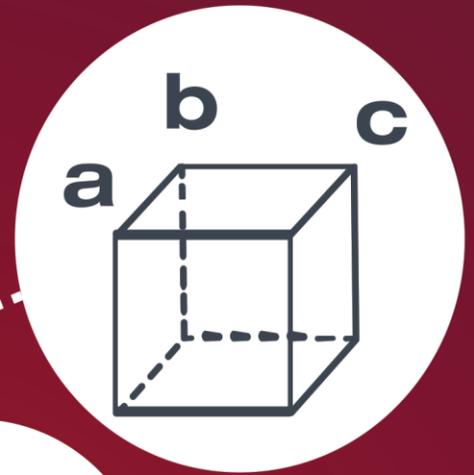


International Council on Education for Teaching

Expanding Access and Exploring Frontiers

July 9-11, 2018
Laredo, Texas, USA



TEXAS A&M INTERNATIONAL UNIVERSITY

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Welcome from the President of ICET



Dr. James O'Meara, President of ICET since 2012

Dean of the TAMIU College of Education

It is my great pleasure and privilege to welcome you to Laredo and the 62nd World Assembly of the International Council on Education for Teaching. As we come together to *discuss teacher education at the edge*. As part of my welcome, I would like to share two stories about the history of ICET before concluding with a brief explanation of the theme and share some insights into what lies ahead for ICET.

When did the ICET form? What does the name mean?

ICET as a concept began during an international teacher congress held in Copenhagen in August 1952. Key events during the congress included the formation of the World Confederation of Organizations of the Teaching Profession (WCOTP) and a commitment to form a group to prepare summary reports of opinions and current practices with regard to selected topics, including Education for Teaching. In 1953, a small group of teacher educators attending the WCOTP Assembly in London formed the International Council on Education for Teaching (ICET). Over the next five years, the group continued to meet during WCOTP Assemblies. Dr. William J. Haggerty, President of the State University of New York at New Paltz, was elected President of the organization for a three-year term in 1958. Haggerty described the purpose of ICET in 1961 as to bring persons interested in teacher education together and to publish material about the way teachers are prepared in different parts of the world.

Why Laredo and Why the Edge?

As we enter the Education 2030 era, “ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all” represents a challenge for those working in isolated and/or low resource contexts. Since most of the meetings of Education 2030 have occurred in major cities across the globe, the International Council on Education for Teaching chose the US border town of Laredo, Texas, to highlight how educators working along the edge of the US – México border are responding to this call of quality education for all.

The edge can represent either a border or a frontier. For some, a border represents a fixed, rigid barrier defining a clear-cut boundary. For the organizing committee, Laredo represents a forum for the explorers and pioneers redefining the frontier of teacher education. Frederick Jackson Turner describes “the significance of the frontier” in terms of the changes experienced by those who spend time in a frontier zone.

What Lies Ahead

As President of ICET, I am committed to working with the Board to sustain the traditions established during the last 61 World Assemblies. ICET will continue to host World Assemblies to provide a forum for persons interested in teacher education to come together to share knowledge about the way teachers are prepared in different parts of the world. During these assemblies, we will continue to recognize the thought leaders and servants to the promotion of educator preparation worldwide. After these assemblies, we will publish the Yearbook of Teacher Education to disseminate these ideas to those who are unable to attend this year’s ICET World Assembly. In closing, I would like to remind all that the secret to the sustained success of ICET lies in the strength of the ties formed during and between World Assemblies. I encourage you to use this week to reconnect with old friends and reach out to make new friends. Approach our Board Members to learn about Board Membership. Finally, I challenge you to continue to develop and share your knowledge so we can continue to explore the edges of our understanding of the education required for teaching in the 2030 era.

Reyes L. Quezada, Ed. D.

Chair, ICET

Professor and Department Chair, Department of Learning and Teaching

University of San Diego-School of Leadership and Education Sciences

As the Chair of the ICET Board of Directors, it is a pleasure say Welcome and “Bienvenidos” to the 62nd ICET World Assembly in Laredo, Texas. We specifically want to thank Dr. Pablo Arenaz, President of Texas A&M International University as the host of this year’s ICET World Assembly, and the College of Education. ICET is an international non-governmental organization (NGO) that brings together educators particularly, teacher educators from various parts of the world. We share, and present best educational practices, and discuss innovation in teaching and research, and discuss how these global issues, as well as challenges and opportunities we face and how they are dealt differently across international borders and contexts. ICET is known for its networking, it is inclusive, and the opportunities it affords us to meet in different parts of the world each year allows us to learn from one another and learn about education and teacher preparation from a global context and perspective.

I hope you attend the 2019 ICET World Assembly, as it will once again be at an exciting place where both cultural and academic learning will take place. I highly encourage you to learn more about ICET as an organization by talking to current and past Board members as well as many delegates who have been attending ICET for many years and consider the continuation as a member yourself. We welcome you to the Welcome Reception Sponsored by Laredo Convention & Visitors Bureau scheduled for Sunday, July 8 at La Posada Hotel where you can learn more about ICET and meet its Board of Directors.

The ICET 62nd World Assembly Gala and Change Maker Recognition Evening at the Max A. Mandel Municipal Golf Course will take place on Tuesday evening-it is an event not to miss! Our research network Learning in Community (LIC’s) table sessions are also scheduled during the week where you will have the opportunity to participate in conversation and dialogue on international research networks. Last, we look forward to seeing everyone on Wednesday at ICET’s Business meeting to update you on organizational programs that the organization is involved in. We hope you take advantage of these networks so you may meet new colleagues from throughout the world.

On behalf of the ICET Board we would like to thank the conference chair, Dr. James O’Meara, Dean of the College of Education at TAMIU and his conference organizing committee, particularly Jessica Verastigui, his assistant for the many hours they have invested to make this year’s ICET World Assembly a success. Past ICET Conference chairs know how much time, energy and effort events such as this require and we know that James and his team have developed an exciting and innovative Changemaker program that will be intellectually stimulating and will provide opportunities for us to socially and professionally interact with each other throughout the week.

On behalf of the ICET Board of Directors, I wish you have had an engaging and fruitful conference. While you are here at the conference, take time to explore Laredo, Texas as well as Nuevo Laredo, Mexico for everything they both have to offer!

Gracias a todos!

Reyes L. Quezada, Ed. D., Chair, ICET

Concept Note: The 62nd ICET World Assembly

Background and Rationale

The mission of ICET is to improve the educational experiences and outcomes of learners in all parts of the world by providing opportunities for those involved in their education to share knowledge, practice, resources, and expertise and establish active partnerships that are designed to enhance the quality of teaching and learning and improve life opportunities for learners. As we enter the Education 2030 era, “ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all” represents a challenge for those working in isolated and/or low resource contexts. Since most of the meetings of Education 2030 have occurred in major cities across the globe, the International Council on Education for Teaching chose the US border town of Laredo, Texas, to highlight how educators working along edge of the US – Mexico border and in low-resource settings are responding to this call of quality education for all.

At the Edge

The edge can represent either a border or a frontier. For some, a border represents a fixed, rigid barrier defining a clear-cut boundary. For the organizing committee, Laredo represents a forum for the explorers and pioneers redefining the frontier of teacher education. Frederick Jackson Turner describes "the significance of the frontier" in terms of the changes experienced by those who spend time in a frontier zone. We hope the delegates of the 2018 ICET World Assembly will benefit from this frontier experience and grow because of spending time with the explorers and pioneers they meet during their time at the edge.

Objectives

The main objectives of the 62nd ICET World Assembly in Laredo are to:

1. Provide workshops for teachers, administrators and other education specialists working in high-need, isolated, and low-resource settings
2. Promote cooperation between higher education, government, non-profit, NGOs, and the private sector to strengthen approaches for advancing educational outcomes in local contexts
3. Create an international forum for researchers to discuss the issues and trends linked to Sustainable Development Goal 4 within the Education 2030 Framework
4. Assist institutions all over the world to expand participation of undergraduate and graduate education students in the generation and dissemination of scholarly activity

Major Themes

The 2018 ICET World Assembly provides delegates with an opportunity to explore the trends and issues of the Education 2030 vision of inclusion and equity, gender equality and quality education. We invite authors and presenters to consider the following themes when preparing their submissions

Inclusion, equity and gender: addressing systemic, structural, and situational inequalities experienced by indigenous peoples, migrants and refugees, people who have been marginalized or are living with disabilities while mainstreaming gender issues via teacher training, curricula and pedagogy.

