIS in 2007), data was reported differently across the years, which implied that the Review Team could not compare data across all years to pick up trends. A lesson learnt as an outcome of this review is that Media Companies track and analyse data differently.

Some analyse only print media in detail, providing numbers reached. Other Media Companies break down data per types of media. This is a learning to take forward, with the recommendation that the Media Communications task team decide on the type of data and the format that is required and ensure that data is sourced in a **consistent** format from media companies and stored centrally for easy access.

6.11 Monitoring and feedback

The latter years of the NSW (2005 to 2009) demonstrate **improvements in formal documentation and records kept** for the NSW. Reporting improved and records were available. The fact that there was a single implementing agency was also a key sustainable success factor in ensuring consistent messages were given with regards to the NSW.

Monitoring and evaluation was done during the NSW each year. Achievements are recognised through **improved design of forms to grant holders** (templates for the application process, reporting, documenting grant conditions which outline what is acceptable). Currently, DST and SAASTA conduct site visits independently and do not have a formal process in place to share and present monitoring findings. It is necessary to solidify M&E processes by having a formal feedback mechanism in place.

SAASTA's NSW site visit form that is used by internally selected employees to observe, monitor and assist grant holders during the NSW, has limitations, as identified by SAASTA upon reflecting of the feedback loop. As stated, "*We don't give them feedback afterwards – this is difficult because the form we have does not lend itself to give proper feedback*". The form should be changed and updated to ensure the capturing of required data for tracking NSW achievements as well as for evaluating the quality of delivery of Grant Holders.

SAASTA stakeholders interviewed indicated that there were some Grant Holders who did not perform as well as expected upon award of their grants. This weakness brings to the fore the importance of **quality control procedures** and performance management aspects. In terms of quality, "*If you have a bad experience as a citizen you are put off NSW – if interviewed you will say it had no value – this is why quality control is so important*".

The purpose of monitoring instruments developed by SAASTA for the NSW site visits is to provide support to Grant Holders should they experience any challenges and to determine whether they are implementing what they said they would upon award of their grants.

Monitoring instruments are completed for each site visit and submitted to SAASTA afterwards. Information is collated manually. The project coordinator and project Manager review the forms in raw format and the project coordinator collates feedback into SAASTA's final report. An analysis of the monitoring instrument revealed that it probes only for the adequateness of the venue, which is a limitation. A revised monitoring instrument is proposed and is included as Annexure J[53]:

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[53] It is noted that the questions provided are draft questions that should be discussed by the DST and SAASTA and refined before being included in the Monitoring instrument

Since we live in a technological revolution, having the option available and making stakeholders aware of the opportunity to complete a feedback form (with the same questions as above) online at a given web address, would provide the opportunity for spontaneous feedback. There is also the possibility of having computers available at sites for spontaneous feedback by those who wish to do so, as well as electronic hand-held devices that are programmed to automatically feed into a central database to allow for real-time reporting as monitoring forms are completed. These methods of monitoring should be further investigated to identify the most feasible and efficient method for the next phase of the NSW.

It is worthwhile noting that the National Rural Youth Service Corps (NARYSEC) includes youth that are employed by the Department of Rural Development and trained on handheld devices by Statistics South Africa (Stats SA) to conduct household surveys in their communities. At the end of 2011, there will be 15,000 youth trained across South Africa. Utilising existing skills could be cost-effective to the NSW and could fill a gap where currently there may be insufficient human resources to monitor at NSW sites.

No database to support the annual report numbers: The Review Team had difficulties determining data in support of numbers in Annual Reports since there was no database to support any of the annual reports. SAASTA noted that a database is in the plan as of 2010. It appears as though data was never captured for analysis but those who compiled the report worked on hard copies. This is a system prone to a lot of errors and in future it is recommended that a database be created to capture all reports.

7 Extent to which NSW accommodates nation building and transformation and contributes to the cultural and linguistic environment of South Africa

Given the history of South African politics, the review assesses the extent to which the implementation of the NSW was appreciated and/or contributed to the country's nation building and transformation agendas. Some of South Africa's distinguishing features are its cultural and linguistic diversity, which are evident by the different ethnic groups and 11 official languages.

Section 9.1 presents the findings of the review in terms of the NSW's contribution to supporting the South Africa's national building and transformation agendas[54]. Section 9.2 assesses the extent to which the approaches used in the implementation of the NSW appreciated and accommodated the cultural and linguistic environment of South Africa[55].

7.1 NSW's contribution to the country's nation building and transformation agendas

"The NSW should be for everyone – if it is not for everyone, we are denying those groups participating with the opportunity to mingle together with all race groups and share experiences with each other"

DST stakeholder interviewed

On the whole, the NSW seems to be positively contributing to nation building and transformation agendas of the country. However, stakeholders interviewed point out that care should be taken to ensure that actions to address inequality are not in fact eliminating some people and compromising nation building and transformation.

In terms of South Africa's transformation agenda, the NSW succeeded in reaching areas that were not reached during the apartheid era.

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[54] Section 9.1 responds to the TOR section 4.2.14

[55] Section 9.2 responds to the TOR Section 4.2.7

Table 17 shows the areas where Grant Holders conducted NSW activities during the ten-year review period.

Table 17: Areas Covered by Grant Holders/Service Providers (2003-2009)

Areas of Coverage	Definition of area	Number of Grant Holders	Percentage of Grant Holders
Urban	City	4	3%
Urban & Semi Urban	City and surrounding suburbs/townships	15	12%
Urban & Rural	City and farm areas	1	1%
Semi-urban/rural	Surburbs/townships and towns	52	40%
Rural	Farm areas	29	22%
All areas	Refers to Grant Holders who had outreach activities in Urban, Semi Urban, Rural and Semi Rural areas	20	15%
Not categorised (blank)	Insufficient information in Annual Reports and Grant Holder documentation to determine area of coverage	9	7%
Grand Total		130	100%

62% (Urban & Rural, Semi-urban/rural, Rural)

77%
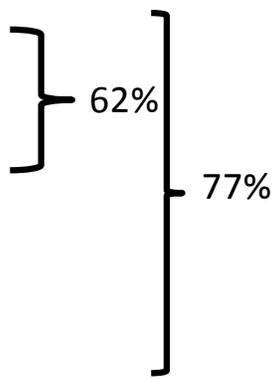
In the process of engaging with each other, participants (including learners, educators and the public) learn from one another, thereby contributing towards nation building. Nation building is also evident in the working together of Grant Holders towards the NSW. In total, 62% (n=81) of Grant Holders provided activities in only previously disadvantaged areas, that included rural, semi-rural and semi-urban areas. An additional 15% of Grant Holders focused activities in all areas, which included both previously disadvantaged areas and former privileged areas. This implies coverage to previously disadvantaged areas by 77% of the Grant Holders, a significant achievement of the NSW for the ten-year review period.

Statistics on the racial representation of beneficiaries targeted during the NSW showed that the NSW included mainly Africans – other race groups are negligible[56]. Targeting only previously disadvantaged communities produced adverse results. Stakeholders interviewed stated that the NSW has not been inclusive in terms of all racial groups in South Africa. As cited, "*Every time organisers of the NSW are black South Africans. Participation by white South Africans is limited. Organisers and people who attend NSW are largely black*".

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[56] Findings from Annual Reports and Grant Holder documentation reviewed

This implies that the NSW has lost the opportunity of accessing insights and information carried by other racial groups who are active in SET and scientific research areas.

However, as much as targeting previously disadvantaged people comes through as a shortcoming in the NSW approach it is a positive and practical way to contribute to transformation agendas. The NSW intentionally targeted previously disadvantaged communities and this has been hailed as a contributor to the country's transformation agendas. As stated, *"For years these activities were accessed by a few white South Africans. The NSW targets poor members of the society, girls, and disabled learners. So it is consciously transforming the community in that way by including different races, sexes, etc."*

If the NSW becomes a truly South African initiative that includes all sections of the population it will contribute to the country's nation building and transformation agendas. In order to nurture a sense of belonging by all cultures and race groups when it comes to the NSW the level of participation by NGOs and industry should represent all cultures and race groups in South Africa.

7.2 NSW's contribution to the cultural and linguistic environment of South Africa

One way to consider the NSW in terms of its contribution to the cultural and linguistic environment of South Africa is to reflect on cultural and linguistic representation across various forms of media.

It is no easy feat to incorporate the diverse cultural and linguistic environment of South Africa in the NSW. Attempts to contribute towards the linguistic and cultural environment of South Africa include the following:

- **The NSW has been sensitive to different cultures and languages in South Africa.** Local languages were used in the NSW presentations – some activities were offered by indigenous facilitators proficient in the local languages who acted as presenters or translators. In rural areas, there were some translators for local languages where English could not be well understood.

Broadcasting through radio was in all 11 languages on the eleven radio stations of the SABS. **Broadcasting through television was mainly in English**. Where the news made mention of the NSW across SABC channels, various languages were used to report on the NSW.

However, the extent of this is uncertain as further exploration was not part of the scope of this review.   **NSW materials** published and distributed, **NSW activities and readership outreach were mainly in English**.   Media has unintentionally omitted outreach of the NSW to some cultural groups as the focus has been placed on National newspapers, which are in English.

- **Outreach to all provinces in South Africa**:   Running activities in various areas contributed to the linguistic environment because activities are bound to accommodate the dynamics of the language spoken in those areas.

  The selection of an increased number of Grant Holders across provinces who speak indigenous languages was cited as contributing to the linguistic and cultural environment as more and more areas are reached.

- **Incorporating activities based on regional and geographic advantages**: The NSW activities such as tours to mines in mining areas, the use of traditional games, showcasing traditional science such as making clay pots or explaining how traditional medicines work.   These **activities contributed to the cultural and linguistic environment of South Africa**.

Without increasing the NSW budget significantly, a communication strategy put in place for future NSWs should include an emphasis on building relations with a wide range of and Media Organisations (print and electronic media) that represent the eleven official languages. Media releases in an extended range of media sources should be encouraged and targets put in place to enhance SET reporting around the NSW as well as SET reporting beyond the NSW. Journalists, TV and radio presenters who represent various media forms, TV and radio stations should be identified across cultures and linguistic groups. Such a campaign should be planned in detail, collaboratively with media stakeholders.

8 Timing of the NSW

Jan	Feb	Mar	Apr	**May**	Jun	Jul	**Aug**	Sep	Oct

The NSW was hosted in May from 2003 to 2008 and changed to August from 2009 to 2011. This chapter establishes the most convenient timing of conducting the NSW in South Africa based on inputs from DST and SAASTA stakeholders, as well as Grant Holders, Educators and Learners interviewed as part of this review[57]. The chapter reflects on how stakeholders experienced the shift in terms of the focus week moving from May to August, as well as the suitability of hosting the NSW in either May or August. Benefits and disadvantages are presented in a Table. These are based on exploration with stakeholders on different options in terms of the timing of the NSW.

8.1 Findings from interviews

When exploring the timing of the NSW and the impact of shifting it from May to August, the review found that the change in the timing of the NSW negatively affected planning and internal organisational processes of many Grant Holder and Service Providers. As a result, four organisations withdrew from hosting the event in 2009.

May

In terms of timing of the NSW, the majority of stakeholders interviewed are of the opinion that the NSW is most suitable to be held in May. **Stakeholders regarded May as more suitable** for the following reasons:

- Learners and teachers are able to use what they have gained from NSW in the classroom.

- The month of May is early enough in the year when there is no pressure on learners and teachers to complete their teaching and prepare for examinations so they can appreciate what they learn.

August

More stakeholders regarded August as less suitable than those stakeholders who regarded August as good timing in terms of the NSW. **August is regarded as less suitable** for the following reasons:

- August is a problematic month in the country because of worker's industrial action period of mass demonstrations and interruption of public institutions, including schools.

- August is a critical term of the school year where learners and teachers want to focus on finishing the curriculum. It is too close to the end of the school year and preparation for Grade 12 exams.

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[57] The chapter responds to the TOR section 4.2.11.

- Because Grant Holders offer information on careers and bursaries early in the year, having the NSW in August is too late and too close to HEI submission dates.

- Reconciliations take place in September/October for SAASTA, hence August is less suitable.

The stakeholders who regarded August as more suitable were those Organisations that require sufficient planning time alongside their own internal activities. Students in the focus groups indicated that August provides sufficient time to organise internally before engaging in external events. They specified that by August they are finished their work and ready to revise.

| March/April |

Stakeholders regarded **March or April as less suitable** because it is too close to the beginning of the year as "*some schools are only getting started around February*" and it could clash with first term tests and school holidays.

| June/July |

A minority of stakeholders considered the option of hosting the NSW during the **winter school holidays between June and July**. In their opinion timing the NSW in the June and July holidays seems a favourable period that will engage learners during their long break and not conflict with school teaching and learning times. However, the majority of stakeholders regarded the June and July holidays as less suitable due to the challenge of accessing the maximum number of learners - this could minimise the potential outreach and impact of the NSW.

