

## REPORT

### **16<sup>th</sup> REGIONAL CONFERENCE FOR MATHEMATICS, SCIENCE & TECHNOLOGY EDUCATION IN AFRICA (COMSTEDA 16) CONFERENCE**



**Date:** 06 - 08 November 2018

**Venue:** Maun Lodge

## **COMSTEDA 16 LOCAL ORGANISING COMMITTEE (LOC)**

### LIST OF LOC MEMBERS

<b>No.</b>	<b>Name</b>	<b>Role/Committee</b>
1.	Ndondo W. Koolese	Focal Person
2.	Spar Mathews	Conference Coordinator
3.	Baamogeleng Moteti	Local Organising Committee Chairperson
4.	Baipidi L. G. Kgabi	Advisor
5.	Onalenna Masi Sithole	Conference LOC Secretary
6.	Tshepiso Stanley Boy	Conference LOC Vice Secretary
7.	Nosizi Angela Majama	LOC Financial Advisor
8.	Tumisang Chere	LOC Procurement Advisor
9.	Nametso Kootshole	LOC Procurement Advisor
10.	Esther Tlhapi	LOC Transport Advisor
11.	Joseph Wasureba	LOC Publicity
12.	Sibongile Boy	Accommodation and Catering Sub-Committee Convener
13.	Phillip M. Kalanke	Accommodation and Catering Sub-Committee Member
14.	Pelotlhomogi Modise	Accommodation and Catering Sub-Committee Member
15.	Lebone F. Tsietso	Accommodation and Catering Sub-Committee Member
16.	Modiri Mosiamiemang	Accommodation and Catering Sub-Committee Member
17.	Mathews Masole	Fundraising Sub-Committee Convener
18.	Baetsi Danso	Fundraising Sub-Committee Member
19.	Onkabetse A. Mmereki	Fundraising Sub-Committee Member
20.	Olerile Ntema	Fundraising Sub-Committee Member
21.	Boitshepo Mutumba	Fundraising Sub-Committee Member
22.	Judith Lydia Makhani	Fundraising Sub-Committee Member
23.	Guru Dev Korvi	Fundraising Sub-Committee Member
24.	Gaabadzo Moseki	Exhibitions Sub-Committee Convener
25.	Veronica Ridge	Exhibitions Sub-Committee Member
26.	Daesaeong Han	Exhibitions Sub-Committee Member
27.	Insuk Song	Exhibitions Sub-Committee Member
28.	Sai Rani Korvi	Exhibitions Sub-Committee Member

29.	Badisa Letlotlo	Excursions, Entertainment and Transport Sub-Committee Convener
30.	Areng Sehularo	Excursions, Entertainment and Transport Sub-Committee Member
31.	Kelebogile Buka	Excursions, Entertainment and Transport Sub-Committee member
32.	Dr Lesego Stone	Excursions, Entertainment and Transport Sub-Committee Member
33.	Colline Lerothodi	Excursions, Entertainment and Transport Sub-Committee Member
34.	Ponatshego Mafuta	Excursions, Entertainment and Transport Sub-Committee Member
35.	Goitsemodimo Mmusi	Logistics, Publicity & Marketing Convener
36.	Kabelo Moswetsi	Logistics, Publicity & Marketing Member
37.	Nkobi Enock	Logistics, Publicity & Marketing Member
38.	Lesley Kehitile	Logistics, Publicity & Marketing Member
39.	Dr Mompoloki Shanah Suping	Programme, Abstracts & Rapporteurs Sub-Committee Convener
40.	Lesedi Mokwena	Programme, Abstracts & Rapporteurs Sub-Committee member
41.	Dr Reginald Oats	Programme, Abstracts & Rapporteurs Sub-Committee member
42.	Dr Moipolai Motswiri	Programme, Abstracts & Rapporteurs Sub-Committee member
43.	Mokgweetsi Rankgoane	Programme, Abstracts & Rapporteurs Sub-Committee member
44.	Ofentse Phale	Programme, Abstracts & Rapporteurs Sub-Committee member
45.	End Salani	Programme, Abstracts & Rapporteurs Sub-Committee member
46.	Dr Kgomotso Mabusa	Programme, Abstracts & Rapporteurs Sub-Committee member
47.	Kagiso Kagelelo	Programme, Abstracts & Rapporteurs Sub-Committee member
48.	Oliver Moses	Programme, Abstracts & Rapporteurs Sub-Committee member
49.	Ompetlile Tekisi	Registration & Administration Sub-Committee Convener

50.	Hensen Seidisa	Registration & Administration Sub-Committee Member
51.	Pako Moilwa	Registration & Administration Sub-Committee Member
52.	Tseleng Nthethe	Registration & Administration Sub-Committee Member
53.	Thebeitsile Katlholo	Registration & Administration Sub-Committee Member
54.	Anna Motswakhumo	Registration & Administration Sub-Committee Member
55.	Gabaakelwe Chaba	Registration & Administration Sub-Committee Member
56.	Tshepo S. Baipusi	Registration & Administration Sub-Committee Member