Quality learning: creating a sustainable supply of effective dual-language, enterprise education, global citizenship, and Science, Technology, Engineering, and Mathematic (STEM) educators supported by leaders committed to developing learning environments to open pathways of learning, discovery, and opportunity.

Lifelong learning provision: designing multiple and flexible learning pathways and entry points and re-entry points for accessing quality technical and vocational education and training, higher education studies and/or funded research opportunities.

Audiences & Resources

ICET World Assembly attracts a diverse audience that includes scholars, members of government and ministries, teachers, administrators and other education specialists.

Academics

Paper Sessions and Symposia

Each session consists of three to four papers with one Session Chair or Discussant, who handles introductions, time keeping, and guides the content of the session. All paper sessions are scheduled in 90-minute time blocks. Papers will be classified into one of the following teacher education themes

1. *quality early childhood development, care and pre-primary education.*
2. *relevant technical, vocational and tertiary education, including university*
3. *innovative enterprise education, global citizenship, and STEM outcomes*
4. *effective leading for learning in diverse, digital, high-need, isolated or low-resource settings*

Research Network Roundtables

The ICET Research Network Roundtable sessions aim to create a forum for researchers with a shared interest in advancing and disseminating knowledge in one of the three core ICET research themes: Internationalizing Teacher Education; Teacher Knowledge Mobilization; Teacher Recruitment, Retention and Development. The Research Network Roundtables are scheduled to meet for at least one hour during the World Assembly.

Students

Student Research Skills and Publication Strategies

Students attending the 2018 ICET World Assembly will be able to register for a series of Research Skills and Publication Strategies workshops. These sessions will involve working with editors of undergraduate research journals to learn how to transform their research assignments into peer-reviewed publications.

Key Resources

1. [The Global Education First Initiative](#)
2. [The Incheon Declaration](#)
3. [Unpacking Sustainable Development Goal 4 Education 2030](#)
4. [Education for People and Planet](#)
5. [Global Citizenship Education Topics and Learning Objectives](#)

Organizing Committee

Dr. James O'Meara

Dean of the College of Education at TAMIU

Patricia Lopez

Executive Assistant to the College of Education at TAMIU

Jessica Verastigui

Special Program Aid / ICET Secretariat

Melinda Lee Downie

Administrative Associate to the College of Education at TAMIU

Schedule of Events

Time	Monday, July 9
8:00-9:00 a.m.	Keynote Speech: Edem Adubra: Student Center Ballroom
9:15-10:45 a.m.	Session 1 Presentations: Various Rooms
10:45-11:00 a.m.	Break
11:00-12:30 p.m.	Session 2 Presentations: Various Rooms
12:30-1:30 p.m.	Lunch: Dusty Diner
1:30-2:15 p.m.	Teacher Quality and Quantity: Matthew Opoku Prempeh Student Center Ballroom
2:30-4:00 p.m.	Session 3 Presentations: Various Rooms

Time	Tuesday, July 10
8:00-9:00 a.m.	Keynote Speech: Carolina Zaragoza: Student Center Ballroom
9:15-10:45 a.m.	Session 1 Presentations: Various Rooms
10:45-11:00 a.m.	Break
11:00-12:30 p.m.	Session 2 Presentations
12:30-1:30 p.m.	Lunch: Dusty Diner
1:30-2:15 p.m.	Life-Long Learning: Luis Hernandez: Student Center Ballroom
2:30-4:00 p.m.	Session 3 Presentations

Time	Wednesday, July 11
8:00-9:00 a.m.	Keynote Speech: Hendrina Doroba: Student Center Ballroom
9:15-11:00 a.m.	Session 1 Workshops & Movie
11:00-11:15 a.m.	Break
11:15-12:00 p.m.	Session 2 Workshops and Movie
12:00-1:00	Report from Roundtables and ICET Business Meeting

Special Events Schedule

Sunday, July 8, 2018

- Welcome Reception: The reception will be located at La Posada Hotel, a historical landmark in downtown Laredo. 7:00-9:00 p.m.

Monday, July 9, 2018

- World Market and Silent Auction of International Fair-Trade, American Hand-made, Local Business, Gift Cards, Art, Craft, Jewelry, Home Décor, and MORE! Student Center Rotunda, 8 a.m.-5 p.m. Auction bidding ends at 4:40.
- Shopping for Mexican Souvenirs – Basket and Pottery Alley. 4:45 p.m.
- Local Event: Rhapsody on the Rio Grande (Free Movie Event) at the Outlet Shoppes at Laredo. 7:00-9:00 p.m. (Meet in La Posada Hotel Foyer at 6:45 P.M.)

Tuesday, July 10, 2018

- World Market of International Fair-Trade, American Hand-made, Local Business, Gift Cards, Art, Craft, Jewelry, Home Décor, and MORE! Student Center Rotunda, 8 a.m.-5 p.m.
- ICET 62nd World Assembly Gala and Change Maker Recognition Evening at the Max A. Mandel Municipal Golf Course. Bus pickup at 6:30 PM. (Meet in La Posada Hotel Foyer at 6:15 p.m.) 7:00-9:00 p.m.

About the International Council on Education for Teaching (ICET)



The International Council on Education for Teaching (ICET) is an international association of policy and decision-makers in education, government and business dedicated to global development through education. ICET provides programs and services that give its members access to a worldwide resource base of organizations, programs, specialized consultative services and research and training opportunities at the university level. It is a Non-Governmental Organization (NGO) and participates in NGO meetings and other UNESCO-sponsored conferences around the world. ICET is a NGO in consultative status (Roster) with the Economic and Social Council.

Founded in 1953, ICET was part of a major cooperative effort by the world's education community to provide quality education for its citizens. Since then, ICET has continued to emphasize international cooperation in educational development to improve the quality of teacher education and to expand global educational opportunities. Scholars, administrator, practitioners from universities, colleges, departments and institutes of education as well as members of government ministries, the teaching profession and business leaders interested in educational development are invited to participate in ICET and share their ideas, research and experience with professionals from around the world.

Keynote Speaker: Dr. Edem Adubra



Edem Adubra joined UNESCO in 2003 in the Division of Secondary, Technical and Vocational Education as a programme specialist (P3). In 2006, he transferred to Windhoek Cluster Office as P4 to lead UNESCO's Education programme in Angola, Lesotho, Namibia, South Africa and Swaziland. Most of his responsibilities included support to the reconstruction of the Angolan education system after the civil war. He also coordinated partnership in Education between UNESCO and the Southern African Development Community (SADC), particularly in the areas of teacher training, higher education, TVET, EMIS, ESD and HIV/AIDS.

Adubra obtained his Bachelor degree in Arts from Université du Bénin (Lomé, Togo) in 1980, his Master's degree in Linguistics from Lancaster University (UK) in 1987, and a dual Doctoral degree in Educational Administration and Comparative and International Education from the Pennsylvania State University (USA) in 2002. He received several distinctions, including the Hubert Humphrey Fellowship Award in 1996 (USA) and the Fellowship Award of the African Federation of Teaching Regulatory Authorities – AFTRA (2017)

Keynote Speaker: Carolina Zaragoza



Carolina Zaragoza Flores was appointed by President of Mexico Enrique Peña Nieto and ratified by the Mexican Congress as Consul General of Mexico in Laredo, Texas on March 5, 2015. She took office as a Consul General of Mexico in Laredo, Texas on May 1st, 2015. On April 26, 2017, she was promoted to the rank of Ambassador.

Carolina Zaragoza Flores was born in the Southwestern City of Taxco, Guerrero, Mexico.

She has a B. A. degree in Foreign Relations from the National Autonomous University of Mexico (UNAM); a Master's degree from Saint Louis University in Missouri as well as Advanced Studies in International Affairs at the Matias Romero Institute for Diplomatic Studies in Mexico City.

Featured Speaker: Hendrina Chalwe Doroba



Hendrina Chalwe Doroba is the Executive Director of the Forum for African Women Educationalists (FAWE)-Africa. She has over 35 years of experience in education, gender, policy advocacy and development, working with government, donors, local and international NGOs, a teacher trainer and mathematician. She is passionate about supporting/building the capacities of teachers in gender responsive pedagogy and empowering the youth to take responsibilities in addressing issues that hinder their education especially in Mathematics Science and Technology. A member of the Advisory Board of the Global Monitoring report, UNGEI Advisory Board, Global Women Leadership Network (GWLN) and Synergos Senior Fellow (2014), Chairperson of GIMAC Steering Committee and represents GIMAC on ECOSCCO.