The table that follows provides an indication of the benefits and disadvantages of celebrating the NSW during the various times of the year explored by stakeholders interviewed:

Table 18: Benefits and disadvantages of celebrating the NSW at different times of the year

Timing of the NSW	Benefits	Disadvantages
May	As quoted: *"May works from a business point of view". "It should be no later than the second week as exams start at the end of May". "Sufficient time to use lessons learnt from NSW in the classroom". "No one complained when we had it during May"*	There could be a challenge in terms of Grant Holders planning sufficiently if procurement is not done well in advance
August	As quoted: *"Gives sufficient planning time to Grant Holders". "Opportunity to focus on Women during Women's Day/Month"*	As quoted: *"Interruptions due to mass industrial action/protests". "Late from a business point of view as SAASTA reconcile in September/October. August places a greater burden on finance and planning then moves to December, which is bad from a school perspective". "August is not a good time to get communities involved as there are initiation schools". "The third term is the busiest for learners and*

Timing of the NSW	Benefits	Disadvantages
		educators". "A little too late to decide on a field. You could have changed the life of a person if you could have had it earlier". "Learners and teachers focused on completing the curriculum and preparing for exams". "Too close to application submissions for bursaries and university study". "A little too late to decide on a field". "You could have changed the life of a person if you could have had it earlier". "Little time before matric exams start"
June/July (During the holidays)	As quoted: *"Parents are more available". "Maximum learner engagement". "Not limited by school activities/terms". "No conflict with teaching and learning times".*	As quoted: *"It is not controlled in terms of schools coming so there is a high likelihood of lower outreach to learners". "Availability of learners and teachers during the holidays is a challenge"*
March		As quoted: *"Could clash with tests so it would need to be before the test series". "Too close to the beginning of the year for schools to engage in external activities". "Too close to the beginning of the year for Grant Holders to plan sufficiently"*

In terms of the most suitable timing of the NSW, it seems most feasible in terms of maximised benefits and minimised disadvantages to host future NSWs within the first two weeks of May each year.

9 Branding of the NSW
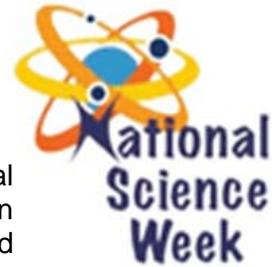
Brands are part of our daily lives and have become valuable institutional assets. Brands encompass a holistic summary of organisational reputation in the minds of stakeholders who engage with people, organisations and programmes that are associated with aspects of these brands.

With it, a brand carries the impressions of the functional and emotional benefits to be gained from engaging with it. In the context of the NSW, the brand carries the impressions and experiences of those stakeholders who attended the NSW, the brand name provided to the public science awareness programme of the DST that is implemented by SAASTA.

Because of its potential power, a critical part of the ten-year review of the NSW was to determine the contribution that branding of the NSW may have created over the years in terms of profiling and enhancing the image of DST[58]. This chapter provides a qualitative overview of the branding of NSW as well as SAASTA and DST given their relationship to this NSI. It provides a brief review of the current branding framework set for Grant Holders in the policy and guidelines available to them (Section 6.1). Section 6.2 discusses the relevance of messaging and brand elements of NSW as well as SAASTA and DST given their interrelatedness, in order to establish whether these are sufficiently differentiated. A critical base of the associations stakeholders form with regards to brands is the experiences that they attribute to them. In the case of the NSW, experiences of Learners, Students and Grant Holders are considered as they impact on the overall brand attribution. Section 6.3 outlines the NSW brand associations and experiences of the brand by those interviewed.

9.1 A consideration of policy in terms of NSW branding guidelines

The branding policy and guidelines presented to Grant Holders provides some insight into the Brand architecture of NSW. Brand architecture defines the approach to brand signage and outlines and articulates the dependency or independence of various related brands. Branding of the NSW is considered and evaluated as part of the communication and publicity strategies of Grant Holders and is outlined in the NSW project brief (2005 to 2009). The outline serves as principle applicable to the delivery of the project and stipulates that the '*branding of the project should promote and maintain good the image of the Department*'.

The branding guidelines stipulate that all promotional and educational material developed and distributed for the NSW should conform as follows: the DST logo appear at the top, SAASTA at the right corner and the logo of the organisation responsible for developing the material in the bottom left corner and the NSW logo in the bottom middle. The positioning and layout of the logos suggests that guidelines are based on relative weight or influence of the various brands namely that DST is funding the initiative and SAASTA enabling implementation rather than branding guidelines based on understanding of the relevance and influence of the brands on the identified target groups.

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[58] This chapter responds to the TOR section 4.2.15

## 9.2 Brand associations: DST, SAASTA and the NSW

In assessing the extent to which the NSW has established itself as a brand, further evaluation of the associations of NSW amongst Grant Holders, Learners and Students was done. The level of differentiation between NSW, SAASTA and DST is assessed and reported in this section.

One method of establishing whether confusion exists among target participants and organisers in terms of the role SAASTA and the DST play in the NSW is to conduct an analysis of the brand identity and personalities reflected by these brands. This evaluation enables an understanding not only of the perceived relevance that these stakeholders attribute to the various brands, but also enables the establishment of the relative alignment of these attributes with the intended brand positioning.

The brand positioning of NSW on an emotional level is to inspire engagement in SET related fields. SAASTA is positioned as enabler in the growth of the pool of quality SET learners, scientist and innovators while DST serves as the custodian of SET activities within the RSA.

In considering this section, it is important to highlight the position of Grant Holders and Learners/students as boundary partners. The diagram below illustrates that the DST relates directly to SAASTA as a boundary partner and SAASTA relates directly to Grant Holders as a boundary partner. Grant Holders relate directly to learners and students as a boundary partner. Learners and students do not interact with SAASTA or the DST during the NSW. Any associations with these two organisations are most likely to be developed through branding during the NSW.

Figure 12: The extent of contact between NSW boundary partners
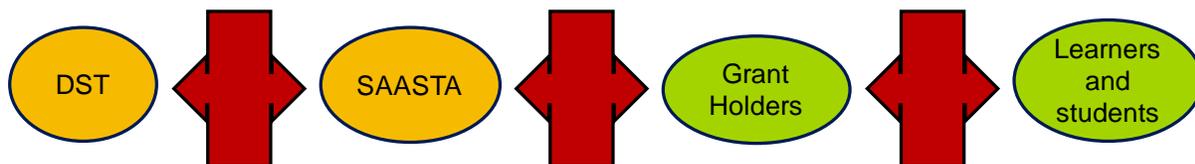
Given the relationship between the three brands (DST, SAASTA and NSW), it is critical to understand which brand had the biggest impact on decision making and drove behaviour most significantly. This understanding will assist to inform a more tailored marketing plan and guidance in terms of specific brand architecture suitable to the wide spectrum of target beneficiaries that these brands reach.

9.2.1 Learners and students as boundary partners:

Learner focus groups were sampled from urban areas and rural areas to identify how they associate with each of the brands (DST, SAASTA and the NSW). The purpose of including urban and rural beneficiaries was to establish whether differences occur in each group. It is noted that no differences occurred in terms of brand associations for urban and rural groups interviewed, however, differences did occur in terms of the brand experience of the NSW that related to language being a barrier.

Learner and student associations with the NSW:

Key brand elements that enable the NSW to function as a brand include the brand name and the logo. The descriptive nature of the brand name, which explains the activities and focus of the targeted week, enables especially learners and students to relate to the brand easily. The Logo as the creative design, projects the foundational values and meaning associated with the brand.

The NSW logo was recognised by the majority of the respondents, due to the fact that it was displayed on the T-shirts and school bags received during some of the NSW events.

According to learners of the NSW, the programme conjures up images related to:

- The processes and methods of science and technology especially experiments, problem solving and discovery;

- The products resulting from science and technology especially inventions and 'gadgets';

- The subject matter investigated by science and technology including ecosystems, constellations; and

- The skill involved in the fields of science and technology especially discovery, knowledge and hard work;

- The careers that can be pursued in the field are seen as business opportunities for the future.

From the **learner and student interviews** no direct recall of the DST and SAASTA brands were made when asked.

Although Learners and Students were able to provide associations, with the brand, that are in line with its proposition, it is interesting to note that the brand itself was reported to have little influence on their participation. The main factor influencing learners to attend the NSW was that teachers told them that they had been chosen to attend the event. They were also aware that it was only open to those who got the highest marks in maths and science and that, based on this, the teachers decided who would go. This is often the case when there is limited space for a specific workshop. Once they were told that they were chosen, they were happy to go considering that it was an outing and that they felt quite privileged to have been chosen.

From the learner and student recall as discussed in the focus groups NSW does not seem to have been promoted much within schools during the review period – learners were instead simply told they had been chosen to attend the event by teachers. Learners' parents had no involvement in the process at all. Most respondents agreed that learners know very little about NSW until they hear about it at school – they recommended that it needs to be advertised and promoted more.

It can therefore be seen that Learners and Students due to their relative proximity and interaction with NSW have a stronger association with NSW as a brand and that this was mainly based on their participation in the activities. On the positive side spontaneous associations are in line with the brand proposition, however the link between NSW and DST and SAASTA is relatively weak despite branding at sites.

9.2.2 Grant Holders as boundary partners:

Grant Holder interviews as outlined in previous chapters enabled the assessment of associations with DST and SAASTA specifically given the closeness and interaction assumed between these parties. In this section the associations and influence of especially DST and SAASTA as they relate to Grant Holders is explored.

Grant Holder associations with the DST:

A question was posed in Grant Holder interviews which required respondents to describe their main associations with DST and SAASTA. The following findings in terms of brand associations were found from the review:

- A number of Grant Holders declared that they had no associations with the DST, as quoted: "*We don't relate with them", "We don't have much dealing with them. Not at all",* and "*I really don't know much about DST*".

- A substantive number of Grant Holders contended that their main dealings with DST were through NSW as well as various other science projects. A number of these Grant Holders are part of the DST stakeholder forum by virtue of being a facility of the National Research Foundation (NRF). As a result these Grant Holders have access to information, resources, programmatic support from DST and finances from DST and in turn implement certain projects on behalf of the DST or in collaboration with the DST.

- Associations with DST were that of custodian and partner in the realisation of SET campaigns. The following quotes illustrate Grant Holder association with the DST: "*DST is a partner, one of our stakeholders where we can get information and make use of their facilities especially because we focus on science campaigns. We can also do some activities for them on request*" and "*We work very closely with DST other than NSW as we have many other programs that we run throughout the year. We enjoy the support that we receive from the DST*".

- Some Grant Holders only relate with the DST through the NSW, as quoted, "*Our relationship with them is really through events like NSW - there isn't an on-going relationship... it's mostly based on events*".

Grant Holder associations with SAASTA:

Grant Holders, in their interviews, were also required to describe their main associations with SAASTA.

The following findings in terms of brand associations were found from the review:

- The majority of the Grant Holders related with SAASTA through the NSW. They correctly associated SAASTA as the NSW project manager in charge of organising the programme implementation and managing the finances. Grant Holders view SAASTA as their link between them and the DST. Most of the Grant Holders' sentiments are echoed by the following quotes: "*We have the contract with SAASTA. We have accountability to SAASTA about programme and finances. Because we are part of NRF SAASTA oversees the science enhancement*" and "*They brought us into contact with DST. They are the link between us and DST*".

- Some Grant Holders also refer to associations with SAASTA on other projects and events such as other science outreach programmes and science quizzes.

9.3 Brand experiences and meaning

A method of determining brand experiences and parity or differentiation amongst brands, is to elicit, through the use of projective methods, a visual association of each brand to establish how target beneficiaries of a programme perceive a brand, their familiarity of the brand and their personal experience when they think about the brand (referred to as brand persona, personalised as a character or personality).

Projective elicitation was done with a sample of learners and students in two of the nine provinces where the NSW was implemented during the review period. The purpose of the elicitation was to establish the levels of recall of brand logos by learners by presenting each brand separately, using pictures of each logo as well as photos of banners and branded materials used during the NSW[59].

To enable a better understanding of the experiences and meaning of the DST, SAASTA and NSW brands, the key points of parity[60] and differentiation were explored in focus group interviews. Learner focus groups were sampled from urban areas and rural areas so that differences in the branding experience by different target beneficiaries could be identified. In terms of brand experience, there were no relevant differences identified.

A critical brand element that impacted on the brand experience of learners and students as target beneficiaries is **the language in which the brand communicates** with them. This impacted on whether learners and students perceived the activities and content as relevant to them or not. English was used as the medium of communication to those learners interviewed. This was considered problematic to some of the learners (especially those more rural beneficiaries targeted). It is noted that since 80% of activities provided by Grant Holders during the review period were from rural, semi-rural and semi urban areas that included suburbs, townships and farm areas61, the fact that the NSW is implemented in English reduces the brand experience for many of those beneficiaries targeted.

The various brands have varied levels of influence and relevance on stakeholders, which depends on their engagement with these brands.

The following was found in terms of parity and differentiation between the NSW, SAASTA and the DST as a result of the review:

- The **NSW logo** was strongly associated with the core value proposition of promoting science and technology, especially the Science Week, emphasising career guidance and information.

- The **brand persona** projected for the NSW by learners and students is the following: relatively young, intellectual, confident, hard-working, motivated and approachable (open and friendly). This brand image provides reassurance to learners and students that they are embarking on a future that is attainable, through belief in themselves and that maths and science are not difficult. Trust and respect for the brand is portrayed and it is related to as a friend.

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[59] Photos of branding that occurred during the period 2000 – 2009 were supplied by Grant Holders who were interviewed as part of this review

[60] Parity in the context of this review implies how brands are similar and relate to each other

[61] Refer to Chapter 9 for further analysis and findings in terms of areas covered by the NSW

- **Experiences that are associated with the NSW brand** are critical determinants of perceptions, associations and future expectations and engagement with SET related activities. Learners as the recipients of the information and end-target within the South African population related their experiences in various ways. Involvement in NSW activities on a functional level provided:

  o Exposure to SET careers and bursaries to pursue them;
  o Learning about endangered species and environmental protection;
  o Learning about how SET work in everyday items such as magnets and cars;
  o Seeing and experiencing experiments in physics and chemistry; and
  o Winning prizes.