## **1.0. INTRODUCTION/GENERAL INFORMATION ABOUT SMASE-AFRICA ORGANISATION**

Strengthening Mathematics and Science Education in Africa (SMASE-Africa) is a Pan-African Organisation registered in Kenya under section 10 of Societies Act. Currently the organisation has a membership of 27 countries. The Secretariat and headquarters of the association is located in Nairobi, Kenya at the Centre for Mathematics, Science and Technology Education in Africa (CEMASTEa) with an office in Kenya Science Campus along Ngong Road. The Association was formed early 2001 formerly as SMASE-Western, Eastern, Central and Southern Africa (WECSA) to create synergy in addressing challenges facing Mathematics and Science Education in African countries. The Association brought together 35 African countries during annual regional conferences, but has a membership of 27. The aim was to promote dialogue, sharing collective learning and collaborative action. Member countries promote promising classroom practices in enhancing the quality of mathematics and science education by developing teacher capacities and collaboratively learning together from each other's practices.

The Government of Japan, through Japan International Cooperation Agency (JICA) and Kenya as well as other development partners supported SMASE-Africa to provide a platform for networking and capacity building for its members. The activities of SMASE-Africa include promoting Teacher Capacity Development programmes, technical workshops and conferences, and technical exchange visits and research work. Since its inception, over 1,800 educators from 27 countries in Africa have benefited from the training programmes. SMASE-Africa has also successfully organized 13 regional conferences and three technical workshops.

### *Vision*

"A leading organization in promoting effective classroom practices for quality education in Africa".

### *Mission*

"To promote effective classroom practices in primary and secondary mathematics, science and technology education through research, fostering relevant policies, networking, collaboration, advocacy and teacher capacity development in Africa".

Conference for Mathematics, Science and Technology Education in Africa (COMSTEDA) is the annual conference name adapted by SMASE-Africa. From inception in 2001, SMASE-Africa Association has been conducting conferences regularly to discuss issues regarding the teaching and learning of Science, Technology, Engineering and

Mathematics (STEM). These conferences became known as 'Conference for Mathematics, Science and Technology Education in Africa' (COMSTEDA) since the year 2016. SMASE-Africa Association has since been recognized by the African Union as a flagship carrier of Mathematics and Science issues in Africa. The association in its quest to meet the African Union Agenda 2063 goals, one of which is to "improving Science, Technology, Engineering and Mathematics (STEM) Education in Africa", holds Annual Regional Conference for Mathematics, Science and Technology Education in Africa [COMSTEDA].

### **1.1 16<sup>th</sup> REGIONAL CONFERENCE FOR MATHEMATICS, SCIENCE & TECHNOLOGY EDUCATION IN AFRICA (COMSTEDA 16) CONFERENCE**

The Ministry of Basic Education of the Republic of Botswana hosted the 2018 conference in Maun. While the previous COMSTEDA conferences were modelled on country reports and experiences from member countries, COMSTEDA 16 took the approach of research. COMSTEDA 16 provided a forum for educators to interrogate issues, share ideas, practices, and challenges relating to teaching and learning Mathematics, Science and Technology Education in respective countries with a view to improve the quality of education. The conference brought together educators, policy makers, researchers, teachers, NGOs, public/private sector stakeholders, and learners to present papers, hold workshops on the theme "Teacher Professional Development in Africa: Competencies, Skills and Values in STEM Learning Environment" under the following sub-themes/thematic strands:

**Strand 1:** Teacher Professional Development in Africa: Developing Knowledge, skills, and values in STEM learning/ teaching engagements:

**Strand 2:** STEM Curriculum Development, Implementation and Assessment: From Theory to Innovations:

**Strand 3:** The School Culture and Learning in the STEM areas: Leadership for learning:

**Strand 4:** The role of Professional Associations in the STEM Teaching-Learning environments.

**Strand 5:** Towards STEM teaching and learning: The use of ICT

### **1.1.1 OFFICIAL OPENING**

The Deputy District Commissioner, Mr Gaborekwe led the dignitaries during the arrival of the Honorable Minister of Basic Education. The Deputy District Commissioner then proceeded to introduce guests.

Kgosi Kealetile Moremi welcomed all to the tourism capital of Botswana and advised the delegates to be careful as they tour various sites in the vicinity, as some wild animals in the area are dangerous. He wished all a good stay in Maun.

The President for SMASE-AFRICA Mr Benson Banda started by acknowledging the presence of the Minister of Basic Education, Honorable Bagalatia Arone and applauded him for being supportive. He hastened to challenge teachers to reflect on what will be discussed in the conference and take lessons to address students' needs.

He also welcomed all to the 16<sup>th</sup> Regional Conference for Mathematics, Science and Technology Education in Africa – COMSTEDA 16. He stated that the conference is a culmination of various continental activities implemented by SMASE-Africa member countries, reiterating that African network continue to experience tremendous growth in promoting teacher capacity development in Mathematics, Science, and Technology Education. The teachers and learners in member countries continue to experience growth in lesson innovation and learning respectively. The President reminded delegates that the 2030 Global Universal Agenda underscores Education for Sustainable Development, specifically SDG 4 on Quality Education and Lifelong Learning which restates the need to increase the number of youth equipped with both Technical and Vocational Skills relevant to employment, preparing them for decent jobs and entrepreneurship, (UN, 2015, p.21).