Featured Speaker: Chemwi Mutiwanyuka



Chemwi Mutiwanyuka is a Programme Analyst with the ADEA Working Group on Education Management and Policy Support where she has worked for 7 years. She has participated in three EMIS Peer Review exercises to date and contributed to the development of the SADC EMIS Norms and Standards and Norms and Standards Assessment Framework. Her portfolio also includes the African Union Specialized Technical Group on Education, Science and Technology as well as fostering gender sensitive education practices. She has previously written and moderated an online discussion for the Commonwealth on Funding education (the role of scholarships, bursaries and other mechanisms) on behalf of ADEA.

Featured Speaker: Suky Kang



Suky Kang is Director of International Partnerships with Code.org. This nonprofit is dedicated to expanding access to computer science in schools and increasing participation by women and underrepresented minorities. The leadership of Code.org believe that every student in every school has the opportunity to learn computer science, just like biology, chemistry or algebra. Code.org provides the leading curriculum for K-12 computer science in the largest school districts in the United States and Code.org also organize the annual Hour of Code campaign, which has engaged 10% of all students in the world. Before joining the Code.org team, Suky taught youth and adults in art museums, Spanish classrooms, after-school coding camps, and equity and social justice workshops.

Featured Speaker: Diana Richie



Diana Richie is the Strategic Partnerships Director at New Teacher Center (NTC). This nonprofit is dedicated to improving student learning by accelerating the effectiveness of teachers and school leaders. NTC builds capacity within districts and district partners to drive student learning, teacher effectiveness, and teacher and leadership development. They do this by providing PreK-12 teachers and school leaders with the skills and supports needed to create optimal learning environments that accelerate students' academic (literacy and numeracy) and social emotional success. NTC provides new teachers with research-based, high quality mentoring and coaching to improve preparation and retentions and as a result ultimately, boost student achievement.

Featured Speaker: Valentina Raman



Valentina Raman is the US Empathy Engagement Manager at Ashoka US. This non-profit identifies and mobilizes a global community to embrace these new frameworks and build an “everyone a changemaker” world. Ashoka US works to ensure that every child masters empathy through our Start Empathy initiative, which includes a growing network of Changemaker Schools. Via Youth Venture, it reaches teens and the organizations that serve them to encourage young changemaking. Ashoka U, meanwhile, has set the standard at the university level for what it means to incorporate social innovation into the culture and curriculum of higher education. Moreover, Changemakers.com continues to be a platform for changemakers of all kinds to come together in service of social progress, most notably via its online competitions. All of this work supports our central aim: to shape a country where problems no longer outrun solutions, and where each one of us feels empowered to drive positive change in ways big and small.

Featured Speaker: Mary Yarus



Mary Yarus is Vice President of Family Support and Adult Literacy at Nuehaus Education Center. This nonprofit was founded in 1980 by a group of parents and teachers who were interested in bringing effective Orton-Gillingham-based reading instruction to Houston. They had just organized the Houston Branch of the Orton Society (currently the International Dyslexia Association) as a way of gathering information about appropriate instruction for their dyslexic students. Since the beginning, parents whose children were struggling to learn to read have called Neuhaus for information and direction on how to help their children. In response, the Family Support Office has grown to meet their needs. Family Support Coordinators respond to calls and emails for information. Monthly Information Presentations and annual seminars are scheduled to give more in-depth information to parents. Adult learners also called Neuhaus for literacy help. In 1985, in response to interest expressed by adults in the community who wanted to improve their reading and spelling skills, adult reading and spelling classes began. By 2011, classes were held two evenings a week during the school year. This outreach program led to the publishing in 1993 of a new Neuhaus curriculum, Multisensory Reading and Spelling.

Featured Speaker: Akwasi Addae-Boahene



Akwasi Addae-Boahene is Chief Technical Advisor Transforming Teacher Education and Learning (T-TEL). This teacher education is a four-year Government of Ghana Programme supported by the UK's Department for International Development, and managed by Cambridge Education in association with the Open University of UK. The mission of this programme is to transform the delivery of Preservice Teacher education in Ghana by improving the quality of teaching and learning through support to all 38 Colleges of Education. T-TEL is part of Girls – Participatory Approaches for Student Success (GPASS), a Government of Ghana programme targeting resources at school management, teacher skills and research to improve education, particularly for girls. Key program components include: training and coaching for tutors in Mathematics, English and Science, and eventually some generic materials for all tutors; support to the management of Colleges and training of College Principals; support to reform of the pre-service curriculum; and support to the development of more effective student practicums;

Featured Speaker: Dequan Li



Mr. Dequan Li is a senior representative of E-Platform International Education Science and Technology (EPI) China. EPI has recently joined the Future Schools Research Institute of CSDP, a unit of Ministry of Education, as the strategic partner and consultant. The Future Schools Research Institute is one of the two major units of National Center for School Development Programme (CSDP) of the Ministry of Education. CSDP is a unit directly under the Ministry of Education with the mission of serving educational reform and innovation on three leading educational innovation projects: green, smart and future -oriented new campus (School 2.0), university smart learning workshop, future school (basic education), promoting future -oriented school form change and educational technology innovation.

Featured Session: Sanford Harmony

Communicate.	Learn relationship skills that promote self-confidence and respect.
Cooperate.	Work cooperatively and collaboratively with others.
Connect.	Develop an increased sense of connection with their peers.
Embrace diversity.	Learn to appreciate similarities and differences.
Resolve conflict.	Develop positive conflict resolution strategies that will last a lifetime.
Build healthy relationships.	Helps to reduce stereotyping, teasing, harassment and bullying.

Sanford Harmony is a social-emotional learning program that builds stronger classroom relationships so teachers can spend less time managing troublesome classroom behavior and more time teaching! Sanford Harmony provides relationship-building strategies that foster stronger classroom communities by helping each child understand and appreciate the diversity in others. By

breaking down barriers to relationships, Sanford Harmony enables students to connect and collaborate with others at much deeper levels. Children feel more comfortable and connected in their classrooms, leading to a more effective teaching environment that promotes more harmonious interactions and supports improved academic achievement.

Sanford Harmony is available to schools free of cost through the Sanford Education Center. Currently used in thousands of classrooms across the U.S., the program:

- Is designed for students in grades Pre-K through 6th
- Improves student cooperation, collaboration and problem solving
- Helps to reduce teasing, bullying, and aggression
- Establishes trust and encourages connection and empathy
- Promotes harmonious peer-to-peer relationships
- Includes materials for parent communication

Sanford Inspire

Sanford Inspire is a movement of teacher preparation programs committed to improving student outcomes through providing teachers with personalized professional development. Teacher preparation programs who collaborate with Sanford Inspire improve student outcomes through providing teachers with personalized professional development. The Sanford Inspire Program includes a series of no cost, on-demand professional development experiences that provide engaging and meaningful opportunities to enhance teacher craft, technique, and skill. These self-guided, online courses can be completed in 60 minutes or less and include tools that teachers can immediately implement in the classroom.

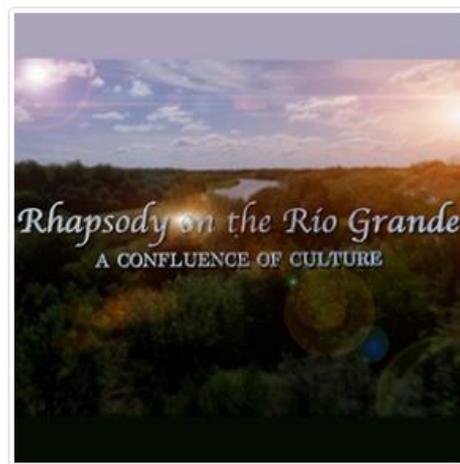
	Learning Environment Child Well-Being, Classroom Procedures, Managing Student Behavior, Safe & Welcoming Environment
	Planning & Delivery Backwards Design, Checks for Understanding, Components of Direct Instruction, Components of Inquiry, Differentiation, Elements of Delivery, English Language Learners
	Motivation Culture of Achievement, Motivation Theory
	Student Growth & Achievement Assessment, Setting Goals, Tracking Progress
	Professional Practices Culturally Responsive Pedagogy, Professional Conduct, Reflective Practitioner

Featured Event: Rhapsody on the Rio Grande

“Rhapsody on the Rio Grande,” is an innovative film produced with generous funding support from the City of Laredo, and based on a haunting musical composition, “Rapsodia,” by TAMIU faculty member and University organist [Dr. Colin Campbell](#). It explores the river’s immutable ability to bring together diverse peoples and, using music, explores the streams of culture, history and identity.