  On an **emotional level** NSW created excitement, motivation and fascination, as quoted,

"It motivated us to be better and to study hard so that we can have a bright future".

Learner interviewed

- Points of parity between NSW, SAASTA and DST: **Learners perceived all three brands to be concerned with SET and its promotion**. Careers and people involved with these organisations were considered hard working and having a high self-esteem. The overarching essence is that of knowledge and a shared future focus emphasising improvement to a better future world.

Points of differentiation between NSW, SAASTA and DST:

- SAASTA and DST were relatively unfamiliar to learners. Learners and students interviewed did, however, see SAASTA as an intermediary (a mother figure) managing the relationship between NSW and DST as the authoritative father figure.

- DST was strongly associated with Government and seen as a source of funding of careers in SET.

- As a brand, the persona of the DST was perceived by learners to be much older, more serious, proud and successful in projecting a message that education is key to success.

The manner in which the NSW is branded alongside SAASTA as enabler and DST as custodian of SET activities has developed significantly over the years. NSW as a national brand serves as inspiration and engagement platform that opens interaction regarding SET related initiatives.

10 Synergy between the NSW and the National Maths Week (NMW)

The International Mathematical Union (IMU), supported by UNESCO (of which South Africa is a member country), declared the year 2000 to be World Mathematical Year (WMY2000). South Africa was actively involved in organising events to mark WMY2000 through participation from organizations such as the South African Mathematical Society (SAMS), the Association for Mathematics Education of South Africa (AMESA) and the South African Mathematics Olympiad (SAMO), with assistance from the Departments of Education and Arts, Culture, Science and technology[62].

It was from this event that the National Mathematics Week (NMW) evolved. The then minister of education prompted by the then Chairman of the IMU Committee of South Africa declared 16 – 22 October 2000 to be Mathematics Week and it became a national event henceforth.

From 2000 to 2004, in the week set aside for Mathematics, teachers and members of AMESA across all provinces were encouraged to do Mathematics activities that were fun and encouraging to learners so as to popularise Mathematics. In 2005 the first NMW national event was held at Sci-Bono in Newtown through funding from the Telkom Foundation. From 2005, a national event was held to celebrate the NMW each year, and provincial activities, also known as regional activities, were encouraged in each province.

SAMF which is a collaborative effort between AMESA and SAMS (South African Mathematics Society) was founded in 2008 and it took over professional organisation of the NMW and organised a major celebration of NMW that coincided with the launch of SAMF. The Minister of Science and Technology announced a proposal in 2008 for the NMW and NSW to be combined.

According to a SAMF stakeholder, the NMW is fashioned along the same model as NSW. A national event is hosted in one province and regional activities run in all the provinces. However, unlike NSW activities, NMW activities are not funded by Government. Funding is sourced from private organisations and as such funding is not always adequate. A funding shortfall exists to cover human resource capacity required to run the activities and it is also not enough to cover the actual activities in the provinces. The assertion that follows attests to this:

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[62] http://wmy2000.math.jussieu.fr/wm2000w1.pdf

"The people who organise the National Maths Week have full time jobs and organise it over and above their usual work. Funding is a problem because if we are given R500 000 we have to share it between the national event and the 9 regions. For the national event you have to bus people and fly in people so the money goes to other things other than what we would really like the money to be used for like buying resources to help the learners to get in tune with Mathematics"

AMESA president

As a response to the proposal by the former Minister to combine the two initiatives and a keen interest by the SAMF to take this forward, the TOR required that the compatibility of the two initiatives be explored, that key stakeholders' opinions for combining the two initiatives be determined and that implications of combining the two initiatives be highlighted.

Section 5.1 explores the Science, Engineering and Mathematics links in the NSW. Compatibility of the NMW and NSW is considered in Section 5.2. The implications of combining the two initiatives are identified in Section 5.3, highlighting the benefits and possible consequences of combining the two initiatives.

10.1 Science, Engineering and Mathematics links in NSW

The National Science Week (NSW) organisers highlighted the importance of profiling Mathematics in the NSW based on the understanding that "*scientific concepts are interconnected by the rules of Mathematics*" therefore making mathematics a language of science. Science cannot exist without Mathematics while on the other hand Mathematics gets its context from Science. The link between Mathematics and Science is undeniable, as most stakeholders who were interviewed noted:

"The people we want to attract into science career paths cannot go there without Maths. Maths is equally important if not much more important because if you have done Maths you can be able to do other things but if you have done science without Maths there is very little you can do" (AMESA stakeholder)

"There can never be science without maths" (DST stakeholder)

Table 19 shows activities that are classified as Mathematical, Engineering or Technology activities that were showcased in each province over the whole week in 2009. It is noted that Science activities are not listed as the majority (over 75%) of activities were that of science.

A look at the activities provided in 2009 shows that NSW included a few Mathematical, technological and engineering activities in its week.

Table 19: *Mathematics, Engineering and Technology activities featured in the 2009 NSW*[63]

Province	Mathematics	Engineering	Technology
		• Careers SET: Meet a Chemical Engineer, Civil Engineer, Medical Doctor and a Pharmacist. • SET Educational Tours to: Sewage plant, water management and recycling plant, Eskom substation, Tshikondeni coal mine, air force base, Coca-Cola Company and Nadoni water reticulation.	• **Careers SET**: Meet a chemical engineer, civil engineer, medical doctor and a pharmacist. • **SET Educational Tours** to: Sewage plant; water management and recycling plant; Eskom sub-station; Tshikondeni coal mine; Air force base; Coca-Cola company & Nandoni water reticulation
Gauteng	• Workshops on: Rates of reactions; Electricity; Fun with polymers; Fun with **Mathematics** and SET exhibitions	• Workshops on: Statistics, **Genetic Engineering**, Chemical Pathology, Development of drugs from plants, water purification, DNA extraction, cell Chemistry, etc.	-
North West	-	-	• Workshops on **computer literacy**, and a visit to Fab lab and Madibeng water system
Mpumalanga	• **Mathematics** and Science Quiz competition	• Rocket launch and activities on HIV awareness, science shows and **exposure to role models in SET**. • Educational tours to: Airport, SA weather services, Thekwane Lemon farm, Agricultural Research Council, SAPPI Craft Mill, Coca-Cola and **TUT Faculty of Engineering** • Career exhibit by the University of Pretoria focusing on **Engineering (Chemical & Civil)** and Veterinarian Science.	• Rocket launch and activities on HIV awareness, science shows and **exposure to role models in SET**.

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63 http://www.saasta.ac.za/images/pdfs/nsw2009_programme_highlights.pdf

Province	Mathematics	Engineering	Technology
Kwa Zulu Natal	• **Maths** 20 competition semi-finals and finals	• System and also a presentation on careers in Astronomy, **Engineering**, Computer Science and System Development	• System and also a presentation on careers in Astronomy, Engineering, **Computer science and System Development**
Eastern Cape		• **SET Careers Day**	• **SET Careers Day**
Free State	• Workshops on: **Family Maths** and Family Science	• Open day: visits to **Engineering faculty, Civil Engineering, Mechanical engineering**, Information Technology and FABLAB • Career exhibitions on **Engineering: Electrical; Civil and Mechanical** • **Meet SET role models**: Physiotherapist; Medical Doctor; Engineer; etc.	• Open day: visits to Engineering faculty, Civil Engineering, Mechanical Engineering, **Information Technology** and FABLAB • **Meet SET role models**: Physiotherapist; Medical Doctor; Engineer; etc.
Northern Cape	• Competitions: Tangram ; Trebuchet; and **Mathematical relay**	• Exhibits on the following sectors: Mining; **Engineering**; Agriculture, and Medicine. • Meet scientist: Town planner; Architect; **Mechanical Engineer, Electrical Engineer; Civil Engineer** and Physiotherapist	-
Western Cape	• Presentation on: Role played by **Mathematics** in Physical Sciences, teaching and learning	-	-

From the Table it can be seen that all provinces, except the North West and the Western Cape, each featured at least one Engineering activity. Gauteng, Northern Cape and Western Cape are the three provinces that did not feature any technological events.

An attempt by the NSW to involve technology, engineering and mathematics activities confirms the importance of the connection to science that the three have. Interviews with various stakeholders (AMESA, SAASTA, and SAMF) indicated that the NSW had funded Mathematics activities. This shows that the link between Mathematics and Science is an important one realised by SAASTA in the NSW and also by SAMF as seen in their proposal to combine NMW and NSW.

10.2 The compatibility of the objectives of National Mathematics Week and the National Science Week

The section below is a compilation of the NMW and NSW objectives and an analysis of their compatibility.

NSW objectives

The NSW objectives listed below were compiled using information from the SAASTA website http://www.saasta.ac.za , responses from high level interviews with SAASTA and DST staff and the NSW Project brief of 2005 – 2009.

- To excite our youth with Science at an early age and to encourage them to develop an interest in studying Mathematics and Science subjects;
- To create awareness of the important role Science plays in people's daily lives;
- To create awareness amongst those sectors of society bearing an influence on the subject and career choices of learners;
- To contribute to the development of a society which values and appreciates Science, Engineering & Technology (SET);
- To provide a platform for scientists to engage each other and also to engage with the non-scientific community;
- To promote partnership between media and scientists;
- To profile the work of the DST and its priorities; and
- To attract learners to SET career(s) (including research).

NMW objectives

The NMW objectives below were put together by compiling responses from interviews with members of AMESA, SANCIMU and SAMF who are active in the organization of the NMW and from the SAMF website http://www.samf.ac.za

- To celebrate Mathematics;
- To highlight the beauty, utility and applicability of Mathematics;
- To dispel the myth that this subject is difficult, abstract, and only accessible to a few;
- To popularize Mathematics, to increase public awareness, understanding and appreciation of Mathematics;
- To create an opportunity for learners, parents, educators and the general public to share the excitement of Mathematics together;
- To provide information and guidance on careers in Mathematics;

- To highlight the importance of Mathematics in society;
- Showcasing Mathematics as important in the science field;
- To contribute towards professional development of Mathematics educators in South African; and
- To promote the advancement of the Mathematics in South Africa.

From the above it is clear that the objectives of the NSW and the NMW have a common purpose. Both initiatives aim to popularise, promote and raise public awareness of their subject matter, in this case Mathematics for NMW and Science for NSW. They also share a similar objective of attracting and providing career guidance to Mathematics careers for NMW and Science, Engineering and Technology careers for NSW. The discussion above on the link between Science, Technology, Engineering and Mathematics demonstrated that both the Mathematics and the Science field are trying to attract the same learners to the same careers.

10.3 Implications of combining the two initiatives

There are benefits and detriments to combining the NMW and the NSW. The discussion below explores the benefits and detriments of combining the two initiatives.

Benefits of combining the two initiatives

"They belong together, logistically and practically"

SAMF member

- **Both NSW and NWM target the same audience**: Learners that study Mathematics and/or Science as a subject, learners interested in Science and Mathematics careers, educators who teach Mathematics and Science (sometimes educators who teach Mathematics also teach Science) and the general public. Combining the two initiatives means there could be less time spent out of the classroom attending these events.

- **The NSW emphasises the link between Mathematics and Science**: Learners and Educators are exposed to the link between Mathematics and Science at the NSW, since facilitators highlight the importance of learners choosing pure Mathematics and not Mathematics literacy to study in a SET direction when providing career guidance.

- The **NMW can benefit from existing NSW structures** and in the process, there is no duplication of roles and less manpower is used for both initiatives: SAASTA has an efficient organisational structure in place that organises and runs the NSW. In return, the NSW would be enriched by Mathematics activities and content provided by those key Mathematics stakeholders regarded as leading role-players in the Mathematics field in South Africa.

- The NMW has **built relationships with private companies who provide and have provided funding** to running the NMW over the years. Combining the two initiatives

would bring on board additional partnerships that would not be brought on board should the NMW remain a programme isolated from the NSW.

Negative consequences of combining the two initiatives

- **Mathematics might be overshadowed** and not get as much exposure as part of the NSW as it currently does on its own.

- One Mathematics stakeholder asserted that **having the initiatives over the same week might be enough** and not necessarily having them together. In view of the fact that NMW and NSW are already running, there is a sense that there are enough activities for Mathematics and for Science to have their own week. Combining the two might mean a reduction of activities for both initiatives in order to accommodate one another.

- **There are complications of merging a government driven initiative with an NGO-driven initiative**: The NSW is a government initiative that has objectives related to policy positions of the DST with political connotations whereas the NMW is an NGO initiative driven by SAMF a Section 21 Non-Profit Organization (NPO). The proposal presented by NMW organizers suggested a merger of the two initiatives on an equal footing. However, this is not feasible given the nature of both entities being on an unequal footing. Furthermore, it is not feasible given that the NMW's budget is around half a million, compared to a NSW budget of around R12 million. It is more feasible to encourage a partnership between the NSW and the NMW with the Minister celebrating and acknowledging both initiatives at the national launch.

10.3.1 Guidelines for combining the two initiatives

Following on from the proposal by the minister of Science and Technology in 2008 to combine the two initiatives, meetings have been held by all concerned stakeholders on how to combine the two initiatives. From these meetings SAMF developed TOR on the Merger between the National Science Week and the National Mathematics Week. However, as a result of this review, it is recommended that rather than merging the two initiatives, the events should coincide. NMW stakeholders would be responsible for providing Mathematics activities as part of a combination of STEMI activities presented at sites during the week. SAMF would be recognised as a partner supporting the NSW.