The President further stated that all those present were to promote STEM education in Africa, aimed at strengthening country level interventions and policies that support best practice. He emphasized that COMSTEDA is an important platform to share and interrogate on-going initiatives that enhance STEM education on the continent. He continued to state that the forum is an apt opportunity for all to engage in learning discourse through session attendance and discussions.

In conclusion, the President thanked the Government of Botswana (Ministry of Basic Education), sponsors, partners, exhibitors, and delegates for according the Association the support and participating in the conference. He also thanked SMASE-Africa secretariat and Local Organizing Committee (LOC) for having worked tirelessly to ensure that the conference becomes a success.

Honorable Bagalatia Arone started his address by sharing the goal of the President of the Republic of Botswana, which is striving towards diversifying the economy of Botswana through the educational agenda. Redirecting the country's economy focus from being resource based to knowledge based. The Minister indicated that this goal was a challenge to all educationist. He argued that quality of any education system is depended on the quality of teachers and as such, resources need to be channeled towards capacity building of teachers. He commended the organizers for the theme of the conference, which he said, was supportive of the President's aspirations.

The Minister expressed his delight in welcoming all present to the 16<sup>th</sup> Regional Conference for Mathematics, Science and Technology Education in Africa - COMSTEDA 16. He welcomed the SMASE-Africa Executive Committee and assured them that the government of Botswana was intent on making this conference a resounding success. He restated the theme for this year's conference which is "Teacher Professional Development in Africa: Knowledge, Skills and Values in STEM Learning Environments" as being quite relevant subject to deliberate on with the main aim of sharing experiences to better the education sector on issues of teacher development and STEM learning. The Minister emphasized that STEM is key in economic development of any nation therefore Africa has to embrace the initiative.

The Honorable Minister informed those attending of Botswana's commitment to transform and catalyze socio-economic growth through effective use of Science, Technology, Mathematics, Engineering (STEM) and Innovation through Vision 2036 pillar, "Sustainable Economic Development". He stated that the Government of Botswana, through the Education Sector has come up with a five-year strategic plan, the Education and Training Sector Strategic Plan (ETSSP), which aims to transform education leading to improved education sector performance. He further informed those participating that the process of transforming the Education System to embrace STEM has commenced in earnest. He urged participants to realize that STEM plays a pivotal role in the transformation of the economy. He stated that one of the eleven priority areas in the ETSSP strategy is "enhancing the teaching and learning of Mathematics and Science at all levels and the other priority area aligns well to development of Continuous Professional Development for Teachers that he believes similar strategies exist in countries represented in the conference.

It is clear that Honorable Minister, Bagalatia Arone acknowledged that teaching STEM related subjects was not cheap. Therefore, as Africa there is need to explore avenues to meet the cost of this crucial education area that impacts strongly on any country's economic development. The Minister appreciated the involvement of JICA as a Development partner in teacher development and urged them to forge further



partnerships to support the teaching of Mathematics, Science and Technology. Honorable Minister proceeded to signing of the Memorandum of Understanding (MoU). In his remarks, the Minister of Basic Education Honorable Bagalatia Arone stated that the signing of MoU indicated unwavering commitment of Botswana to support SMASE-AFRICA Association and STEM initiatives.

The President of SMASE-AFRICA launched Zambia Journal of Teacher Professional Growth (ZJTPG). In his remarks, the President stated that although the journal is housed in Zambia National Science Centre, it is meant to facilitate publication of papers presented during COMSTEDA. The platform is for teachers to have their research work published. He announced that the journal needs reputable editors.

The Council Chairperson, North West District Council, Mr Moenda highlighted some achievements the Council made in conjunction with business community support with regard to advancing of the education sector agenda.

The official opening session was concluded by visiting the exhibitions.

### **1.1.2 PROCEEDINGS FOR THE CONFERENCE**

#### **1.1.2.0 PLENARY SESSIONS:**

##### **GROUND BREAKING PRESENTATION:** Ms Leapotswe Bantsi (BIUST)

Topic: Inquiry Based Science Education/Learning (IBSE) Concept

Inquiry-Based learning-teaching is defined by the US National Science Foundation as leading students to build their understanding of fundamentals of scientific concepts through direct experience with materials, by consulting books, other resources, and experts, and through argument and debate among themselves (Harlen, 2013). In view of this definition, it is clear change needs to be effected in a view to deliver quality science education, which supports innovation for prosperity. The presenter highlighted that innovation approach to the delivery of Mathematics and Science is essential to improve quality learner output in any education system. The approach actively involves students in their own learning; help students to develop a conceptual framework, help students develop problem-solving skills, promote student discussion and group activities. In addition, science teaching should help students experience science in varied, interesting, and enjoyable ways and assess students' understanding at frequent intervals throughout the learning process.