Laredo Mayor Pete Saenz said the documentary opens the door to the wonder that is Laredo.

“We are proud to collaborate on such a worthy endeavor. This film-making work of art showcases Laredo’s bountiful culture manifested through its rich history and gifted people,” said Mayor Saenz, “This documentary captures “*nuestro* Laredo,” our communities’ longstanding ability of bringing people and their talents together. As we show this film off to the world, I can only hope that the effect it has on viewers is as enticing and uplifting as I see it. Our community is complex in ways, yet, embraces simplicity in expression and care. We have outstanding educational institutions, truly one-of-a-kind music, talented people and invariably, our bilingual and bicultural border mix is a strength to be touted. This film opens the door to the wonder of who we are,” Saenz concluded.



Arthur Emerson, president and CEO of KLRN, which produced the film, said it is truly a labor of love.

“Rhapsody on the Rio Grande is a labor of love that has been in the making for two years. We are so pleased that the final product is ready for broadcast. Laredo has played an essential role in shaping the culture of South Central Texas, and this documentary takes the unique features and diverse talents of this community and brings them to light for all to see,” Emerson noted.

The film was produced by KLRN and directed by Austin-based filmmaker Luke Dillard.

Part of the film’s special charm is its colorful use of the sounds of Campbell’s composition as performed in concert by the Laredo Philharmonic Orchestra, under the direction of Brendan Townsend, accompanied by the famed Mariachi Nuevo Tecalitlán de Guadalajara, directed by Fernando Martínez.

School Visit: Hector J Garcia ECHS

A National Blue Ribbon School



Hector J. Garcia Early College High School
 5241 University Boulevard, Laredo, TX 78043
 Phone: 956-273-7700 | Fax: 956-273-7795



Hector J. Garcia Early College High School (GECHS) is a partnership between the Laredo Independent School District and Texas A & M International University (TAMIU). GECHS is a small public high school (a maximum of 480 students) that draws students from every middle school in the Laredo Independent School District of Laredo, Texas. There are four grade levels, ninth to twelfth, with approximately 120 students per grade level. The mission of Garcia Early College High School is to provide our students with the cognitive skills and subject area knowledge that students need to master in order to succeed in today's colleges and universities. Garcia Early College High School offers a rigorous academic program with a small personalized setting. Students who attend GECHS must have a strong work ethic that will contribute to a successful college experience.

ADMINISTRATION

Dr. Sylvia RiosSuperintendent
 Mr. Israel Castilla.....Principal
 Cindy L. Dominguez.....11th/12th Counselor
 Yvonne Leal.....9th/10th Counselor

ACCREDITATION

H.J.Garcia Early College High School @ TAMIU has been an *Exemplary School* and has received *Distinction Designations* from the Texas Education Agency

STUDENT BODY

As a small public high school, with comprehensive curriculum, Laredo Early College High School is one of four high schools in the Laredo Independent School District. Garcia Early College High School considers specific student populations as part of its recruitment efforts:

- Students who are first-generation college goers
- Students who are identified at-risk
- Students lacking access to the academic preparation needed to meet college readiness standards for whom the cost of college is challenging
- Students identified as Limited English Proficient

The approximate enrollment of 435 has an ethnic composition which mirrors the city of Laredo. 90% of the student population at GECHS is identified as Hispanic. Over 95% are candidates for a two or four year postsecondary institution.

HISTORY

Laredo Early College High School opened its doors in August, 2006 with 102 students. In August 2017 Hector J. Garcia Early College HS enrolled 435 students

CLASS of 2017

Last May 98% of our graduates earned 40+ Dual Credit ours at Texas A&M International University, and of those 56% graduated with 60+ college hours.

CURRICULUM

An Academic Program That Prepares Every Student for College Work

- Pre AP classes constitute part of the curriculum
- Standard-based curriculum holds all students to high expectations
- Academic catch-up program combines basic skills with advanced concepts
- Differentiated instruction meets the learning needs of each student
- College Readiness Class addresses college level indicators
- Instructional delivery incorporates technology and media

COMMON INSTRUCTIONAL STRATEGIES

- Collaborative Group Work
- Writing to Learn
- Literacy Groups
- Questioning
- Scaffolding
- Classroom Talk
- Fundamental Five

DLA GRADUATION REQUIREMENTS

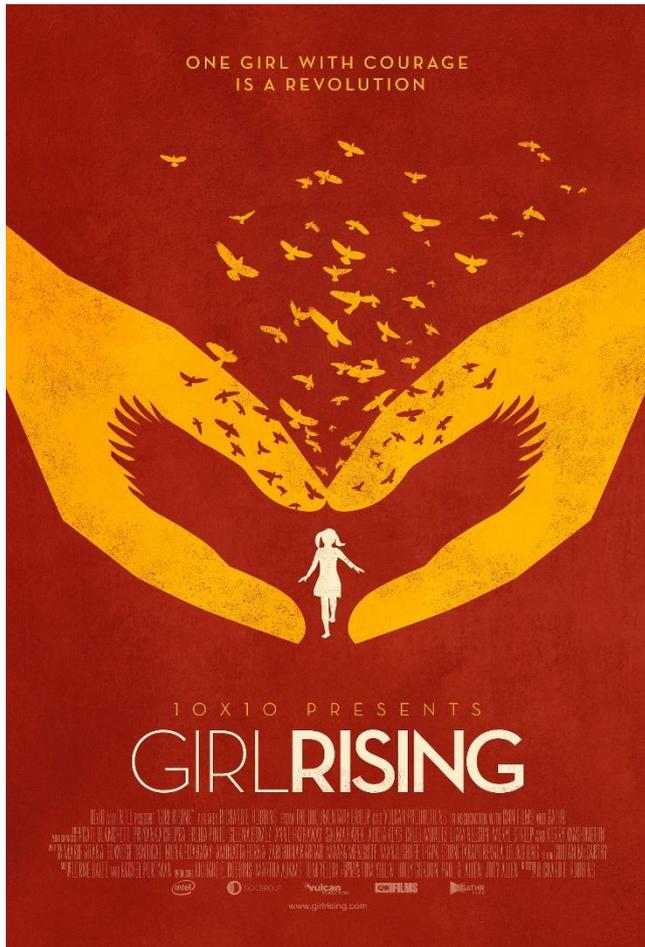
(Class of 2018)

SUBJECT AREA	CREDITS
English	4.0
Communication Applications	.5
Math	4.0
Science	4.0
Social Studies	3.5
Economics	.5
Health	.5
Physical Education	1.5
Other Languages	3.0
Fine Arts	1.0
Technology Applications	1.0
Electives	2.5
TOTAL CREDITS REQUIRED	26.0

POSSIBLE PERFORMANCE ACKNOWLEDGEMENTS

National recognition on PSAT/ACT-PLAN, Bilingualism, AP Exams Score 3, 4, or 5, 12 hours with 3.0 GPA, ACT score 28 Composite without writing, SAT Reading + Math score =1250, Natl./Intl. Certification or License

Featured Documentary: Girls Rising



The movie tells the stories of nine girls from different parts of the world who face arranged marriages, child slavery, and other heartbreaking injustices. Despite these obstacles, the brave girls offer hope and inspiration. By getting an education, they are able to break barriers and create change. Each girl's story was written by a renowned writer from her native country.

Girl Rising - an innovative new feature film about the power of education to change a girl - and the world. Girl Rising is powered by strategic partner, Intel Corporation, and distribution partner CNN Films. Meryl Streep, Anne Hathaway, Liam Neeson, Cate Blanchette, Selena Gomez and other A-list actors contribute voice performances to the film, which features original music from Academy Award winner Rachel Portman, in collaboration with Hans Zimmer. The film spotlights unforgettable girls like Sokha, an orphan who rises from the dumps of Cambodia to become a star student and an

accomplished dancer; Suma, who composes music to help her endure forced servitude in Nepal and today crusades to free others; and Ruksana, an Indian "pavement-dweller" whose father sacrifices his own basic needs for his daughter's dreams. Each girl is paired with a renowned writer from her native country. Edwidge Danticat, Sooni Taraporevala Aminatta Forna and others tell the girls' stories, each in its style, and all with profound resonance. These girls are each unique, but the obstacles they faced are ubiquitous. Like the 66 million girls around the world who dream of going to school, what Sokha, Suma, Ruksana and the rest want most is to be students: to learn. Now, by sharing their personal journeys, they have become teachers. Watch Girl Rising, and you will see: One girl with courage is a revolution.