One way to sustain independence is in the inclusion of Mathematics in the re-naming of the NSW. SAMF propose the name to be *National STEMI Week*. The acronym STEMI refers to **S**cience, **T**echnology, **E**ngineering, **M**athematics and **I**nnovation. The proposed name ties in with the discussion above that endorses the link between Science, Technology, Engineering, Mathematics and Innovation. The need to substantiate this link cannot be underscored. Stakeholders involved in NMW and NSW have identified the link and its importance in pursuing STEM careers. To create awareness in the minds of target beneficiaries that Maths is part of Science, the brand identity of the NSW should be reconsidered. Globally, STEMI is a recognised term and if the NSW is looking to move towards next practice, the term STEMI may be more appropriate as it is all-encompassing.

It is important to look into these concerns and ensure that everyone is in agreement with the way forward. In an interview with a stakeholder from SAMF it came up that SAMF valued its independence.

11 Assessing value for money

Since the DST is the major funder of the NSW, it is appropriate to determine whether there is a return on investment in terms of what the Department has spent on various aspects of the initiative. The TOR requested that value for money be considered for the following five aspects of the NSW[64]:

- National Launch events;
- Communication and Publicity;
- Grants awarded to organisers;
- Materials distributed to some of the target participants; and
- Management and related fees payable to SAASTA, the National Implementing Agency.

Figure 13 illustrates the total costs for the NSW across the sample years where data was available. It is noted that data on costs was not available for 2003.

Figure 13: Total NSW Costs for 2005, 2007, 2009

Total NSW Costs for Sampled Years

	2005	2007	2009
	R 5,621,069.00	R 6,830,386.00	R 9,991,119.00
		+18%	+31%
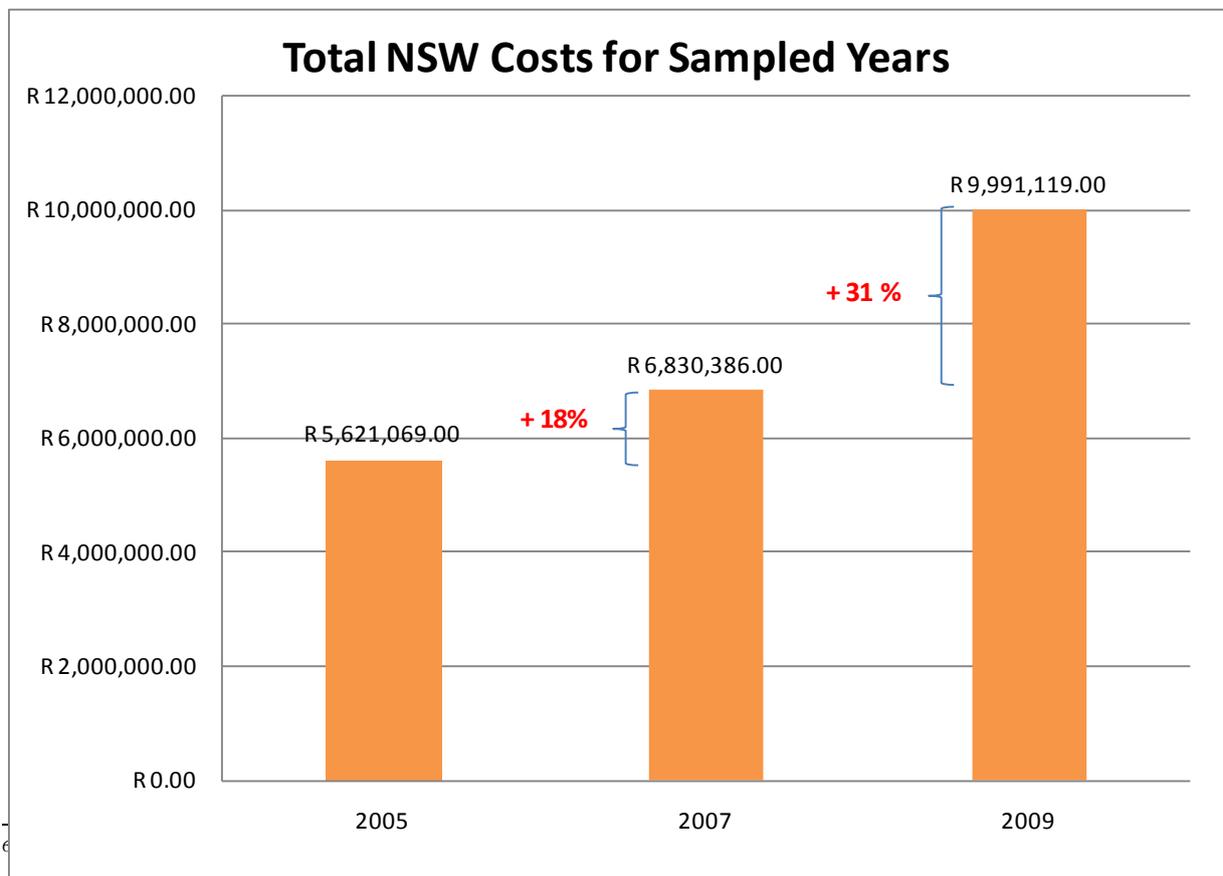
The overall NSW costs increased from R5.62 million in 2005 to R9.99 million in 2009, representing a 43% increase in total costs over the four year period.

Financial Statements provided various line items that were grouped according to the aspects that the TOR requested to be assessed in terms of value for money. Table 20 provides a breakdown of costs over the three sampled years to provide an indication of trends over time. The following Table provides the NSW costs by line item for 2005, 2007 and 2009.

Table 20: NSW costs by line item for 2005, 2007 and 2009

Item	2005	2007	2009
Communication and Publicity: (Advertising and Marketing; Communication and Courier)	R 157,098.00	R 1,211,469.00	R 2,424,003.00
Materials distributed: (Educational Materials)			R 603,101.00
Grants awarded to Organisers: (Grants and Fees)	R 3,206,245.00 (46 Grant Holders)	R 4,312,024.00 (46 Grant Holders)	R 4,959,798.00 (82 Grant Holders)
Management and related fees (Project Management; Conferences/Workshops; Refreshments; Printing and Stationary; Travel, Subsistence, and Grant Holder Meetings; Honoraria, Fees for Services, Salaries; other)	R 2,257,7246.00	R 1,306,892.00	R 2,004,216.00

Figures presented show the following:

- There was a significant increase in communication and publicity over time;

- Materials were only distributed from 2009 onwards;

- Grants awarded to organisers increased steadily from 2005 to 2009. Although the number of Grant Holders remained constant (n=46) between 2005 and 2007, the grant amount increased from an average of R69,701 across Grant Holders in 2005 to an average of R93,740 across Grant Holders in 2007. The amount decreased significantly in 2009 to an average of R60,485 received across Grant Holders (despite inflation from 3% in January 2005 to 8.1% in January 2009).

- Management and related fees decreased from 2005 to 2007 and increased in 2009 but the amount was still lower for 2009 than for 2005. Although not discernable from the graph, in some years where the programme under spent (i.e. costs were less than the income received), funding was rolled over to the following year[65].

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[65] According to the SAASTA financial team, the unspent balances or "carried forwards" were not always tracked as separate line. Any amount unspent was deducted from the total expenditure, and reversed against the New Year's NSW budget. As such is not possible to easily determine the amount of unspent funds per year.

11.1 Value for money: National Launch events

Expenses for National Launches are covered by DST directly and are not tracked by SAASTA (as seen by the omission of costs in Table 20). Given the limitations of the financial data, the discussion of value for money is based on findings from interviews with various NSW stakeholders.

National Launch events, lead jointly by DST and SAASTA, are held each year in a designated province and serve as an official commencement to the NSW. National Launch events were hosted by the Minister or Deputy Minister for Science and Technology. The events were attended by 1,500 to 3,500 political officials, learners and educators in 2007 and 2009 respectively and included organisational exhibitions.

The following factors were identified as enhancing value for money relating to National Launch events:

- **Strong political support**: The launch events reportedly demonstrated strong political support for the initiative- the Minister was present at each National Launch to open the NSW and demonstrated her support for the NSW. The National Launch events were valuable because they provided an opportunity for political officials to speak in support of NSW.

- **Enhancing cooperative governance**: Provincial Department of Education MEC's are present on the day as partners in the National Launch.

- **Publicity through media coverage**: More than half of the Grant Holders interviewed believed that the National Launch events are **good value for the money invested, mostly because of the publicity and media coverage that the event brings to the NSW**. There is a lot of profiling of the National Launch: a slot in Morning Live, TV News, radio stations broadcasting the event. Stakeholders indicated up to 30 radio stations being present on the day of the Launch to broadcast the event.

The key factor identified by a quarter of the Grant Holders, DST and SAASTA stakeholders interviewed as inhibiting value for money, relating to National Launch events, is that the events were too political and shifted the focus away promoting SET to politics. A politically focused event was believed to be inappropriate given the large number of learners attending.

Although most learners and students interviewed during this review did not attend a National Launch event and knew little about it, those learners (only one group in Pretoria) who did attend indicated that the event was motivational, especially for young women:

"The minister encouraged us women to empower ourselves and go into the field of science and engineering because there is a lack of women in these fields. She talked to us like a mother encouraging her daughters"

"It was exciting having the minister of science and technology talking to us and I kept thinking that I am going to work hard to make her proud of me. We were so motivated and excited with lots of energy, ready to go back to class and improve our standard"

Learners indicated two key factors that could enhance the value of the National Launch events in future:

- Providing learners with **more time to ask the Minister questions about how she got to be in this high position**; and

- Be inclusive in the approach – **male learners would have liked young men to be included and profiled more at the event**.

Findings from learners clearly suggest that there is great value in having them attend National Launch events. Logistically, value is increased when learners do not spend a few hours travelling to the venue to experience the event.

All stakeholder groups interviewed agreed that while the National Launch is an important expenditure from a political point of view, **it does represent as much value for money with respect to the impact on those targeted as quality activities filled with educational content on SET that are reaching more people**.

Recommendations made by stakeholders to increase value for money for National Launch events in future, include the following:

- **Host National Launch events at HEIs**: This could save money and is an appropriate venue for such an event. Learners bussed in for the event could go to activities on the day that would be hosted during the NSW. Attending activities would be more beneficial to learners than sitting for hours listening to various speeches.

- **Combine National Launch events with NSW activities at the site that would continue for the week**: To increase value for money for the National Launch events, stakeholders suggested that learners and those attending the launch would benefit from experiencing NSW activities. The Minister proposed having a day set aside to experience the NSW before the actual launch.

- **Reduce 30 second advertisements on prime-time television**: It is valuable to have news channels communicate the National Launch and the NSW but stakeholders are of the opinion that advertisements costing a lot of money could be eliminated and money could be shifted to other budget line items that would provide greater value to enhancing the NSW.

11.2 Value for money: Communication and publicity

From 2005 to 2009, NSW expenditures for communications and publicity (also referred to as advertising and marketing) increased dramatically, as evidenced in Figure 14.

Figure 14: An illustration of NSW coverage against costs for sampled years (2005, 2007 and 2009)
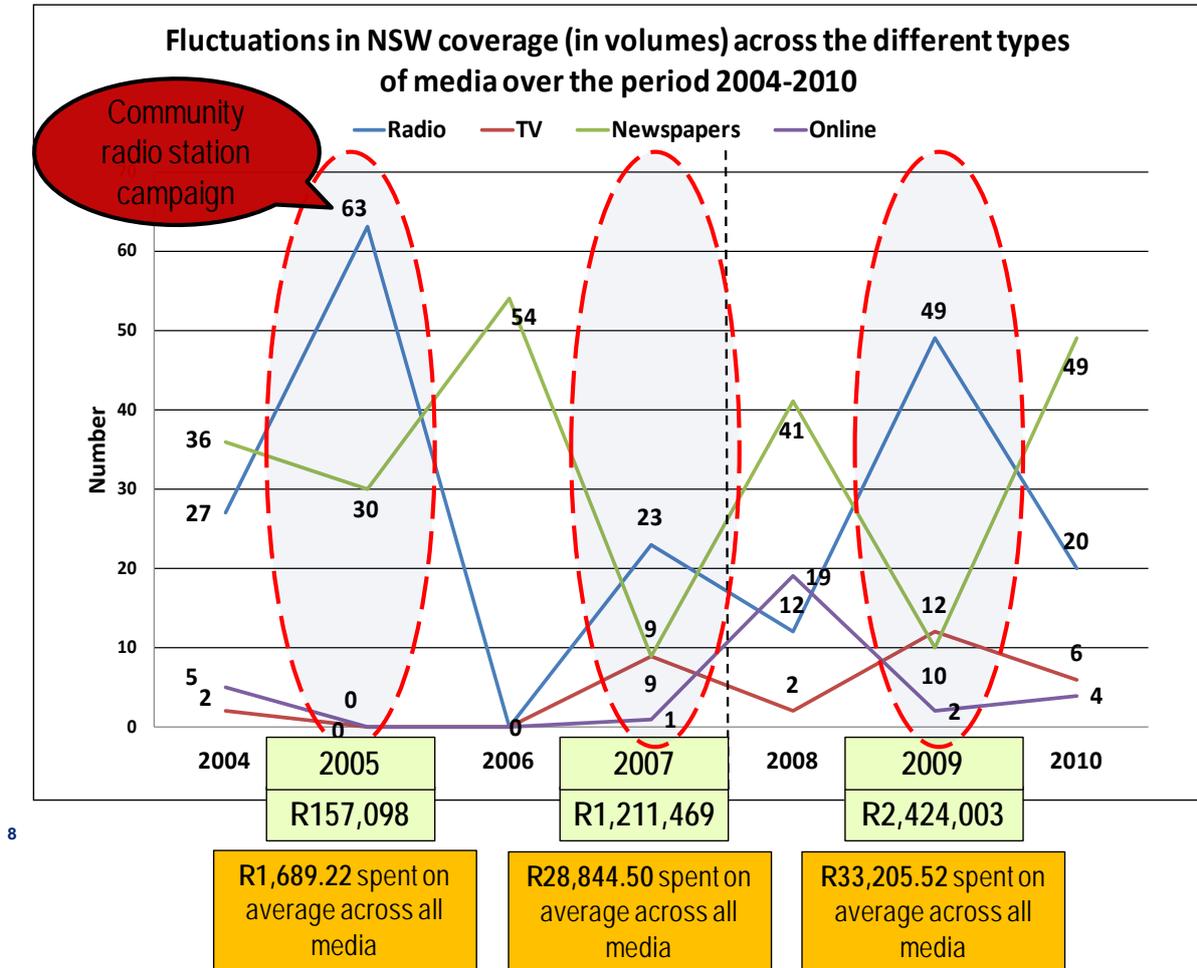
Analysing the costs associated for 2005, 2007 and 2009 against coverage from secondary data sources, it is evident that the greatest value for money was in 2005 when a community radio station campaign was run, reaching 63 radio slots and 30 articles published. Although the budget increased more than seven fold from 2005 to 2007, radio broadcasting decreased from 63 slots in 2005 to 23 slots in 2007. Articles published decreased from 30 in 2005 to 9 articles published in 2007. There was an increase from no television slots in 2005 to 9 television slots in 2007 and 12 television slots in 2009. It is clear that **the use of television as a medium to communicate the NSW significantly increased the budget for communication and publicity**. What could not be determined from the review due to the lack of data found within documentation provided was the impact that television coverage had in terms of circulation (numbers reached) to the targeted beneficiaries.