**Keynote Speaker 1: Professor Jill Addler, Title: Professional learning communities and professional development in mathematics education**

Professor Jill Addler started her address by sharing experiences from the WITS University Mathematics Connect Secondary Project (WMCS). The project was reported to involve teachers and a researcher working together, on a particular topic and concept, planning teaching, reflecting, re-planning the same lesson and testing whether learners attain what is intended. The speaker reported that project was run in two phases.

*Phase 1:* The phase ran from 2010 to 2014 involving 10 secondary schools in one District, 2 x Professional development courses that is Mathematics for teaching (67%) and Mathematics teaching (33%). These programmes were conducted through Lesson study approach in schools. Lesson Study was run from 2013 to 2014.

*Phase 2* was scheduled to run from 2015 to 2019. The phase would involve expanding the programme to six (6) districts; enroll more teachers in Lesson study in initial schools (2015-16), development of Professional Development courses, enrolling of Teachers of Grade 8-10 and Senior Phase Mathematics Subject Advisors.

The programme is an initiative to strengthen teacher capacity building thus promoting teacher growth. The speaker emphasized that the programme was ideal to allow strengthening of teaching-learning process of STEM subjects. She encouraged members of those countries present to uphold the ideals of Lesson Study to allow teacher Professional Growth that eventually translates into learner quality output.

**Keynote Speaker 2: Dr Haniso Motlhabane, Title: Africa STEM Value Consciousness: Commitment to Practice**

Dr Haniso Motlhabane highlighted the objectives of the presentation as follows:

- Stimulate critical thinking
- Challenge the practitioners to extend their imagination and innovativeness on how to revolutionize delivery of STEM for maximum impact.
- Challenge practitioners to individually commit to drive economic growth through STEM.
- Challenge African states to introspect not only on their policies as statues but on purpose and commitment to policy implementation.

The key points that emerged from the presentation were as follows:

a. The need to see Science and technology as an engine of economic growth. Dr Motlhabane substantiated this consideration by citing trends in literature reflecting how science and technology had engineered economic growth dating as far back as 1950. He held the position that as Africa was once a cradle for mathematics and science as far back as 3150 BC citing the Egyptian civilization as an example, probably there is a need for renaissance for Africa in this regard.

b. The need for Africa to be conscious of Science, Technology and Innovation (STI) as a catalyst for development. The third edition of the Africa forum have emphasized the importance of research to foster innovation and the importance of involving the private sector in order to improve the impact of teaching STEM subjects.

c. The need for critical mass for Africa to catch-up. The speaker stated that African countries need to devise means to catch up with developed world in terms of having more people involved in science-related fields. He stated the need for education systems to come up with ways to develop a sustainable pool of scientists.

d. There is need for STEM practitioners to bridge the African and First world STEM gap. Dr Motlhabane further urged members to help in demystifying STEM subjects and thus make learning of Mathematics and Science enjoyable by removing any possible abstract content delivery.

### **Speaker 3: Mr Thomas Danicek, UNESCO**

#### **Title: Workshop on Gender-Responsive STEM Teaching and E-Content Development**

The presenter shared data on women science learners across various countries, which clearly indicated the disparity in the numbers of women learners versus their male counterparts in studying science-related subjects with women being fewer in number.

The research findings were as follows:

- Lack of academic support given to a girl child.
- Stereotypes in the way some old textbooks used by students were presented.
- Teaching of the STEM subjects was found to be teacher centred.

The researchers came up with the following interventions:

- (a) Mounting a series of 2 week-long capacity building workshop for teacher educators and university instructors.

- (b) Mounting workshops attached to bigger projects such as KFIT (Rwanda) and HNA (Ghana and Ethiopia).
- (c) Leading participants to develop contextualized learning content by applying the principles of Instructional design as one way of how to guarantee quality.

The recommendations that the research team came up with included:

- Adoption of specialized enquiry-based teaching methods
- Systematic introduction of female role models
- The need to foster networking and spread of information that raise awareness of the need for inclusivity.
- The need to support girls' exclusive learning institutions and initiatives.

#### **Speaker 4: Human Resource Development Council (HRDC), Mr Meshack Tafa**

Mr Meshack Tafa, indicated that The National Human Resource Development Strategy (NHRDS) approved by Cabinet in January 2009 recommended a rationalisation strategy geared towards eliminating the overlapping mandates and duplication of services between the then Tertiary Education Council (T.E.C.) and the then Botswana Training Authority (BOTA). The NHRDS put in place a holistic and integrated institutional framework comprising two new statutory bodies namely; the Botswana Qualifications Authority (BQA) and the Human Resource Development Council (HRDC).

The realization of the NHRDS will guarantee the delivery of a range of national, societal, government, private sector, civil society and institutional reforms that are yet to prove that they are necessary to guarantee Botswana's future status as a 'winning nation'. Furthermore, NHRDS is a key contributor to ensuring that Botswana is a 'nation at work' with its people employed in high-skill-high-value jobs.

The overarching goal of the NHRDS is to optimize the efficacy and outcomes of the NHRDS to drive Botswana's development agenda. The desired outcomes of the Strategy are economic diversification and societal transformation

#### **HRDC Objectives:**

- Provide policy advice on all matters of the National Human Resource Development
- Co-ordinate and promote the implementation of the National Human Resource Development Strategy.