Abstracts (By order of presentation)

Note: only the abstracts of those who presented at the World Assembly are included in this section of the proceedings.

2. Faculty-Led Programs: The Key to Unleashing the World for First Generation Students

Triana Valdez and Minita Ramirez, Texas A&M International University, United States
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Providing an international opportunity for first-generation students is not always easy. Getting students to take the chance is easier when traveling with an adult/faculty member. Helping Faculty develop these programs and direct recruiting support for the faculty to make the classes, is critical to the success of the program. Partnering student services with faculty, chairs and deans allows for enthusiasm and strong and successful programs. Presenters will share the best practices in developing a program abroad and how to engage and partner with Student Services to assure the making of the class. Additionally, the majority of the presentation will focus on real examples and engage the discussions of the personal issues which complicate matters for first-generation Hispanic students who wish to study abroad. Students who have never left the area of South Texas and/or Northern Mexico have many questions and in many cases are afraid to ask because they think everyone else know the answers and only they do not. The number one reason students do not apply for these opportunities is they fear traveling alone. The challenge is the same as the opportunity; leading students through their first experience abroad is what opens their minds to the reality that "they can do anything." Developing confidence in first-generation students and exposing them to another world is a game changer. Having a faculty member whom the students already respect and trust lead them through their first experience is definitely a life altering and leads to the students' success.

3. Why Teach? The Challenge of Attracting New Entrants into the Teaching Profession in England – Is There an Answer?

James Noble-Rogers & Jackie Moses, UCET
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The House of Commons Library highlights that 'whilst overall teacher recruitment was above target in each year from 2006-07 to 2011-12 it has been below target in each year since. In the current application cycle (2017/18) applications to teacher training are down by 33% compared to the same time in the previous year (January) and the situation is much worse in the secondary sector', where the increase in pupil number means that demand for teachers is higher than in other age phases. UCET have been asked by the Department for Education to investigate the reasons why teacher recruitment and retention in England is facing such challenging times. UCET will work with current Initial Teacher Education providers and their partner schools to explore reasons why entry into the profession is in decline. It will also take the opportunity to investigate whether a number of factors are having an impact on the current recruitment and retention figures. We will conclude by considering what could be might be done to try to address this imbalance and considering some of the options that the government may wish to consider in order to address this current crisis.

4. Elevating Online Educator Preparation Programs to Improve Persistence and Timely Completion

Kashif Asdi, Academic Partnerships
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Increasing student persistence is a long term goal in all online and brick and mortar academic institutions. By 2020, the prediction is that more than 50% of the students will take at least one online course (Allen & Seaman, 2014). There is an increased concern about student persistence in online courses among academic and administrative leaders. The consequences of student dropout are significant for students, academic and administrative staff. This session provides a systems, team-based, approach to enhance online educator preparation programs for improved student persistence and timely completion. Research-based best practices in program planning, course development, course delivery, and student experience along with the impact these processes have on persistence rates and timely completion will be shared.

5. Commensurate Challenges Faced by Teachers in the Teaching Geometry Proofs in Grade 12

Kakoma Luneta, University Of Johannesburg, South Africa
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The way we teach Geometry has been debated over many years. Until Van Hiele and his wife (1986) developed a systematic way to approach Geometry, it was a kind of personal way and use of behaviorism and or constructivism was made. One important point that has been missed in the literature is all proofs use an inductive approach. But to use such an approach implies the person must know the algorithmic path to follow. While Van Hiele made some concrete recommended on how to teach Geometry, he did not take the idea a step further and offer guidance of how to solve Geometry problems/ riders. Geometry has been recognised as a difficult part of Mathematics both to teach and learn. The reason could be that procedural and conceptual knowledge appear and ought to be operationalized simultaneously especially in riders. This paper aims at guiding the teacher and the learner with declarative knowledge (theorems) towards solving the rider. The idea is based on a study conducted in 2012 which involved Mathematics structures combined with analysis and synthesis.

6. MESH International: Improving the Quality of Teaching Via a Knowledge Management System/Mobilization Strategy to Develop Evidence-Informed Practice

Sarah Younie, Linda la Velle, and Marilyn Leask

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MESH (Mapping Educational Specialist KnowHow) is a low-cost, international, educational research knowledge management system for evidence-informed practice. This project addresses the UNESCO SDG 4 for “generating inclusive and equitable quality education and promoting lifelong learning opportunities for all in education”, by creating a model for quality-assured knowledge for educators, offering connectivity and research summaries (MESHGuides). With international authors and a network of educators from 186 countries, MESH aims to share knowledge to support teacher professional development globally, support the efficient use of existing resources and give equitable access to knowledge for teachers and learners regardless of location. This paper presents the knowledge mobilisation strategy of MESH, focusing on approaches for maximizing the impact of research findings from doctoral research, plans for extending the reach of research and the challenges of translational research across contexts, particularly those of developing countries. Data from an international questionnaire to explore teachers’ current research practices are presented and discussed. In three months, 308 responses from twenty-four separate countries were gathered. Data shows that teachers engage with research knowledge through practices such as reading and discussions within their worked-based settings, but they engage less on postgraduate studies and networking outside of their own institutions. Equally, respondents were positive about the MESHGuides approach to providing research knowledge and reported use of this approach to support development of their practices. An update will be provided on the work of the MESH Policy Committee, which is bringing the MESH system to the attention of policy makers and aid agencies.

7. An Evidence-Based Model for Improving Student Achievement by Accelerating the Effectiveness of Early Career Teachers

Diana Richie, New Teacher Center, United States

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Over the last 20 years, New Teacher Center (NTC) has worked with state agencies, school districts, policy-making organizations, and a range of educational institutions to define the characteristics and fundamental elements of high-quality induction programs that accelerate the development of new teacher effectiveness, improve teacher retention, strengthen teacher leadership, increase student learning, and support equitable outcomes for every learner. Diana will share the evidence-based behind NTC’s program the critical components that have proven to improve student learning.

9. The Effect of Formal, Non-Formal and Informal Learning on Teachers' Promotion to Middle Leadership Roles in Schools

Smadar Donitsa-Schmidt & Ruth Zuzovsky, Kibbutzim College of Education, Israel
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Teachers' professional development occurs through multiple avenues. These include formal learning activities such as credited studies in higher education institutions, non-formal learning such as in-service workshops in teacher centers, or informal on-job experiences. Studies that evaluated the effect of these learning experiences focused mainly on the improvement of teachers' knowledge, skills and instructional practices and ultimately on students' learning. The present study examined the effect of formal, non-formal and informal learning experiences on teachers' promotion to middle leadership roles in their schools during early career stages. Middle leadership roles are defined as posts of responsibility held by teachers who are not regarded as part of the senior school management. Analyses were based on data from two entire cohorts of Israeli teachers who completed their pre-service programs in 2005-2006 and started teaching in elementary or secondary schools (N=4,624). They were followed until 2015. Results showed that Israeli teachers continue their formal and non-formal learning alongside their teaching duties throughout their first decade of work. By the end of ten years, about a quarter of the teachers were holding a middle leadership position. Findings showed that all types of learning affected the holding of leadership positions; yet, the effect was differential throughout the years. The effect of formal learning grew over the years, and it became the most influential factor of teachers' promotion to leadership roles after a decade. Informal learning remained an influential factor throughout the years. Non-formal learning had the lowest effect. Policy implications will be elaborated.

10. Exploring the Tools of Leadership by Education Leaders in Public Secondary Schools in Lagos

Tola Olujuwon & Juliet Perumal, University of Johannesburg, South Africa
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This multiple case study explores the tools of leadership used by education leaders to manage schools. It aims to identify the tools that leaders use to enhance performance in schools in the context of Nigerian public secondary schools. The research participants purposively selected based on research criteria were nine teachers, three principals, three vice principals, and an educational administrator in an educational district in Lagos State, Nigeria. The study used semi-structured interviews and an analysis of Nigerian education policy documents to elicit data. The findings provide insights into tools of leadership such as power, authority and influence used by leaders which could make or hinder progress in schools. The findings reveal the power discourses used by leaders on their subordinates as well as the impact of individual differences, ethnicity and micro politics employed by leaders on teaching and learning. The study recommends adherence to ethical standard in administering schools which would enhance the morale of staff and thereby increase performance in teaching and learning. Tools of leadership employed by leaders are of great significance in students' performance and effective leadership in public schools.