What is necessary before committing almost a quarter of the total NSW budget to communication and publicity as was done in 2009, is an analysis of what types of media is most effective in terms of value for money, for each target group of beneficiaries defined.

Should such an analysis provide evidence that radio is just as effective in bringing across a message to youth as television, then the communication and publicity budget clearly does not demonstrate value for money.

On the contrary, with figures available that may demonstrate reach to significantly more youth through television than through radio, a cost benefit analysis could be done to calculate a cost per person to determine value for money, as was done to determine the cost per person over the years for the total NSW budget.

It is worthwhile noting that when learners were asked where they heard about the NSW, the following types of media were cited:

- Television was cited four times (SABC2 - HIPSB2; and SABC News);

- Print media was cited twice (science magazine and the Sunday Times);

- On-line media was cited once (MIXIT); and

- Radio was cited once (Radio Capricorn).

Given the importance of promotions to the success of NSW, some stakeholders recommended that the NSW attempt to leverage more publicity without increasing spending. Stakeholders interviewed indicated that avenues should be explored where the National Science Week and SET information can be published or broadcast without spending significant amounts of money.

Journalists interviewed during the review indicated that **a hindrance to voluntary reporting is the lack of interesting content**. **The NSW has not created or sustained a pool of interested journalists that voluntarily report on the event**.

The following factors recommended as an outcome of the review, could increase value for money spent on communications and publicity:

- **Provision of interesting, new and exciting content early**: Journalists suggested that interesting content that will be presented at the NSW be communicated early to them (one to two months before the NSW) so that they can produce editorials and broadcast a number of weeks before the actual event, providing citizens with insights into the interesting aspects that would be showcased during the NSW.

- **Build and sustain relationships with journalists and reporters**: Irrespective of the budget, future media activities should emphasise the importance of **active marketing amongst journalists across all types of media with the aim of increasing editorials and broadcasting slots** to increase voluntary reporting. There is an opportunity to leverage more reporting by developing relationships with journalists, editors and executive producers and growing their interest and desire to publish and broadcast science content.

- **Collaboratively plan and work with journalists with the aim of increasing media coverage on the NSW**: Key content for the NSW should be identified in a collaborative manner between the DST and journalists.

- **Determine which types of media are most effective**: It is necessary to determine the types of media that are most effective for each type of stakeholder group.

- **Link the NSW to other events**: Linking the NSW to other events and flagship projects during the 2011 NSW gained the interest of journalists.

11.3 Value for money: Grants awarded to organisers

As part of the NSW, SAASTA provides grant awards to organisers to implement various activities and events during NSW. These grants awards represent the largest portion of NSW costs annually.

Value for money relating to NSW grants awarded was explored using data and information from Grant Holder site reports, NSW Annual Reports, financial statements, and interviews with stakeholders.

A cost analysis was done to determine a cost 'per person' for 2005, 2007 and 2009, based on data that was available in documentation reviewed. The following costs 'per person' can be extrapolated from the data:

Table 21: Cost per person over the NSW sample years (2005, 2007 and 2009)

Calculation	2005	2007	2009
Number of citizens reached[66]	172,895	175,905	204,174
Grants and fees / number of citizens reached	R18.54	R24.51	R24.29

Table 21 shows that the cost per person for 2009 is lower than for 2007. Findings across stakeholders interviewed, including the Minister and learners, indicate that venues were cramped. Too many learners in venues that cannot fully accommodate the numbers may have impacted on the decrease in cost per learner. Another factor is the dis-proportionate increase in grants awarded over the period, implying that more money should have been set aside and provided to Grant Holders.

It would be worthwhile to determine what the cost per person should be for quality activities that provide the ability for participants to see demonstrations and exhibitions and hear the key messages through activities in a **venue that is not too crowded and too loud**, since these factors were seen as reducing the value for money of activities at sites during the NSW.

Grants are considered the most important expenditure in terms of value for money due to their impact in targeting beneficiaries of the NSW. **All stakeholders interviewed reported that grant awards are good value for money**. The following factors enhanced the value for money of grants awarded to organisers of the NSW:

- **Additional funding leveraged because of grants awarded**: There is no existing report template for organisations that come on board with their own funding to implement NSW activities, which limits the data on the amount of funding that these organisations have contributed to the NSW as a whole. Nevertheless, the Grant Holder database captured through analysis of Grant Holder documentation over sampled years (2003, 2005, 2007 and 2009) highlights various additional resources that were leveraged by Grant Holders. These are presented in Table 22.

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[66] Data for the number of citizens reached was extracted from Annual Report documentation

Table 22: Type of resources leveraged in addition to grants awarded

| Types of Resources/sponsorships	Number of Sponsors				
	2003	**2005**	**2007**	**2009**	**All**
Cash	4	0	8	1	13
Catering (refreshments)	1	1	3	5	10
Professional Time	0	0	5	0	5
Transportation	6	0	7	2	15
Venue Hire	2	0	2	1	5
Educational/ Career Supplies	3	1	5	4	13
Technical/Admin Supplies	1	0	8	6	15
Prizes	1	0	7	0	8
Promotional Material	3	0	1	1	5
Workshops/Events	1	0	2	0	3
Other	0	0	1	1	2
Total	**22**	**2**	**49**	**21**	**94**

Although the number of sponsors fluctuated over time, it is clear that some Grant Holders have successfully leveraged a variety of additional resources through sponsorships. Data available for sponsorships secured for the four sampled years is equivalent to more than R1.6 million. This indicates that **Grant Holders have the capacity to leverage other funding to support their NSW activities, thereby increasing the value of the programme**.

- **Reach to target beneficiaries**: Grants awarded for NSW activities during the review period, along with support from provincial Departments of Education to access schools, are the key reason for outreach across the country. If it was not for grants, there would be no NSW, since the implementation model focused on a grant funding mechanism to provide activities. Figure 15 presents an analysis of grant amounts awarded against the number of NSW participants for the sampled years. Findings suggest that there was a significant increase in the number of participants between 2007 and 2009.

Factors that hindered value for money for the outreach of activities with quality content were the following:

- **The implementation approach (predominantly a grant-funding mechanism)**: Concerns were raised about the content of the NSW being compromised by the administratively heavy process created by the grant-making mechanism. As stated, "*SAASTA have so many organisations receiving money for the NSW and they spend so much time on administrative processes that they lose sight of the importance of the content*".

Figure 15: Grant Awards Costs and NSW Participation for Sample Years
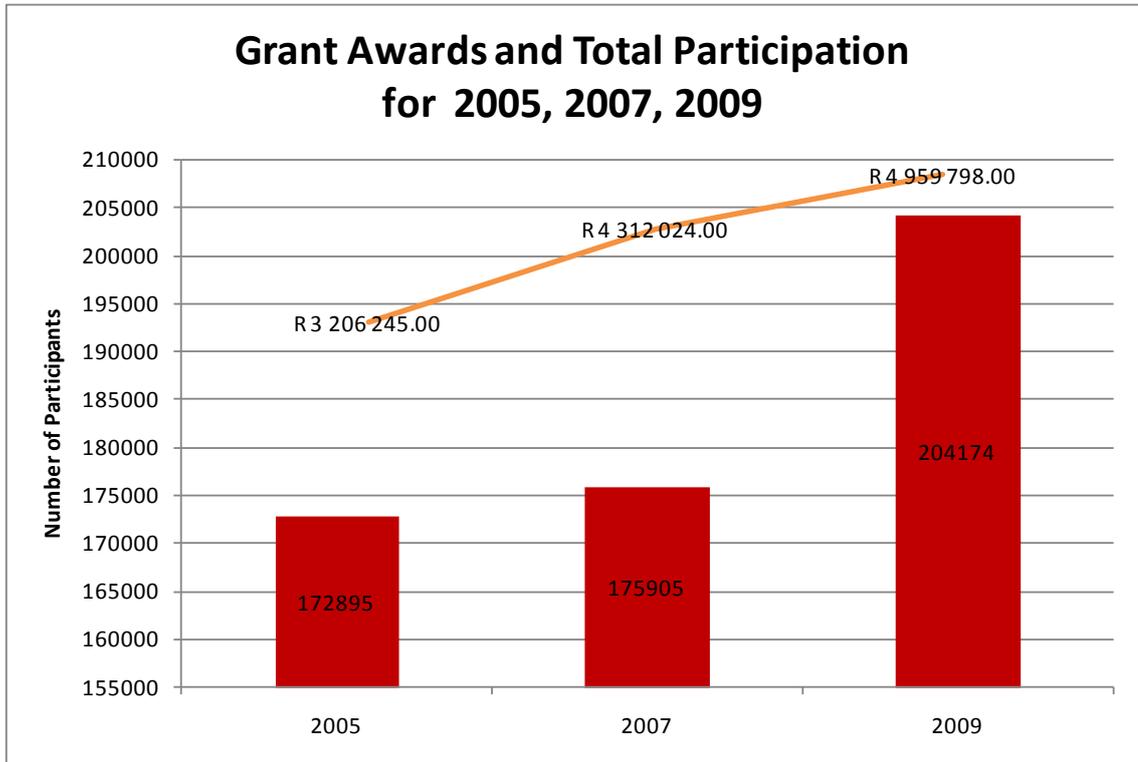
- **Partnering, marketing and leveraging** were three themes identified for ensuring the success of the most ideal NSW. Stakeholders interviewed indicated that more organisations should come on board and participate in the NSW. A marketing drive to build relations with organisations across the country could significantly enhance the NSW.

- **Plan and engage early**: Stakeholders indicated that organisation occurs late. Particularly within the DST, this implies Units who become involved must rush in to fill a space. It is highly recommended that all stakeholders who could possibly be involved in the NSW should be engaged early in the planning process.

- **Silo syndrome**: It is evident from engaging with the DST and SAASTA that content expertise exists across both organisations. Due to lack of collaboration and coordination amongst units, the NSW has lost many opportunities to present cutting edge activities across SET. All stakeholders emphasised the importance of collaboration through sharing content that can enhance the NSW.

11.4 Value for money: Materials distributed to target participants

NSW Annual Reports indicate that two types of materials are distributed during NSW—promotional and educational materials. Costs data for educational materials distributed was available for only one of the sample years. According to financial statements, R603, 101.00 was spent in 2009 on distribution of educational materials during NSW. Table 23 summarises the materials distributed from 2006 to 2009.

Table 23: *Number of Educational Materials Distributed Over Time*

Type of Educational Material	2006	2007	2008	2009	All Years
Posters		49950	2680	217700	270330
Storybooks				300	300
Booklets	28000	40000	33400	100000	201400
Games				2000	2000
Career Cards set				5000	5000
A4 Sheet printed both sides				200000	200000
IKS Policy Documents			20000		20000
CD				1000	1000
Brochures		190000			190000
Periodic Tables		180000			180000
Total	**28000**	**459950**	**56080**	**526000**	**1070030**

Table 24 describes the distribution of promotional materials from 2006 to 2009.

Table 24: *Number of Promotional Materials Distributed Across the Years*

Type of Promotional Material	2006	2007	2008	2009	All Years
T-shirts	3000	8300	12200	7500	31000
Golf shirts	400	500	600	800	2300
Posters	10000	10000			20000
Empty Belly Posters		100000	10000	10000	120000
Lanyards			5000		5000
Rulers			600		600
Banners			3		3
Foam Peaks				600	600
Water Bottles				1770	1770
Total	**13400**	**118800**	**28403**	**20670**	**181273**

Numbers collated indicate that 1,070,030 educational materials and 181,273 promotional materials were distributed through the NSW. However, it is not known if all of these materials actually reached intended beneficiaries. As one Grant Holder noted,

"You can hand out materials but cannot monitor if they are utilised. Until such time that there is a proper monitoring system we will not know if it is a waste"

Learners and students interviewed recalled receiving periodic tables, T-shirts with the NSW logo on them, school bags, pens (branded with different institutions and company logos; example the University of Pretoria), stationary, career pamphlets, key rings, prizes from the science quizzes and books.