- Prepare the National Human Resource Development Plans; and
- Plan and advice on tertiary education financing and workplace learning.

### **Functions:**

- Education & Training Financing
- National Human Resource Development Strategy
- Institutional Capacity Building
- Work-Place Learning
- Human Resource Development Planning
- Internship & Apprenticeship
- Education and Labour Information
- Human Resource Development Policy Advice
- Research & Innovation

**Key human resource challenge** – Mr Tafa stated that while the country needs STEM, there is also need for STEAM not to be left behind. HRDC recognize the importance of the arts covering humanities and social science subjects alongside sciences.

### **Presentation by Oabona Nthebolang (HRDC): Action research framework for teachers**

The value of action research is to encourage participants to engage in professional inquiry to understand and solve institutional problems with a view to improve practice. Action research offers teachers an opportunity to assess and reflect on their teaching practices. It offers an opportunity to explore and test new ideas, material and methods of teaching. It also assists teachers with evidence based teaching methodologies enabling them to make better-informed curriculum and assessment decisions. Levels of action research include individual, school and district level.

### **1.1.2.1 CONFERENCE SUB-THEMES PRESENTATIONS**

#### **STRAND 1**

#### **Teacher professional Development in Africa: Developing Knowledge, skills, and values in STEM learning/ teaching engagements**

Presentations revealed that in many African countries the role and functioning of schools are changing and as well as what is expected of teachers. As such there is increasing need to have programmes for Continuous Professional Development of teachers with a view to sustain their relevance. One of the presenters, Onkabetse

Mmereki whose presentation was titled, knowledge Based Economy; A call for Botswana indicated that there is low enrolment and graduation rates in science, technology, engineering, arts and mathematics (STEAM). He argued that a country aspiring to transform the economy to being knowledge based needs to develop and implement a comprehensive and targeted STEAM programmes to nurture talent and potential at all levels of education and skills development system, including the workplace. The main findings of the research indicated that success of the economies is facilitated by investment in basic facilities to enable production. This, he stated that it provides an opportunity of improvement for pre-service and in-service training in order to have quality teachers employed to positively influence and support STEM.

Another presentation titled "Action research on enhancing academic excellence in science through the use of collaborative learning method at Gamodubu Primary School" by Mr Tiro Mokgoare argued that in Botswana the past five years has shown that a substantial number of students are not doing well in science subjects. Although his study focused on Gamodubu Primary School, Collaborative Learning was found to be key in assisting in improving performance as it is an instructional Methodology characterized by students working together and working towards a common goal, a characteristic of 21<sup>st</sup> century approach.

It was evident from presenters in this strand that CPD is the key for quality learning approaches in STEM as was buttressed by Dr Moipolai Motswiri, Mr. Ezekiel Tumbo and Mr. Kazuyoshi Nakai.

## **STRAND 2**

### **STEM curriculum Development Implementation and Assessment: From Theory to Innovations:**

Presentations under this strand offered opportunities for teacher professionals to share their experiences to STEM curriculum development, implementation and assessment. Specifically, arguments revolved around current trends in curriculum implementation and evaluation by acquainting them with various procedures" whether they are formal or informal.

A presentation titled Learner Engagement: Evidence-based Lessons Mr Mvula Henry indicated that active learner engagement, evidence-based Lessons for STEM/STEAM education, and pre-Service Teacher Development on knowledge, skills and effective competencies are essential. This was buttressed by other scholars such as Dr Shanah

M. Suping, Anthony T. Koosimile, Dr Moipolai Motswiri, Ms Agnes Mando Banda, Mr End Salani and Dr Lesego Tawana, and devolution of teacher management in secondary school achievement by Paul A. Odundo, and Stephen M. Njoroge.

It was evident from the presentations though, that ICT Integration is still a challenge in the education sector and that there is need from education systems to emphasise this aspect to promote quality STEM/STEAM teaching-learning process. Mr Tshepo Kgwefane, Mr George Mulenga, Mr Vincent Mudenda, Mr Ngulube and Dr Trust Masole argued that there is need to strategically acquire relevant resources to enhance performance of learners in STEM subjects.

It became clear from the various presentations that curriculum developers, educators and policy makers needed to come under one roof in order to best plan for the learner.

### **STRAND 3**

#### **School culture and learning in the STEM areas**

Discussions under this strand pointed to the fact that creating a STEM culture in schools goes beyond providing educators with the tools to teach students curriculum geared towards Science, Technology, Engineering and Mathematics. Presentations indicated that there is need for schools' leadership and support for STEM activities be strengthened. The presenters, which included Benardicto Ngoma, Gondwe Colious and Vincent Mudenda, Ms Kagiso Kagelelo, Dr Reginald Oats and Ms Tlhatlogo Sengawane, registered a case in respect of learners with special learning needs, gender inclusivity and STEM subjects. This was a very interesting advocacy for inclusivity in STEM. Participants and presenters agreed on the need for schools, homes, communities and workplaces treat and support children for STEM. Discussions saw pointed to the fact that children have great potential when environment is concussive and as such should be viewed as follows:

- Collaborators who can solve authentic problems by working collectively.
- Creators with innovative ideas and products that will strengthen our economies.
- Critical thinkers that are valued for their ability to analyze, determine, and evaluate multiple solutions to solve complex issues or reach an end
- Major debates under this strand revolved around the fact that creating a STEM culture in our countries goes beyond providing educators with the tools to teach students curriculum geared towards science, technology, engineering

and mathematics. The implication derived from presentations was that if people fail to see beyond these categories in the acronym, they will fail to realize Africa's greater potential. STEM is a mind-set; a way of thinking that demands us to tap into integral skills like collaboration, creativity, critical thinking and inclusivity.