11. Inspiring Girls and Young Women to Become Teachers in Africa

Hendrina Doroba & Chemwi Mutiwanyuka

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The “Most Significant Change stories” was a joint competition launched on Thursday, 19th November 2015 in order to map innovative programmes that have advanced girls’ secondary education in the African continent. The initiative involved six (6) countries namely Mali, Senegal, Sierra Leone, Uganda, Zambia and Zimbabwe with each submitting its own top three stories. A total of 18 stories were reviewed and ranked by the Fawe and ADEA team. They were later submitted to a panel of three (3) judges who were representatives from the Ministry of Education of Burundi and Kenya as well as the UNESCO office in Kenya. Out of these, the top three most innovative stories were selected using the criteria of access, retention and performance.

12. ECHS Inspiring Hispanic Students to Become Teachers in Hispanic Serving Communities

Israel Castilla, Hector J. Garcia Early College High School (ECHS)

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Inspiring Hispanic Students to Become Teachers in Hispanic Serving Communities like Laredo involves a partnership between the school district, the university, students, and their families. Hector J. Garcia Early College High School (ECHS) celebrates each World Teachers’ with the induction of a cohort of students into the TAMIU Pre-Ed Track. These inductees are currently students enrolled in the Laredo Independent School District ECHS who have declared education and teaching as their desired future career. During the induction, the students received a TAMIU RISE badge and were challenged to abide by the TAMIU code of Respect, Integrity, Service and Excellence (RISE) as they complete their Pre-Ed experience while at the Early College High School. Parents are included in the ceremony as the role of the family is a key driver of success in the Hispanic community. The Celebration also emphasizes on the importance of preparing qualified teachers.

13. Designing Dual-Credit Pathways to Recruit and Support High-Quality Candidates from Hispanic Serving Schools

James O’Meara & Cindy Dominguez, Texas A&M International University, United States

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US Accreditation bodies require teacher preparation programs to develop plans and set goals to recruit support and graduate high-quality candidates who reflect the diversity of local classrooms. Hispanic-serving schools from Laredo provide a unique set of recruitment challenges for local teacher preparation programs seeking to meet this requirement. These challenges include addressing parental concerns about the cost of a degree and balancing the competing priorities of university and family expectations. The presenters will share preliminary data on the implementation of a Pre-education initiative designed to address these concerns. The initiative involves a partnership between TAMIU and the Hector J. Garcia Early College High School. In 2017 Hector J. Garcia Early College High School was one of only 5 High School in Texas named as a National Blue Ribbon School by the U.S. Department of Education. The National Blue Ribbon Award is bestowed to schools that have achieved a high level of academic excellence. Participants will learn about how the combination of a dual- credit program design and student support is assisting TAMIU mitigate the impact of these challenges and help Laredo Independent School District recruit high quality STEM and Bilingual Education graduates for local hard-to-staff schools.

14. 20 by 2020: Increasing the Recruitment, Preparation, and Retention of Teachers

Priscilla Aquino, Educate Texas

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The 20 by 2020 Student Success Plan promotes success by reaching 20 percent of Texas students and teachers in four key impact areas (College Readiness, Effective Teaching, Higher Education and Collective Impact) by 2020. Educate Texas partners with state agencies, school districts, high-performing charter schools, colleges of education, high-quality alternative certification providers and individual schools to implement innovative practices shown to enhance the quality of teaching. Educate Texas helps identify and implement evidence-based policies that support effective teaching. The objective is to design a teacher pipeline for recruitment, development, evaluation, compensation and retention of excellent teachers.

15. Providing Teachers with Empowering and Authentic Learning Pathways: An Example from a Graduate Program ‘North of the Border’

Cher Hill and Paula Rosehart, Simon Fraser University, Canada

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This paper describes the ways in which our graduate-level programs provide practicing teachers with empowering possibilities for professional learning, as well as reports on the impact of our programs. Foundational to our Diploma and Masters programs are practitioner inquiry methodologies (Cochran-Smith & Lytle, 2009; Pinnegar & Hamilton, 2009; Samaras, 2011) in which our teacher-learners engage in the intentional, disciplined study of their own teaching practice, enabling them to address tensions specific to their professional context. This fieldwork is combined with coursework focused on a particular theme (such as Inclusive Education or French Language Learning), bridging theory and practice. Learning is ungraded - encouraging teachers to take risks, and involves continuous self, peer and instructor assessment of core professional capacities, holistic ways of knowing, doing and being (McDiarmid & Clevenger Bright, 2008). Teachers are encouraged to represent their learning through diverse mediums, such as narratives, art, and poetry, as well as standard academic texts, deepening and extending understandings of practice. Our instructional teams are comprised of master teachers seconded from schools, university scholars, and mentors, and programs are developed in collaboration with k-12 school districts and other organizations (e.g. First Nations Communities, Francophone Associations), contextualizing scholarly learning within particular contexts. These practices enable our diverse student population to engage in meaningful, authentic professional learning and experience (often) unprecedented success as learners. During our session, we will share results of ‘post-pre assessments’ (Hiebert & Magnusson, 2014), which reveal change in teacher-learners’ knowledge, skills, dispositions, and attitudes at the end of the two-year graduate diploma program, as well as self-reports from alumni, and examples of comprehensive portfolios.

16. Entrepreneurial Skills Required For Establishing Small And Medium-sized Enterprises In Nigeria: Implications on Business Education Curriculum

Margaret Igbinoba, Federal College of Education (T), Akoka, Lagos, Nigeria.

Margaret.igbinoba@gmail.com

The contribution of small and medium-sized enterprises to the economy of any nation is strategic and instrumental to its growth, development, employment generation and wealth creation. One of the objectives of Business Education is to equip its products with entrepreneurial skills which will enable them to become self reliant after graduation. This paper seeks to examine the entrepreneurial skills required to establish small and medium-sized enterprises and to find out if there is significant relationship between these skills and the skills taught in Business Education. The Nigeria certificate in education (NCE) Business Education curriculum was examined. A 5-point Likert scale questionnaire was designed to find out the opinions of 100 entrepreneurs on the adequacy of the skills taught at the NCE level for the establishment of small/medium scale enterprises after graduation. Data was analysed using chi-square statistics which showed that there was no significant relationship between the skills taught in NCE Business Education programme and the skills needed to establish small and medium scale enterprises. This is because not much attention is given to the practical aspect of entrepreneurship education. It was recommended that curriculum developers should find out developments in the industry and ensure that they include the required skills in NCE Business Education curriculum as well as provide adequate opportunities for practical experiences. This would help them to set up small and medium-sized enterprises and also create jobs for others.

17. STEM-Based Discrepant Events: Envisioning Pedagogical Content Knowledge Growth with Per-Service Teachers

Puneet Gill, Texas A&M International University

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An often-overlooked idea is that science requires the support of community efforts and should promote informal science learning experiences (National Science Teachers Association, 2017). In teacher preparation programs, pre-service teachers should understand science is connected to the community, and not an isolated activity discussed solely in schools. Science can enhance communication skills and mathematics. It also utilizes first-hand exploration of inquiry and process skills (National Science Teachers Association, 2017). This discussion aims to analyze a case study where elementary pre-service teachers were asked to participate in service-learning experiences at a Boys and Girls Club. Teachers were asked to apply science pedagogical techniques, mathematics, and technology applications alongside discrepant event demonstrations. They were also asked to improve their teaching techniques over a period of a week through the DEAL (Describe, Examine, Articulate Learning) model worksheet (PHC Ventures, 2017). This model enabled them to examine the experience in light of their learning goals, and to “articulate their learning” after the service-learning field experience was complete. This article discusses how teachers can effectively scaffold science pedagogy, STEM (Science, Technology, Engineering and Math) concepts, and technology in a discrepant event demonstration while undergoing a critical reflection process.