Learners found the following most valuable:

- The career pamphlets, because they were very informative and they could keep for a long time;

- The bursary and University application and information forms; and
- The branded T-shirt with NSW and Young women in Science logo.

There is evidence that suggests the educational and promotional materials provided by DST and SAASTA are informative resources that can be used by beneficiaries beyond NSW. Half of the Grant Holders interviewed believed the **materials distributed** were good value for money because they **provide useful information and reference material for learners and educators**, especially information related to careers; and they are made available to schools to be used as resources by all learners and educators beyond NSW.

However, other findings indicate that the materials and not as valuable as they could be. The following factors were identified that hindered value for money in terms of promotional and educational materials:

- **Language barrier**: materials distributed to target participants have been published in English only.

  Although language is considered a barrier, considering translation of materials into the eleven official languages will significantly increase this budget line item and may not be justified, given value for money that could be leveraged by spending on other budget line items.

- **Late arrival of materials**: Grant Holders indicated that materials often arrived late from SAASTA making it impossible to use them during the NSW focus weeks.

- **Not all material is appropriate for those targeted**: Grant Holders indicated that materials were not always appropriate for the broad range of NSW groups targeted (i.e. unappealing to learners or young people; limited to certain grade levels, etc.).

11.5 Value for money: Management and related fees payable to national implementing agency

SAASTA are responsible for coordination, management, and implementation of all facets of the NSW. With support from DST, SAASTA manages the call for proposals, awards and disburses grant funds (i.e. financial control), facilitates evaluation, convenes Grant Holders and service providers and provides training and technical assistance on SET and the objectives of NSW.

SAASTA maintains communication with the DST through regular meetings, phone conferences, and via e-mail. In 2007, SAASTA recommended the matrix management approach be reviewed to address delays in decision-making/approvals. The recommendation was accepted in 2009, resulting in the establishment of a new communications channel between SAASTA and DST; project managers within both organisations are now the main points of contact. This new approach to communication has reportedly improved turnaround time and the overall management of the initiative.

The value of SAASTA's role extends beyond duties as project management of NSW. According to several Grant Holders, **SAASTA has played a key role in developing people in organisations and expanding their networks.**

Capacity has been built in several areas, including project management (i.e., planning and coordinating large scale activities/events), proposal writing, and financial management. Involvement in NSW has also provided Grant Holders more exposure as organisations that promote SET and in turn exposed them to like-minded groups. A small number of interview participants indicated that their involvement as a Grant Holders had led to professional growth for themselves and other key staff. The appreciation of the relationship with SAASTA and the impact made by SAASTA on Grant Holders is echoed in the following quotes:

"We've been encouraged to target historically disadvantaged groups… it allows people who would not have those opportunities to get the experience. We also target the same types of groups to get things done in our organization. I'm targeting young Zulus. So for that to work I need to use young Zulus as communicators. They are not necessarily senior staff but it gives them the opportunity to grow and be trained. I think it contributes to their personal development. We have had a couple of staff promoted as a result of their work on NSW."

"The relationship between me and SAASTA is excellent. They are the ones that give me the courage and strength to be where I am with the project. They are encouraging….they are holding me by the hand and providing guidance."

The following factor was identified as a hindrance to value for money for management and related fees payable to SAASTA:

- **Lack of clarity on how management fees are spent**: There was some concern with the fact that SAASTA has been unable to explain how the management fee is spent, as temporary staff and many other costs are carried by other areas of the NSW budget.

Stakeholders indicated that the budget could be optimised by consolidating all public awareness programmes of the DST under one platform. Although the Minister agreed that duplication must be avoided, she recommended that rather than consolidation, units across the DST and SAASTA must **collaborate to coordinate efforts in a coherent manner**. The programme would be enhanced if both DST and SAASTA units collaborate more and take ownership of the NSW, bringing together expertise from each unit with content to enhance the programme, the NSW would become a best practice public awareness programme.

12 Next thinking, next practice
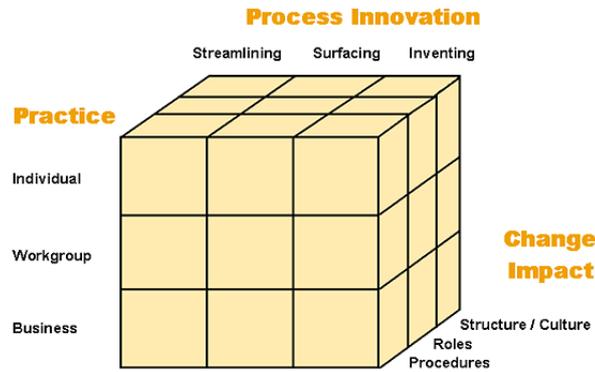
"It's about experiencing what works and what doesn't and asking the question - what works better?"

Beverley Damonse, Executive Director, SAASTA,

October 2011

This review assessed the impact of the NSW over the ten-year period (2000 to 2009), as well as its formative (improvement) and process (implementation and operation) aspects. To start the process of thinking about how to use the findings of the review to inform the next cycle of the NSW, this chapter presents a view of what a next practice NSW looks like. The chapter is intended to guide the strategic direction of the NSW in its next cycle. The recommendations provided should be workshopped further at a senior level within the DST and SAASTA to determine what is most feasible in taking forward the NSW.

Section 12.1 provides an understanding of what is meant by next practice. In Section 12.2 a next practice NSW is considered based on the collective of findings throughout the report, some recommendations provided by DST leadership and other stakeholder groups interviewed as well as next practice thinking.

12.1 The theory behind next practice

Wikipedia explains the term 'next practice' as those practices and processes that go beyond best practice. These next practices and processes are used to take the organisation to the next level in some point in the future. The interesting point about next practice is that its' future focus represents an almost continuous state of improvement. CK Prahalad, the influential thinker on management practices, developed the concept of next practice, and refers to it as "innovate the innovation process itself". He encourages lateral thinking, and aims to break mental frameworks and blockages by questioning the norm. CK Prahalad developed the concept of next practice to support organisations in striving for the next best thing.

"Organisations become winners by spotting big opportunities and inventing next practices … Next practices are all about innovation: imagining what the future will look like; identifying the mega-opportunities that will arise; and building capabilities to capitalise on them."

CK Prahalad (Harvard Business Review) April 2010

There are a number of key elements to bear in mind when looking at next practice. Next practice takes a future-orientated view, whilst being highly adaptive. It is also important to note that next practice is a future state of where organisations want to get to, and innovation plays a critical role in securing the next practices of a forward-thinking organisation. Next practice allows the dots to be connected by exploring weak spots and augmenting them into doable, highly innovative solutions in a disciplined fashion. The other interesting point about next practice is that it refers to whatever the best solution is looking forward. It is therefore a continuous strive for the best possible solution, without becoming complacent with plans and processes implemented years ago.

Next practice requires forward thinking leaders to continuously be on the lookout for the next evolved practice to put the organisation a step ahead. It is important that an organisation builds organisational capabilities that will allow the business to create the platform for uninterrupted innovation. The innovation spoken about does not refer to charismatic decisions made on issues that represent innovation, and that result in big breakthroughs, but rather refers to the changing dynamic of markets driven by abundant connectivity, technology, industry collaboration and consumer savvy drives.

Next practice is hard work. Where best practice is academically or policy generated, next practices are generated by practitioners or users who apply innovation to current best practice. It is imperative to move from best practice to next practice, as the old way of thinking and the old best practices still address old challenges, and fall short of addressing new problems that we are faced with on a daily basis. Next practice is the solution to a fast moving world, almost spinning out of control. Old thinking results in old solutions being proposed over and over again for the same problems, with the same outcomes, next practice thinking sees rigorous creativity applied in an analytical, evidence based environment.

Next practice is what any organisation wants to continuously grow and develop.

12.2 Characteristics of a next practice National Science Week

The following sections provide an indication of what a next practice NSW should look like:

12.2.1 Cooperative Government, collaboration and ownership

A next practice task team would ensure pro-active engagement, guided by a marketing strategy, with the different spheres of Government, communicating the benefit of participating in the NSW (including the benefit to market their own brand in the process through co-branding guidelines, as well as the benefit of networking and collaboration).

For those National, Provincial and Local Government stakeholders who want to collaborate and participate in the NSW, an MOU would be put in place. An Implementation Plan would be developed collaboratively with stakeholders and signed off on annually.

Some recommendations to enhance Cooperative Government include the following:

- **At National Government**: Cooperation between National Departments and the DST could be enhanced through first having a holistic understanding of DST's existing MOUs. Various DST programmes already engage with other National Government Departments through MOU's (as well as other organisations, which are not the focus here). A first step for the DST going forward could be to gain a greater understanding of these MOU's. Considering the compilation of a database of projects compiled and updated quarterly or annually that highlights the outputs of MOUs according to various themes, may be beneficial to the NSW. Such a database would also assist the DST through alignment among the various units and between the implementing agents in terms of various activities funded. Analysing such a database would provide the DST with a high-level view of which activities are well aligned in terms of maximising spend and value for money and which activities are not as well aligned (for example, possibly spending two different budgets or having two different MOUs for the same purpose).

  Ideally, the DST should instil as best practice, the requirement for organisations and National Departments whose initiatives under the auspices of their MOU's with the DST to report back on initiatives that benefit SET during the NSW. This would provide a dual purpose as follows:

  o To inform the general public and key stakeholders about cutting edge initiatives funded by the DST that benefit SET.

  o It would provide a feedback mechanism for the DST to inform them on progress in terms of outputs of MOUs.

- **At Provincial Government**: The DST has successfully brought on board Provincial Departments of Education. It may be worthwhile determining what factors improve the likelihood for partnerships between provincial departments and the DST by looking at those Provincial Departments of Education who have built the NSW as part of their annual plan. These factors may contribute to directing further marketing at provincial level.

- **At Local Government**: Consider how to link up to existing initiatives at local level. Examples for enhancing cooperative government at local level could be the following:

- To have posters or advertisements on electronic media that play within municipal offices that often have long queues of citizens who enquire, pay bills, etc. Such advertisements could be run outside the NSW and could benefit citizens through public awareness. It may even be possible to include activities that were leading or cutting edge at the annual NSW and appropriate for citizens to learn from.

- Local Government making street poles available as their contribution towards the NSW leading up to the NSW.

- Libraries including posters of the NSW and celebrating the NSW in ways they believe they can.

A next practice NSW would **identify the ways that various** National, Provincial and Local Government **institutions believe they could add most value to enhance the NSW**.

The following are some stakeholders identified as key to include as partners in the future as they are believed to guarantee quality content:

- Space: South African National Space Agency; South African Space Institute; CPUT (build satellites); and Sun Space (NGO).

- Science Councils: Agri-research council, CSIR, MRC.

- HEI's: CPUT, Cape Peninsula University of Technology.

- Biodiversity/Conservation: the South African Institute for Aquatic Biodiversity (SAIAB); South African Earth Observation Network (SAEON);

- All Science Centres

- Industry

12.2.2 Cooperation and collaboration through mobilising a task team

A coordination structure is needed

To reach next practice in South Africa, the NSW should break down the silo-syndrome by creating a task team inclusive of stakeholders from sub-programmes and units across the DST and SAASTA, as well as other stakeholders identified as key. Next practice implies identifying a network of role-players, understanding their strengths and aligning these to the focus areas of the NSW so that collaboratively, the NSW is enhanced and rises above what it could be with only a small set of stakeholders attempting to drive focus areas that they are not passionate about or where their strengths do not lie.

The role of the task team is to provide strategic direction conceptually, identifying promising aspects of STEMI to showcase to target beneficiaries during the NSW and to build partnerships with those stakeholders identified as key to an enhanced NSW. The task team would keep a watchful eye on developments, projects proposed as well as progress made. Through tracking and reporting on key tasks to ensure a next practice NSW is implemented each year, the task team would identify challenges early on and mitigate risks that could hinder the successful implementation of the NSW and reaching indicators identified.

12.2.3   A clearly defined strategy, appropriate objectives and focus areas with success indicators that are measurable

It is not clear in many people's minds what the strategy of the NSW is.

A next practice NSW task team would have mapped out the level of involvement of current NSI stakeholders against the potential contribution of these stakeholders to the NSW. This would include mapping out how each NSI stakeholder complements one or more of the NSW objectives.

NSI stakeholder involvement in the NSW would be objective driven by considering what they do (their service offerings and strengths in terms of SET awareness they could provide) and how it complements the NSW objectives.

Aligning these aspects to an implementation plan that identifies, for example, what activities the CSIR or NRF provide and which NSW objectives they align with, could be a powerful means of enhancing the NSW because this could be used to measure ability against actual value added through implementing NSW activities.

Building **a database of individuals and organisations** and their value adds to SET, would assist in determining on a continual basis which sectors are well represented and which sectors need further representation. The target audience also needs to be well defined for each NSW objective. Indicators would specify the target to be reached for over the period so that there is a benchmark to measure against. Youth are considered the key target beneficiaries of the NSW. A next practice NSW would split youth into learners at schools and students either studying or who have studied and are currently employed.