- Does a girl-child and a boy-child have equal inquisitiveness in mathematics homework? If not what are the relative levels of their inquisitiveness and what impact may it have on their future careers?

## **STRAND 4**

### **The role of Professional Associations in the STEM Teaching/Learning Environments.**

The presenter under this strand pointed out the role played by professional associations in the STEM teaching/learning environments. The argued that professional associations allow teachers and learners to meet, engage, and share knowledge and foster supportive, collaborative networks among scientists in the advance of STEM. Tshepo Sharon Leepile, Ivy Bweupe's, Mr Lesley T. Kehitile and Moagedi Kereeditse indicated that activities by professional associations have some impact in the learning of STEM subjects.

## **STRAND 5**

### **Towards STEM teaching and learning: The use of ICT**

Presenter under this strand indicated in oneness the importance and effect of use of ICT in enhancing teaching and learning in STEM. From presentations, it was clear though that schools still lack of ICT resources and as such this being a setback in advancing ICT initiatives in the teaching of STEM. Presenters under this strand included Mr End Salani and Mr Vincent Mudenga. The presenters' conclusion was that ICT infusion raises cooperative and collaborative skills, creativity, motivation and understanding.

## **1.1.3 SUMMARY AND RECOMMENDATIONS**

### **Evaluation and Conclusion**

- The conference objectives were met as there were presenters for all the strands as per call.
- Keynote speakers that were invited all came and presented.



- The conference attracted exhibitors and learners to showcase STEM teaching and learning initiatives
- Excursions were undertaken, which included taking primary schools learners were treated to a tour in the Moremi Game Reserve.
- All service providers appointed during the conference delivered quality services and were fully paid for their services.
- An evaluation meeting was successfully held.

## **Recommendations**

1. SMASE-Africa should have a pool of reviewers from which to draw
2. A dedicated email should be used for the review process, separate from the other email used for general conference correspondence.
3. Decision to be taken and guidance given by SMASE-AFRICA as to what happens to full papers
4. A strict adherence to the call when abstracts are submitted should be emphasized from conference to conference.
5. Workshops by experts in different discussion areas should be arranged during conferences
6. SMASE-AFRICA executive MUST go on a drive to motivate participation from all member countries to make the COMSTEDA a success that it can be
7. Participants should be encouraged to register on-line to avoid congestion at the point of registration.
8. Registration should be done using a software that will allow the officers registering to sport some discrepancies in the registration process.
9. Nametags should be printed at the site of registration.
10. A list of VIP should be made available earlier so that they can be assisted accordingly - given the protocol they deserve.
11. A list of paid up participants should be availed on time by SMASE-AFRICA Executive.
12. Some of the conference material from SMASE-AFRICA Executive should be provided in advance. E.g. Journals.
13. The registration fee should cover the excursion costs
14. Excursion should be on the last day of the conference (so that everyone is catered for, including the LOC)
15. There should have been a specific announcement for participants to tour the exhibits with a time allocation.

## **APPENDIX A**

### **THE SUB-COMMITTEES FUNCTIONS**

The local organizing committee consisted of seven (7) different committees each with terms of references. The committee members were drawn from the different organisation with a stake in the education sector.

#### **1. ABSTRACTS AND PROGRAMS COMMITTEE**

The committee received 102 abstracts from different African countries and other organisations. The breakdown of the submission of abstracts was as follows: Zambia: 42 (41%); Botswana, 50 (49%); Kenya, 7 (7%); Uganda 1 (1%), The Gambia 1 (1%) and finally, UNESCO as a transnational body one (1%). The process of reviewing process was challenging but the committee together with their counterparts in Zambia managed to review all abstracts.

#### **Botswana Educational Research Association (BERA) Training**

The Botswana Educational Research Association (BERA) at the University of Botswana invited all the local teachers and teacher training college lecturers to a three-day training workshop organized by LOC. Facilitators were the BERA officials who took all potential participants through training on conference paper writing in general, as well as presentation skills in front of large audiences. About thirty (30) both from secondary school teachers and colleges of education attended the three-day training exercise.

#### **Keynote Speakers**

The Committee was able to secure three keynote speakers for each of the three days of the conference in Prof. Jil Addler of the Witwatersrand, South Africa, Dr. Haniso Motlhanane of BIUST, Botswana and Dr. Raphael Dingalo of HRDC, Botswana.