18. Back to the Basics: Twenty Ugandan Teachers, a Cow, and a Chalkboard

Catherine Scott, Neuhaus Education Center, United States

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Neuhaus Education Center was asked to work collaboratively with the Empowered Leaders Academy in Uganda to provide and design evidence-based professional development and coaching in literacy instruction. The professional development sought to increase teacher knowledge in literacy to ultimately improve classroom practice and student outcomes on the passing rate on the Primary Leaving Exams. This session will discuss the type of structured literacy professional development presented to the administration and staff, the challenges of presenting professional development in an undeveloped rural area with limited resources, and the necessary flexibility of adapting the professional development based on the unique needs, the culture, and limitations of a rural community. A staff member from Neuhaus Education Center went to Uganda for a week and a half and worked with 20 administrators and teachers from the nursery school and the lower and upper primary school. Lower-school teachers were taught the foundational and critical skills that are necessary to achieve fluent reading. Lower and upper-school teachers received training on how to develop comprehension skills and strategies through activities that increase oral language, vocabulary and background knowledge, summarization, and questioning techniques to help develop deep thinking about the text. Teachers were encouraged to take at least one idea back to the classroom to try. To support the teachers in the classroom, the Neuhaus staff member provided side-by-side coaching. Meetings continued with teachers after school and during breaks to discuss how activities and teaching strategies worked, what problems the teachers encountered, and ways to solve them.

19. Why Teach? The Challenge of Attracting New Entrants into the Teaching Profession in England – Is There an Answer?

James Noble-Rogers & Jackie Moses, UCET

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The House of Commons Library highlights that ‘whilst overall teacher recruitment was above target in each year from 2006-07 to 2011-12 it has been below target in each year since. In the current application cycle (2017/18) applications to teacher training are down by 33% compared to the same time in the previous year (January) and the situation is much worse in the secondary sector’, where the increase in pupil number means that demand for teachers is higher than in other age phases. UCET have been asked by the Department for Education to investigate the reasons why teacher recruitment and retention in England is facing such challenging times. UCET will work with current Initial Teacher Education providers and their partner schools to explore reasons why entry into the profession is in decline. It will also take the opportunity to investigate whether a number of factors are having an impact on the current recruitment and retention figures. We will conclude by considering what could be done to try and address this imbalance and considering some of the options that the government may wish to consider in order to address this current crisis.

20. Using Data-Driven Student Success Systems for Improving Teacher Certification Pass Rates

Laina Allen, Bhaskar Kotha, Will Miller, James O'Meara, Texas A&M International University, United States
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US Accreditation bodies require teacher preparation programs to demonstrate a continued focus on candidate quality during all stages of the program. At TAMIU the focus on candidate quality spans the following stages: recruitment; admission; coursework, certification exams, clinical experiences and recommendation for certification. A recent change to the Accountability System for Educator Preparation Programs now requires teacher education candidates to achieve 90 % pass rates on required certification exams by 2020. This new requirements prompted the College of Education to develop a student success system to monitor student progress at every stage of the program. The presenters will share preliminary data on the implementation of a data-driven student success system involving a partnership with Campus Labs. Participants will learn about how the intentional use of predictive analytics, candidate dashboards, advisor support and early alerts during all stages of the program is assisting the College of Education at TAMIU make progress towards meeting State performance standards associated with certification pass-rates among teacher education candidates.

21. An Evidence-Based Model for Improving Student Achievement by Accelerating the Effectiveness of Early Career Teachers

Diana Richie, New Teacher Center, United States
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Over the last 20 years, New Teacher Center (NTC) has worked with state agencies, school districts, policy-making organizations, and a range of educational institutions to define the characteristics and fundamental elements of high-quality induction programs that accelerate the development of new teacher effectiveness, improve teacher retention, strengthen teacher leadership, increase student learning, and support equitable outcomes for every learner. Diana will share the evidence-based behind NTC's program the critical components that have proven to improve student learning.

22. Accessing Longitudinal Data and Research Papers to Advance the Quality and Effectiveness of Teacher Preparation in a Local 'Zone of Impact'

James O'Meara, Texas A&M International University, United States
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The Texas Education Agency requires teacher preparation programs to demonstrate their effectiveness in producing candidates who are prepared, employed and retained in positions linked to their area of certification. While this expectation may be a challenge for some institutions, teacher preparation programs along the border like Texas A&M International University (TAMIU) benefit from being an affiliate member of the Center For Research, Evaluation And Advancement Of Teacher Education (CREATE). The membership provides TAMIU with access to a multi-system educational research consortium (comprised of 58 teacher education institutions across Texas) focusing on issues of teacher preparation and teacher quality. The presenters will share longitudinal data on current and trend employment, certification and retention patterns of candidates prepared by TAMIU. Participants will learn how faculty use excerpts from the CREATE Annual reports and Research Papers to advance the quality and effectiveness of teacher preparation programs in TAMIU's 'Zone of Impact'.

23. Growth or a Fixed Mindset? What Difference Does it Make to the Success of a Student Teacher?

Charlotte Meierdirk, University of Portsmouth, United Kingdom

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This study will investigate teacher trainees' learning and teaching beliefs, and the changes in these from their acceptance on the ITE (Initial Teacher Education) course, during the course, and through to qualification. The study identifies those trainee teachers with a fixed or growth mindset and then investigates how the teacher's mindset manifests itself in the teacher's learning and approach to teaching. Teachers can have different self-theories of intelligence; research has identified two types of intelligence belief (also known as Mindsets), namely incremental (or growth mindset) and entity (or fixed mindset). Teachers with a growth mindset believe that they can develop their intelligence, while individuals with a fixed mindset believe that their intelligence is innate. The study is based on student teachers studying on a PGCE (Post/ Professional Graduate Certificate in Education) course at a University in England. The PGCE programme is a post graduate programme leading to Qualified Teaching Status (QTS).

24. An Evaluation of Language Competence and Performance of Trainees at a Selected Teacher-Training Institution in Jamaica

Dr. Amorella Lamount, College of Agriculture, Science and Education, Jamaica

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Though the weakness of students in Standard Jamaican English (SJE) has been a prevailing concern, not enough research has been conducted on student-teachers. The purpose of this mixed methods study was to investigate a possible relationship between language competence of student-teachers and their performance in the Practicum Exercise at a selected Teacher-Training Institution in Jamaica. The researcher correlated scores from prerequisite Language Arts courses with grades from Teaching Practice and observed use of written and oral language in planning and delivery of lessons. Results showed positive correlation such that students with lower scores in Language Arts performed at significantly lower levels on Teaching Practice than their counterparts who had higher scores in the Language Arts Courses. Thus, the significance of this research is the shift in the critical model from underscoring limitations of the co-operating teacher to recognizing challenges faced by student-teachers both at the teacher-training college and within the classroom setting. The larger implication is the need for college policy and greater immersion in the target language at the tertiary level, as student-teachers prepare themselves to model language fluency for their students.

25. Improving Teacher Family Relationships through Strategic Leadership: A Case Study

Tony Townsend, Griffith University, Australia

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This paper considers the impact of the Principals as Strategic Leaders program (PASL) on the ways in which principals lead their schools in innovative ways. The four module program, conducted over nine months, focused on strategic thinking, strategic execution and entrepreneurial leadership and supported school leaders to develop both a statement of strategic intent and an implementation plan for the priorities identified within it. The focus of the paper is the detailed study of one of three case studies conducted as part of the research. In this instance the school had determined that their strategic focus would be the improvement of communications and relationships between teachers and parents in the school. The nature of the school's community had changed in recent years from one that had a conservative, religious and rural parent group, to a more urbanised, liberal and highly educated parent group. The subsequent interactions between parents and the school threatened some of the teachers. The paper documents the policies, processes and strategies taken by the school leaders to make a positive impact on both the communication between teachers and families and the overall relationships between families and the school. It considers the professional learning and resource implications of the strategies undertaken. The paper identifies a number of possible strategies that other school leaders might consider as a way of improving student achievement by improving the relationships in the school.

26. Pre-Service Foreign Language Educators' Knowledge and Use of Reading Strategies and Autonomy in Foreign Language Learning

Patricia Eziamaka Ezenandu and Chinyere Henrietta Maduabuchi

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Reading is a major tool available for pre-service foreign language teachers to independently access the ever increasing volume of information needed to achieve academic success and enhanced professional and/or career development. Providing students with a storehouse of knowledge, reading sharpens the intellect and promotes autonomy in foreign language learning. Dwindling academic performance of students across the various levels of education and the fallen standard of education in Nigeria are persistently seen as consequences of poor reading habits, lack of expected knowledge of reading strategies and lack of autonomy among students. Based on the above, the study investigates pre-service foreign language educators' knowledge and use of reading strategies and the extent to which these affect their learning autonomy in the foreign language teaching classroom. The study adopts quantitative and qualitative research design involving semi-structured interview, attitude questionnaire administered to 2nd year students studying English and French language teaching, focus group discussion and students' self-reports. Descriptive and inferential statistics of mean, standard deviation and Analysis of Covariance (ANCOVA) will be adopted in the analysis of data collected in addition to content analysis of students' self-reports. It is expected that the results will promote pre-service teachers' knowledge and use of reading strategies, enhance positive attitude to reading and subsequently foster learning autonomy among pre-service foreign language educators. The study will conclude on the premise that tomorrow's foreign language educators must be seen to be today's independent/autonomous oriented readers, actively and positively prepared for future career aspirations and professional development.