The combination of an up-to-date database as well as a continuous drive to build relations and gain the buy-in and support of individuals and organisations in terms of their contribution to the NSW, would make it possible to ensure sector representation of Grant Holders and Service Providers (those willing to contribute their own resources to the NSW).

Relationship Management: Building a database of individuals and organisations and their value adds to SET, will assist in determining on a continual basis which sectors are well represented and which sectors need further representation. The combination of an up-to-date database as well as a continuous drive to build relations and gain the buy-in and support of individuals and organisations in terms of their contribution to the NSW would make it possible to ensure sector representation of Grant Holders and Service Providers (those willing to contribute their own resources to the NSW).

A next practice NSW would ensure stakeholder representation aligned to the NSW objectives.

12.2.4   Proposed budget breakdown

The NSW budget would include the following budget line items:

- Capacity Development and/or skills transfer;
- Monitoring and evaluation feedback and reporting;
- Intergovernmental initiatives;
- Marketing and nurturing relationships with key stakeholders;

- Enhancing Cooperative government;
- Communication and publicity;
- National Launch events;
- Materials distribution (including banners);
- Project Management and related fees; and
- Grant funding to Event Organisers

12.2.5   A knowledge management system

Storing key information on various aspects of the NSW is critical. A next practice NSW would have knowledge management systems in place that stores data in a consistent format across the years. This reduces the risks of losing institutional memory should key team members no longer be part of the NSW in future. A central system would be accessible by key stakeholders to minimise duplication of documentation, share key documentation, be time-saving and allow for easy access of key data to Review Teams doing evaluations in the future. The system would also allow for handing over responsibilities to new Task Team members and on-boarding anyone who wants to become part of the NSW team.

12.2.6   Technology

A next practice NSW would be designed to provide a physical and virtual experience of the event. Virtual realities are considered. One example is the use of mobile technology to allow citizens to register (with their personal details) to allow tracking over time and to engage through social platforms with citizens to invite them to events, create awareness, congratulate them on achievements and receive their feedback on experiences and questions they may have relating to STEMI.

12.2.7   An inclusive approach for target beneficiaries

Care would be taken to ensure that measures to address inequality do not eliminate some people and compromise nation building and transformation. An exclusive approach of focusing on only Africans is not as ideal as involving all race groups in the celebration of NSW. There would be a sense of belonging by all cultures and race groups when it comes to the NSW and a level of participation by NGOs and industry that represents all cultures and race groups in South Africa.

Without increasing the NSW budget significantly, a communication strategy would be put in place that emphasises the building of relations with a wide range of Media Organisations (print and electronic media) that represent the eleven official languages. Media releases in an extended range of media sources would be encouraged and targets put in place to enhance SET reporting around the NSW as well as SET reporting beyond the NSW. Journalists, TV and radio presenters across cultures and linguistic groups would be identified and included as part of a media marketing campaign. Such a campaign would be planned in detail in terms of regularity and format of increased publicity and communication to all cultures and racial groups in all 11 official languages. The communication strategy would include details of how the NSW can maximise its contribution to South Africa's nation building and transformation agendas or the country's cultural and linguistic environment.

The NSW is a platform that should extend to and from other initiatives throughout the year. In totality, a broader range of initiatives would create the desired impact of improving Science and Maths performance and drawing a greater pool of learners into SET careers. It is suggested that a communication strategy include communications on when the NSW and other related initiatives take place in a **calendar** year as well as how these initiatives relate to each other. Such a calendar could direct the general public to sourcing more information on events and attending those events that most interest them.

A next practice NSW would consider the **establishment of a public engagement forum or sub-forums for each stakeholder group** (learners, students, parents, the general public, scientists, journalists, Government, Science Councils and Science Centres, Inter-governmental stakeholders, as well as other Grant Holders and Service Providers). A formal public engagement platform before and after a NSW event would provide the opportunity for reporting and press releases at no cost, increasing public awareness of DST and its initiatives. This could allow the opportunity for scientists to engage each other, demonstrate to citizens that the NSW is 'world-class' and it could allow the application and management of stakeholder expectations before and an assessment of stakeholder satisfaction after the NSW.

An instrument would be found to enhance participation. One way to ensure ownership is to have each stakeholder group driving the NSW at their level, for example, have youth drive a science ambassador's council. Another way to enhance participation at school level could be having learners from each grade write in to a competition to share why they would want to attend the NSW launch and activities. Selecting a learner per grade in each school across the country where letters were received and having a role model announce names of selected learners over National Television four weeks in advance. Providing these learners with the opportunity to meet the Minister and role models and then to share their experiences of the NSW to the rest of the school after the event, could create excitement and encourage learners at schools to work harder in science and maths.

Personalising the NSW is also a next practice. For example, including a social media platform where learners can register and using their registration as a passport that allows for communication and tracking of attendees, may be effective. In this way, the growth of STEMI publications and interest could be measured in various ways.

12.2.8 Branding guidelines

A full brand architecture review falls outside of the scope of this document, but first level branding guideline considerations are stipulated in Annexure I. Overall, the NSW would be positioned as an annual celebration of Science and Technology that **inspires and engages** the population on SET. The specific communication objectives relevant to future NSW implementations as they relate to branding could be formulated as follows:

- To **inform and create a level of awareness** regarding the specific SET theme relative to non-SET minded initiatives to all stakeholders by end of the NSW implementation week.

- To **persuade, motivate and encourage** boundary partners to involve themselves in the optimal implementation of NSW activities.

- To **differentiate NSW activities** from other activities amidst increased environmental pressures for involvement in non-SET environments

- To **reinforce and influence the attitudes and perceptions** of various stakeholders by the end of the implementation week.

Branding guidelines would be developed and tailored to the intended target audience segments and stakeholders with input from key role players in these segments. Event Organisers (including Grant Holders and all stakeholders implementing NSW activities) would include aspects such as reach, involvement and feedback from target beneficiaries who attended activities as part of their reporting back. An electronic method of reporting back via a web portal would be in place that this is not cumbersome and administratively burdensome to SAASTA. This feedback should include an evaluation of the Event Organiser's experience of the relationship between itself and the DST/SAASTA and any experiential difficulties that could negatively impact on both the SAASTA and DST brands.

A next practice NSW would communicate and promote the brand in the following ways:

- Using technology to engage with relevant stakeholders of the NSW. Using a web-portal with relevant information and an avenue like a blog for discussion of implementation challenges and solutions could be considered.

- The NSW could be communicated to key stakeholders identified in a personal invitation style request for participation highlighting the priorities of DST and how the Grant Holder's organisational ambitions are aligned to it. This would ensure stronger and deeper communication regarding DST priorities and work profiled to various relevant parties.

- There would be competitions that motivate these groups to recruit and involve themselves in the next annual NSW, should be considered. The NSW would use other events as opportunities to identify innovations, thought leadership and interesting aspects of STEM and invite individuals and organisations identified to showcase their achievements at the next NSW (possibly have displays and stalls at relevant events, competitions, conferences or gatherings).

- There would be the creation of platforms for communication and interaction pre- and post-implementation. Social media platforms would be used, relevant to each group of target beneficiaries.

- The language relevant to the site and target audience would be used by most presenters and facilitators, for example, if the implementation takes place at a Venda University and Venda schools are invited, material should be available in Venda.

- When a youth audience is addressed it is critical during engagement to ensure that youth friendly terminology is used like the word 'gadget' to increase the probability of identification with the speakers and relevance of content under discussion.

- Mass Media channels relevant to learners and students which include traditional media such as:

  o TV: SABC2, ETV and the learning channel on DSTV;

  o Magazines such as Drum, True Love, Move and Bona as well as soccer magazines; and

  o Radio advertisements: they listen to radio stations such as YFM, 5 FM, Metro, Motsweding FM, Radio 2000 and Phalaphala FM, Good Hope FM, , SA FM,

- o Lotus FM, Ukhozi FM, Ikwekwezi FM, Ligwalagwala FM, Motsweding FM, Phalaphala FM, RSG and Munghana Lonene FM (the latter in Venda);

- Other channels should also be explored including:

  - o Having road shows in the townships; and

  - o *Mobile* sites dedicated to NSW content and stakeholder information;

- In selecting venues for implementation, cognisance would be taken of the potential crowds that they would need to accommodate. Crowdedness of these events raised concerns around how venues are chosen, and it was suggested that if the number of learners are maintained bigger venues with better acoustics should be considered.

Some work still needs to be done to establish full engagement with the brand from the various stakeholders. What various stakeholders consider as inspirational still needs to be explored. Engagement can only be enhanced through an in-depth understanding of the motivational drivers and situational barriers of engagement with NSW, SAASTA and DST. It is suggested that key to all stakeholders is to find a communication hook that would enhance the relevance of each of the brands. For example messaging and content related to NSW could be as follows:

Learners and students – "Get it right with NSW…"

The science community – "NSW care about our science community…"

Potential Grant Holders – "NSW is your partner in growing SET capability in SA…"

12.2.9   An all-encompassing name to demonstrate inclusivity

STEAMI WEEK

Showcasing:
Science
Technology
Engineering
Art to bring across messages
Mathematics
Innovation

The NMW stakeholders raised a key concern that the name NSW does not embrace Mathematics in the brand image. This is the case for all components of STEMI. All stakeholders and beneficiaries should identify the NSW brand as representing one voice of the DST and one voice of industry.

A next practice NSW would be re-branded to be inclusive. One example is:

STEAMI Week

Art is well reported in South Africa and artists are able to bring across messages of STEMI during the NSW through art exhibitions and plays/dramas, hence the 'A' is included for this reason.

STEAMI week would be seen as the national observation of science week.

12.2.10   A revised funding mechanism

International benchmarking confirmed that South Africa's NSW and Science Week programs in Australia, Canada, Spain and the United Kingdom share similar programme models with common overall aims, objectives, structure, and activities. The Government model of providing primary funding is suitable. Some programmes also benefit from their ability to leverage resources through their networks.

For the DST and SAASTA to plan for long-term sustainability the next practice NSW, it would have a more diverse funding approach that includes a variety of funding sources (e.g. government funding as the primary sponsor, followed by corporate sponsorship and in–kind support where possible. Funding from international agencies would also be considered).

The Director General at the DST recommended earmarking a percentage of money for public entities at the beginning of the year for NSW. This funding mechanism, referred to as top slicing, would be an effective way of encouraging stakeholders of the NSW to contribute and enhance the NSW.

To attract the private sector, the DST would apportion some of the NSW budget to creating an attractive environment with incentives to take part in the NSW. For example, cutting a deal with the media to profile companies in the private sector, who provide significant contributions to the NSW in terms of showcasing STEMI.

12.2.11   Measurement and reporting

Measurement of participation and awareness are important for assessing achievement, but evaluation efforts would extend beyond process and outcome measures to determine the impact of the Science Week initiative on its intended audience (e.g. changes in knowledge, attitudes, and behaviours). A monitoring and evaluation plan would be developed as an outcome of this review that considers what should be measured, determines the kinds of data that should be collected for those measures and puts in place systems and processes to collect data. Annual monitoring would be used to guide strategic decisions relating to the NSW after each consecutive year of implementation.

An envisaged outcome and performance monitoring tool that identifies progress markers and/or OVIs would be in place that sets out the type of activities to focus on across partners and stakeholder groups who are involved or would like to become involved in the NSW.

The tool would identify ways to measure change and contribution of the NSW as well as the type of data to collect to ensure that future evaluations have a baseline of data from which to compare growth of the NSW.

A next practice NSW would also include GPS coordinates for accurate plotting of activities throughout the country. Data presented in future NSW documentation would be reported in a standard format for each year to allow for determining trends over time.

The NSW design would have a formal feedback process built in for all Event Organisers to share insights (based on analysis of site visit monitoring done) on how they performed during the NSW, what best practices were identified and where improvements could be made.

Essential to the success of activities are facilitators who are the face of the NSW to target beneficiaries. Students doing Masters and PhD studies were identified amongst those role models ideally suited to facilitate NSW activities.

A next practice NSW would define the **criteria for these facilitators** and put in place processes to select facilitators who meet the minimum requirements, develop those who do not yet meet the requirements but would like to be part of presenting activities, and measure facilitation through feedback received by target beneficiaries. SET practitioners who share their enthusiasm and passion for SET can get anyone excited.

An effective way of defining criteria for facilitators is the development of a rubric that defines and describes a next practice facilitator, best practice facilitator, compliant and non-compliant facilitator (the latter does not meet the minimum requirements to facilitate activities). It is noted that this exercise should not be a policing one but rather one that allows for facilitators to conduct a self-assessment online to determine the level at which they fit best. This allows for self-awareness and self-development of those who want to grow their skills to provide an enhanced NSW.

The task team who are part of a next practice NSW would collaboratively develop and make use of rubrics to set criteria for activities, facilitators, venues (layout and space), private sector role players, etc.

To assess the benefits realised through the branding guidelines proposed as an output to this review, **key measures and reporting standards** would include at minimum a requirement of exception reporting that compares the dimensions set out in the implementation plan submitted by both Grant Holders and media agencies involved against the achieved reality of the executions.

- Audiences reached:
    - Number of audience targeted vs. those participating and reached in actual terms;
    - Quantity of material produced (printed etc.) vs. quantity distributed;
    - Targeted circulation figures of publications vs. achieved circulation; and
    - Audience reach envisioned vs. achieved audience reached.
- Quality of involvement in NSW:
    - Reporting on queries received during implementation; and
    - Two – way evaluation of interaction between SAASTA and Grant Holders to include measure of perceived adherence to brand promise of NSW and the role that each is playing.
- Brand Associations:
    - Post – implementation evaluation through participant evaluation at implementation sites that include assessment of experience against expectation and attributes associated with NSW, SAASTA and DST as key brands.