#### **Program and Strands**

The committee was able to draft a programme for the conference, which was approved by LOC.

#### **Conference**

Abstracts as submitted by Organisation:

University:	36
College:	09
School:	22
Organisations:	15
Ministry Office:	10
<b>Total:</b>	<b>92</b>

All participants who were scheduled to present managed to present.

All the five breakaway rooms where presentations were made were inconveniently located.

Table 2: Total breakdown of presentations per day

Day	Total	Type of Paper			Country					
		Plenary	P/Sessions	Workshop	Bots	Zam	SA	Zim	Ken	UN
Day 1:	25 (14)	1	23	1	12	12	1	0	0	0
Day 2:	45 (11)	1	42	2	22	17	0	1	4	1
Day 3:	05 (08)	1	3	1	4	0	0	0	1	0
Total	75 (33)	3	68	4	38	29	1	1	5	1

## 2. ACCOMMODATION AND CATERING SUBCOMMITTEE

The sub-committee was tasked with securing venue for the conference and accommodation for participants. Maun Lodge was identified as the only suitable venue to accommodate the 250 participants for the conference.

### i. Conference Facility

- For Official opening
- Five (5) break away rooms were secured for the five (5) strands
- Projectors complimentary
- PA system complimentary
- Holding room for VIPs complimentary with tea/juice)
- Stage was secured at extra cost.

### ii. Feeding Arrangements

- Coupons for meals used.
- The BOMA restaurant was set for use by VIPs and SMASE-AFRICA Executive
- The restaurant adjacent to conference room was set aside for participants.
- The committee made arrangement with the hotel management to communicate changes in number of participants for following day by 1500hrs of each day.

### iii. Dinners

- Welcome hosted by Maun Lodge
- No alcoholic drinks except for toasting
- Entertainment complimentary
- Farewell hosted at Cresta Maun Resort
- Extra drinks were included in the conference budget.
- Entertainment outsourced at extra cost

#### iv. Accommodation

- A list of hotels with rates was uploaded on the SMASE-Africa website to enable participants to do direct bookings with the hotels. The Hotels were Maun Lodge, Cresta Maun Resort, Adansonia, Airport hotel and Sedie Riverside hotel. - Local participants, LOC were booked for lodging at Maun Lodge and Cresta Maun Resort.
- External participants and delegates made their own lodging arrangements.
- SMASE-Africa Secretariat and Vice-President were booked at First Choice Apartments at their own cost.

#### ***Challenges***

- The numbers of participants were not easy to track during the conference, to enable making adjustment for the next day. This came at a cost because fewer people would turn up each day though the service provider had already charged food.
- The dining space especially for tea was very small and as thus caused congestion in front of the conference rooms.
- On few occasions, members of the subcommittee had to assist international delegates at night, to find affordable hotels around.

### **3. EXCURSION, ENTERTAINMENT AND TRANSPORT COMMITTEE**

#### i. Excursions

- The committee organized excursions for delegates on 8 November 2018. All who participated paid for themselves.
- A bus truck from the North West District Council took primary school learners and their teachers to Moremi Game Reserve on 7 November 2018.
- Forty-four (44) participants (36 students from 6 different schools and eight teachers) took part in the excursion. The wildlife office in Maun provided a tour guide to accompany the learners.
- P130.00 was spent on the trip (P2.50 per student and P5.00 per teacher). The amount spent covered the entrance fee into Moremi Game Reserve.

#### ii. Entertainment

- All the groups that were invited honoured the invitation.
- Masalela a Bodimo traditional dance group was paid P3500.00,
- Marimba band was paid P4000.00 and
- The DJ was paid P6000.00.
- In total P13500.00 was spent on entertainment.

#### iii. Transport

- The Committee got all the vehicles it had requested
- No extra costs were incurred.

#### 4. EXHIBITIONS COMMITTEE

##### i. Exhibition area

- Three tents were secured and pitched on Monday 5<sup>th</sup> with the assistance of the prisons department.
- Furniture was secured from the regional offices.

##### ii. Exhibitions

- Eight (8) schools participated: Moremi, Kubung, Matshwane, Delta Water, Mogolokwane, Mathiba primary schools, Moeti JSS and Tshwaragano JSS.

##### iii. Private companies and other stakeholder: Table below;

Organisation	Report	Comments
Macmillan	Exhibited	Displayed products and had an officer to give more details.
HRDC	Exhibited	Had an information desk where they shared their materials to interested participants
BIUST	Did not exhibit	
BQA	Did not exhibit	
MoBE	Exhibited	Mobile lab.
New Era	Exhibited for two days	Brought a team of 6. They exhibited and the use of electronic kits. They shared their kits with Palapye students at the end of the conference.
MoTE (DRST)	Exhibited	Had an information desk where they shared their materials to interested participants

#### 5. FUNDRAISING COMMITTEE REPORT

A number of companies and stakeholders were sent requests for sponsorship; 56 local (Maun) service providers and 23 Service providers in Gaborone. Very few responded and some of those positive supported the activity through various sponsorship (included under sponsors below)