Compliance measurements would be put in place to enable the implementation of branding guidelines to be monitored. This would take place at a randomly selected sample of sites representative of the Grant Holders and Service Providers implementing NSW activities in each province. The most effective measurement is by having an independently trained auditor visit the site. An online-survey via hand held technology is recommended. The monitoring instrument would ask the following questions in this regard:

- Note the type of branded material that is visible (banners, pamphlets, t-shirts etc.);

- For each type note and rate the:

    o Brands displayed;

    o Position of brand on medium;

    o Quality of printing (perceptual scale);

    o Picture of randomly selected example of each type of branded item available;

    o Overall impression of the facility in which activities is hosted; and

    o Overall impression of the organisation at the event.

12.2.12   Political support

A next practice NSW will include **raising public awareness of the importance of science with a broader range of politicians and cabinet** so that parliament grows in their understanding of the importance of STEMI. This will also increase the likelihood of securing a bigger budget towards Science and Technology efforts in South Africa.

12.2.13   South African culture

South Africa is a sporting made nation and yet we are a nation that needs STEMI to improve the quality of life. STEMI is not entrenched as part of South African culture in the same way as sports or politics even though there is an economic need to become equally passionate about SET and what it can do for our country. A next practice NSW is capable of instilling this culture by means of more campaigns and an inclusive approach across private and public sector organisations and NSI stakeholders. A next practice NSW would be taken to *the local culture of communities.* One way of doing this would be to see implementation of the week lived out by all citizens by taking activities into *shopping centres and seeing science shows in Sandton square.*

12.2.14   International benchmarking

A next practice NSW would include exposing stakeholders to global experiences, travelling to other countries, observing their Science Weeks and providing feedback on best practices.

12.2.15   Capacity development

Challenges in engaging specific stakeholders would be resolved through engagement (i.e. dialogue), relationship-building, and providing tailored support. A best practice identified for South Africa's NSW is the **support provided to Grant Holders**.

This practice would continue so that support is provided and capacity developed as a result of implementing Science Week activities. More thought would be given to how best practices can be shared amongst event organisers for the purpose of capacity development.

12.2.16   Formalising participation in intergovernmental initiatives

The DST would enhance the synergy between the NSW and related intergovernmental initiatives by establishing cross-border guidelines or a cross-border strategy for public awareness programmes and dedicated funding for cross-border initiatives. Mentorship to delegates would be provided who visit the NSW.

Establishing regular contact with other countries and demonstrating South Africa's desire for continuous improvement, may create a mutual exchange of information between countries, sharing share their lessons learnt, up-to-date research and key information to benefit NSWs globally. This is a cost-effective way of building relations and marketing South Africa as a leader globally in terms of National Science Weeks.

Should delegates take up the opportunity of observing various NSW sites and activities, a post-NSW round table would provide delegates with the opportunity to provide feedback on valuable lessons learnt, best practices that they observed, possible weaknesses of South Africa's NSW programme and their recommendations on how to enhance aspects of the programme. Journalists would also be invited to the round table and as an outcome; a thought leadership article or informative article could be published in relevant media. Benefits of such an article could include further marketing of the NSW, demonstrating South Africa's leadership position in terms of sharing best practice and high aspirations for continuous improvement of public awareness programmes, and feedback to Grant Holders who rarely receive feedback and would appreciate national and international feedback provided after the NSW.

12.2.17   Planning early

There would be detailed planning early for all focus areas of the NSW. The review found that some Grant Holders withdrew from participation in the NSW because of the shift in the timing of the NSW from May to August. A further inhibiting factor to planning early was annual contracts signed between the DST and NRF/SAASTA, hence the National Coordinating Agency were unsure of further NSWs and withheld from planning early for this reason. A next practice NSW would be supported by a three- to five-year contract with the National Coordinating Agency, supported by the transfer of money annually based on successful implementation of the NSW in that year and supported by progress reports and a clean audit.

A next practice NSW would be planned two years in advance, with the date communicated on a calendar of events well in advance. In terms of the most suitable timing of the NSW, it seems most feasible in terms of maximised benefits and minimised disadvantages to host future NSWs within the first two weeks of May each year.

A next practice NSW would ensure materials are delivered on time to Event Organisers in advance of the focus week.

Planning can create a sustainable stakeholder engagement structure around the NSW. With the creation of a theme for each year, a next practice NSW would create ownership of the theme amongst stakeholders and provide a space for everyone to be profiled, where the Minister would acknowledge achievements for the year.

12.2.18   NMW combined with the NSW

An attempt by the NSW to involve technology, engineering and mathematics activities confirms the importance of the connection to science that the three have. NMW stakeholders would be responsible for providing Mathematics activities as part of a combination of STEMI activities presented at sites during the week. SAMF would be recognised as a partner supporting the NSW.

12.2.19   Communication and publicity

In terms of communication and publicity, a next practice NSW would have clarity on which form of media is most effective for each target group of beneficiaries. The NSW would have planned media coverage and key data would be collected to determine whether indicators have been met. The following data is recommended:

- Planned versus actual number of editorials and slots per beneficiary group for each type of media (inclusive of on-line, print, radio and TV);

- Data on rating (decide on the key words to track over the next five years and request that all articles with the key words be collated, with an indication of positive, neutral and negative coverage);

- Advertising value (track the cost of publications/broadcasts) for different types of media; and

- Circulation (track the numbers reached through each medium);

- Analyse costs against numbers reached for each type of media.

Examples of what more could be done through actively marketing the NSW to journalists would be the following:

- A phone call to John Robbie and all radio disk jockeys across the indigenous radio stations to secure a slot for citizens to call into the radio station and to start talking about science (this could be done across all radio stations and in return, an invitation for them to have a designated area during the National Launch);

- Contacting Martin Creamer (Martin Creamer is Publishing Editor of Engineering News and Mining Weekly) to publish an article;

- On Talk 702 there is a slot on the 'Naked scientist'. Gaining buy-in from the 'Naked scientist' of that week to talk at the NSW or broadcast on the NSW.

- A daily review of each of the five DST priorities, broadcast or published, would imply coverage of all five priorities during the NSW.

To increase communication and publicity without significantly increasing the NSW budget, a next practice NSW would:

- Link the NSW to other science awards and programmes. Use the NSW to highlight unfound heroes in the scientific community similar to the NRF awards.

- Develop a database of scientists and journalists who attend the NSW. This can be used for follow-up in future NSWs and can be used to sustain constant engagement with journalists and scientists.

- Continuously engage with media and scientists through forums or media breakfasts that highlight the work being undertaken in science organisations.

- Utilise other avenues of engaging with the media including annual conferences or social media platforms (e.g., Facebook and Twitter) to promote on-going reporting on the NSW (not just during the focus week).

- Confirm the programme (date and venues) of the NSW well in advance so that all stakeholders, especially the media, can adequately publicise and report on events.

- Frame the NSW in a way that attracts media attention. This includes focusing on interesting content, identifying new themes for each year, and linking it to science awards and ceremonies.

12.2.20   Quality activities at suitable venues

A next practice NSW would include scientists in the planning of the NSW programme to ensure that themes and focus topics selected reflect key issues and developments in the field and are of relevance to the general public. It would broaden the focus of the NSW to include all learners (including younger learners and those not studying Physical Science) and ensure that all components of STEMI (science, engineering, technology, mathematics, and innovation) are adequately covered in NSW activities and events. Activities would be implemented that stimulate and motivate interest in SET careers (e.g., role modelling, educational tours, experiments) during the focus week.

Given their influence on learners' career choices, more efforts would be made to reach out to and engage parents in NSW activities.

13   Conclusion and Recommendations

"Reflecting on achievements thus far is satisfying since we now know the steps the NSW has taken to reach this point and the steps the NSW must still take to reach its ultimate goal"

This review identified the type of adjustments required to take the National Science Week from current practice to next practice. There is no doubt that the NSW should be continued. In terms of delivering the NSW, there are a range of achievements and successes in terms of reach, capacity development, meeting some NSW objectives as well as achievements in terms of implementation and process aspects that have been refined over the years. There is not one year of that can be identified during the ten year the ten years of NSW implementation under review (2000 – 2009), where the NSW was not delivered. In each year, efforts were made to improve in terms of outreach to target beneficiaries. In this context, the two divisions of the DST and SAASTA are suitable to implement the NSW.

Although implementation has been successful, many opportunities have been identified during the review to provide an enhanced NSW. Key areas include the quality and variety of the content delivered during the NSW and the extended variety of stakeholders of the National System of Innovation that could become involved in the next cycle of the NSW to enhance the content of the NSW going forward. There is political support for the programme at the highest level (Minister and EXCO), which is an advantage.

The recommendations put forward to take the NSW to next practice in its next cycle require other kinds of changes to take place for the NSW to fully flourish. The review identified that at a policy level, the NSW and similar public awareness programmes should be driven by a strategic vision for science advancement at a country level. This implies the need for a national strategy for science awareness to guide NSI stakeholders on their involvement in the NSW and on how to communicate various aspects around science. At an organisational level, the review identified that coordination is lacking amongst units within the DST and within SAASTA and that greater coherence and collaboration will create a platform for enhancing the content and quality of the NSW. If leadership is said to define the culture of organisations, then logically, it also collectively defines the culture of programmes. It therefore stands to reason that once leadership takes charge and there is collaboration and support across units of both the DST and SAASTA, the NSW can be moulded precisely into the shape of what the sector needs. As an outcome of this review, a task team is recommended. It is suggested that the task team be comprised of senior stakeholders such as the executive director of SAASTA, the DG and DDGs at the DST and other senior stakeholders that can provide strategic direction conceptually on aspects of STEMI that will inform activities implemented during the NSW in its next cycle.

The review further identified frustrations in the system in terms of SAASTA's capacity to deliver an enhanced NSW. It is critical to consider the system changes that are needed to support a next practice NSW. Should SAASTA continue to implement the NSW as the National Coordinating Agency, it will need to be resourced adequately. Re-positioning SAASTA and aligning its mandate to the DST's vision, should also be considered.

The study identified key attributes to ensure effective re-positioning of the NSW as a continued flagship programme of the DST. These include:

- Collaborative efforts between stakeholders across the industry;

- Strategic partnerships;

- Ensuring buy-in and action from relevant NSI stakeholders across the public and private sectors;

- Understanding successes and shortfalls and strengthening feedback loops;

- Information that is up-to-date, relevant and accessible to direct strategic decisions and inform DST leadership on achievements of the programme; and

- Good communication to raise awareness and increase the number of stakeholders partnering to provide high quality content through activities implemented during the NSW.

A final review workshop was held in October 2011 to share the findings of this review and identify the key next steps as an outcome of the review. At the workshop, stakeholders identified the following as focus areas of the NSW:

- Create **cohesion amongst Government** Departments and spheres of Government;

- Build **relationships and partnerships** to increase buy-in and ownership of NSW activities by a broader range of stakeholders, thereby enhancing the participation of society in terms of a knowledge economy. Stakeholders of the NSI must still be identified and their strengths in terms of contributing to various aspects of STEAMI must still be determined;

- Build an **appreciative society** in terms of the beauty and essence of science (target beneficiaries must still be identified who will be the key focus of messages provided by the NSW to draw them to partake in the event. Youth (learners in schools and students at HEI's); parents, educators and the general public are identified as central to the programme;

- Increase **science communications** through building relationships with media stakeholders and publishing interesting information on STEMI (nurturing next generation of scientists and sharing information to catalyse innovation); and

- **Public relations and corporate identity**.

The NSW is seen as an event where all other initiatives are showcased and acknowledged.

The project guidelines for the NSW list various stakeholders as target beneficiaries. Concerns were raised throughout the review that the strategy of the NSW must be clear in

terms of who it targets, since, although it can be inclusive in its focus, it cannot focus on everyone.

"The NSW can't do everything for everyone all the time"

Stakeholder groups interviewed and stakeholder
comments at Final Review Workshop

Stakeholders at the workshop also proposed that the NSW have a thematic approach where NSI stakeholders buy into and take ownership of activities based on a theme. A task team could rotate in terms of its members to ensure best conceptual development of activities based on a theme. Whatever strategy is taken up, the study identified key attributes to ensure effective re-positioning of the NSW as a public awareness programme. These include:

- **Planning early** and well in advance with coordinated efforts of Collaborative efforts between stakeholders across the National System of Innovation;

- Creating strategic partnerships and ensuring buy-in, **action and follow-through** from all stakeholders identified upfront and others who show their support and commitment as time progresses;

- **Good communication** to raise awareness and market the NSW. **Continuous communication** amongst task team and steering committee members with each other and with NSI stakeholders is key to ensuring enhanced programme content; and

- **Measuring** key aspects of the NSW, understanding successes and shortfalls and strengthening feedback loops.

Next steps identified after completion of the review (identified at the Final Review Workshop) include the following:

1. All stakeholders to read the report and engage with the findings and recommendations;

2. Stakeholders to develop a five-year implementation strategy that clarifies the objectives focused on, stakeholders targeted across STEMI and beneficiaries to be reached; and

3. The implementation strategy will require approval from DST leadership by 31 March 2012.

This review has led to the planting of a seed that needs to be watered. It is recommended that the momentum be maintained by establishing the task team and putting in place dedicated resources who meet regularly to drive the improvement of the NSW.