##### Sponsors

- Ministry of Basic Education (MoBE)
- SMASE-AFRICA
- Human Resource Development Council (HRDC)
- CrestaMaun Hotel (5 complementary rooms)
- Adanson Hotel (2 complementary rooms)
- Airport Hotel (5 complementary rooms)
- First Choice (2 complementary rooms)
- Maun –Mokoro lodge (2 complementary rooms)

- Grand Providence (sunhats for 60 students)
- Operation Investments (1 HP laptop)

## 6. REGISTRATION AND ADMINISTRATION SUB-COMMITTEE

### i. Registration

- The sub-committee was expected to register two hundred and fifty participants (250). The total number of participants registered was two hundred and ninety-eight (298). The total includes the number of participants who came for the official opening ceremony.
- Registration was done on-line prior to the conference and at the beginning of the conference (on site).
- The process of on-site registration started as early as Monday 5<sup>th</sup> November 2018 to avoid congestion at the beginning of the conference.
- Members of the committee divided into categories outlined as follows: Local Organizing Committee, International presenters, Local presenters, exhibitors, Non-presenters local. Six (6) officers were assigned to register the participants and the conference package was presented to those who had paid the conference fee.
- Those who had paid on-line were requested to produce proof of payment.

**Table 4: Registered Participants**

<b>ROLES</b>	<b>Local</b>	<b>International</b>	<b>Totals</b>
Keynote Speakers	11		2
Presenters	28	35	63
LOC	51	0	51
Observers	83	0	83
1. Teachers	(50)		
2. Others	(33)		
Exhibitors	86	0	86
1. Teachers	10		
2. Students	76		
Drivers	13		15
Totals	262	36	298

### ii. Conference Materials

- The name tags were provided to those who had registered.
- Delays in issuing tags to participants who had not registered prior to the conference were encountered.

- The conference materials such as printing paper, permanent markers and highlighters were secured from the Supplies department at the Ministry of Basic education HQ.
- Five laptops were secured from officers at the Ministry of Basic Education who were part of the Local Organizing Committee (LOC) for the conference.
- The packaging of the conference materials was done three (3) days before the conference started and were ready at the time of the conference.

#### iii. Participants Certificate

- The conference participants were issued certificates of attendance.

#### iv. Protocol and Ushering

- Protocol for Ministers handled by the District Commissioner's office assisted by Mrs V. Ridge and Mr Kefithile from the Local Organizing Committee (LOC).
- Fourteen (14) more ushers were also selected to assist in other different assignments as necessitated by the circumstances.
- The ushers were briefed about their roles before the conference and the guidelines were availed to them so that they had a guide to follow in executing their assignment.

#### v. Working Room for the Executive

- The working room was secured for the Local Organizing Committee and SMASE-AFRICA executive.

#### vi. Revenue Collection

- The registration fee was collected by SMASE-AFRICA treasurer at the point of registration.
- After registration all the registration fee collected was eventually reconciled with the registered participants to confirm if all the participants had paid.

### ***Challenges during Registration***

Despite the fact that the Registration and Administration Committee managed its assignment, the following challenges were experienced:

- Many participants registered on day one (1) of the conference and that caused congestion at the point of registration.
- Registration was done manually, making it cumbersome.
- There were delays in issuing nametags because there was no coloured printer at the registration site.
- The committee did not have a list of VIP (Directors and CEO's) from other departments/parastatals and had to make them queue with the rest of the participants, save for those who were known and were assisted accordingly.
- List of paid up participants was not availed on time by SMASE-AFRICA Executive.

## **7. LOGISTICS, PUBLICITY & MARKETING**

i. Conference Publicity: The following was done to publicize the event;

- 30 seconds advert aired on Botswana Television for 10 insertions and Radio Jingle at RB2
- 2 insertions of newspaper advert appeared on Botswana Daily News Paper
- Press Release and Media Invite done and sent to media houses on the 2<sup>nd</sup> October 2018.
- BTV Breakfast Morning Show
- Banners

ii. Certificates and ID Tags:

- The committee designed Certificates and ID TAGS for the conference.

iii. Procurement of Conference Promotional Materials:

- The committee in collaboration with other committees was able to secure the following promotional materials:
  - 250 ID Pouch
  - 60 String Bags for children
  - 250 Conference Bags
  - 250 Abstract Books
  - 250 Note Pads
  - 250 Conference Folder & Posters
  - 250 Golf Shirts for the participants
  - 60 Shirts for LOC and Executive
  - 60 Golf Shirts for LOC
  - Executive Custom Charges and Courier



## APPENDIX B

### SOME CATCHY MOMENTS

#### Official Opening



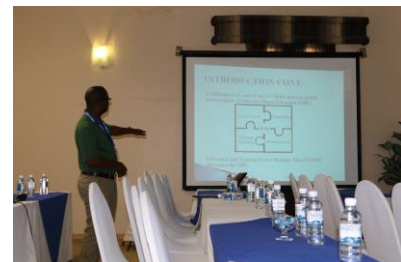
## Signing of Memorandum



## Speakers



## Presenters



## Projects and tour







## Attendance



## Entertainment



## Gifts