28. Supporting Underprepared Students in Online Learning Environments

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The support of underprepared students in higher education is an issue that is often discussed. Researchers have explored best practices and offered strategies that have yielded successful results across diverse academic backgrounds. Now, the constantly expanding number of institutions that feature online learning formats offers additional challenges for educators who are concerned about retaining underprepared learners. Students who face barriers in completing their educational goals in traditional formats; face even denser barriers when they enter the online learning environment. The reality of the digital divide, the lack of basic skills, and the costs associated with equipment combine to further solidify the barriers that prevent online course completion in higher education for these students. It therefore, behooves schools interested in growing their online footprint; to determine issues faced by these students and to develop strategies focused on diminishing barriers to online learning. It is important to understand the diversity of online learning models and the nuances of learning management systems. In keeping with this, this presentation explores best practices for supporting underprepared students in online learning environments.

29. Assessment of Office Technology and Management Education Skills Required For Small Scale Entrepreneurial Ventures

Janet Adeboye Omoyemi, Federal College of Education(T), Akoka, Lagos, Nigeria.
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The economic situation coupled with high rate of unemployment affecting young graduates in Nigeria led to the introduction of business education to impact the necessary office education skills for small entrepreneurial challenges. Based on the high rate of unemployment situation, this study assessed the office education skills required for small entrepreneurial challenges. Two research questions and four hypotheses were formulated to guide the study. Questionnaire was constructed and administered to entrepreneurs who were business education graduates in Lagos State. Data collected were analysed using mean and standard deviation. The z – test statistics was employed to test the hypotheses formulated. The findings are office practice skills, communication skills, human relation skills and information and communication technology skills which are relevant for such jobs as business centres, browsing centres, printing and binding centres and consultancy services. It was recommended that adequate facilities should be provided to enable lecturers teach practical aspect of the course. Qualified lecturers employed and curriculum tailored towards practical oriented skills than theory oriented.

30. Cognitive and Cross-Language Impact of Short-Term Language Training

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Literacy affects aspects of cognition related to reading, attention, and visuospatial processing. However, it is unclear if short-term literacy programs effectively alter cognition. To test this, response times during computer assessments of reading automaticity and visuospatial processing were compared before and after a five-day Spanish literacy program in an immigration detainee center on the US-Mexican border. On the visuospatial task, participants matched one of two visually similar characters to a sample. The Stroop task was administered to assess reading automaticity. Participants indicated the font colour (e.g. red) of visually presented colour word (e.g., the word “green” in red ink) and ignored the meaning of that word (e.g., green). In literate individuals, when meaning and font color are incongruent, meaning interferes with processing and delays response times – a measure of the ability to attend to relevant stimulus features and suppress interference from irrelevant ones. Decreased performance in the trained language (i.e., Spanish) would indicate improved reading automaticity. If training in the dominant language impacts reading in the non-dominant language, performance should also decrease on the English version (the language used at the center). An alternate Stroop consisting of numbers and colours was included to determine if effects were attenuated by gains in attention. Understanding the impact of literacy on cognition will clarify our understanding of mechanisms underlying literacy development, especially that which occurs as a result of short-term interventions administered in diverse, isolated, and low resource settings like that of the detainee center.

31. The Reflexive Journey of the Student Teacher

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This paper is a study into the reflective practice of the student teacher at a university-based initial teacher education institution in England. Specifically it investigates the use of reflective practice during the PGCE (Post/ Professional Graduate Certificate of Education) year. The methodological approach adopted is a combination of both feminism and critical realism, known as ‘feminist realism’. A multiple methodology is used consisting of a case study and questionnaire. The case study includes the analysis, over the PGCE year, of six student teacher’s reflective practice sheets and a series of semi-structured interviews. Conclusions drawn from the data analysis highlight the complex environment the student teacher belongs to. Their placements consist of different social fields that impact on their agency. The external structure of Ofsted (Office for Standards in Education, Children’s Services and Skills - Ofsted is required to inspect ITE providers and their compliance to the new curriculum in England) and the internal social fields of competing agents influence, to varying degrees, the student teacher’s journey to professionalism. This journey includes having to construct and reconstruct a ‘teaching identity’ whilst simultaneously succumbing to the pressures of the various social structures faced in an educational environment. Finally, a new definition and model of reflective practice is presented which emanates from the research findings.

32. Researching Diversity in Teacher Education in England: A Study of a School-Led System

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This paper reports on the Diversity in Teacher Education (DiTE) research programme that was instigated by the Institute for Education at Bath Spa University in 2014. Established in response to the policy changes affected by the Coalition Government in 2010 which gave schools greater responsibility for teacher education, the DiTE project asks the question ‘in what ways, if at all, do different models of teacher education differ?’ Following on from similar research that was undertaken in the 1990’s investigating Modes of Teacher Education (MOTE) (Furlong et al., 2000) the DiTE project was strengthened by having two of the key researchers in the MOTTE project, Caroline Whiting and Geoff Whitty, as part of the DiTE team. This paper provides a history of a research programme that is attempting to illuminate the complexity of teacher education provision in a school-led system. As such it records both the successes and the challenges faced by researchers who are attempting to understand the rapid and radical policy changes experienced by the education system in England and Wales. The background to this narrative is the acknowledgement at government level that there is a crisis both in recruitment and retention in the teaching profession. The paper outlines the significant findings from the research and second, reflecting on the significance of this, and similar, research projects and the role they can play in informing teacher education policy and contributing to a resolution of the crisis in recruitment and retention.

33. Family-School, Community Engagement Practices: Emerging Themes in Selected California Distinguished Gold Ribbon Schools

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Many reasons can be attributed to the academic achievement gap, yet research indicates that when families, schools, and communities develop partnerships, student academic achievement increases & greater participation by parents is evident. This research case study examines the impact of California School Gold Ribbon Recognition Program’s criteria for parent involvement on elementary schools’ reform efforts in family-school, and community program development, and critically examines characteristics of effective school-family and community partnerships in schools with high concentration of ethnic minority students of selected 2008, 2010, 2014, and 2016 California Distinguished Gold Ribbon Elementary Schools.

34. Neuhaus Academy: Using Free Online Resources to Improve Reading and Vocabulary Levels Among Adolescent and Adult Learners

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Neuhaus Academy is an innovative program that provides free self-paced instruction in multiple formats to meet individual learning needs. Based on 21st century teaching techniques, Neuhaus Academy provides interactive instruction and access to inventive learning techniques at any time. The flexible online program provides students with videos and phonetic pronunciation of a word, allowing them to hear and then repeat the sounds of the word. It also sends students on different learning paths depending on their needs and abilities.

35. Creative Free Online Audiology Courses to Connect Teachers with Hearing Impaired Students Worldwide

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World Health Organization (WHO) estimated 5.3% of the world population suffers from hearing loss which affects their ability to communicate and impacts their quality of lives. High incidence of hearing loss is closely related to the parents' level of income and literacy. Vast majority of hearing loss populations lives in low- and middle-income countries and do not have access to appropriate hearing care. Without suitable interventions, hearing loss, poses a significant challenge to education, health, family, income and vocation. Raising awareness and improving access to services can help reduce the adverse impacts of hearing loss. Classroom teachers can help to provide resources with appropriate training. The purpose of this study is to describe free online courses for teachers: Introduction to Audiology and Aural Rehabilitation. Each course consists of 45 hours of contents related to knowledge of hearing loss, assessment, and intervention that supported by TAMIU. These training courses will enable teachers to gain knowledge and appropriate skills to implement evidence-based practices with hearing loss students. Chinese and Spanish subtitle are available. Pre-and post assessments are used to measure outcomes and monitor progress. Our goal is to provide creative education opportunities for teachers around the world to have knowledge and skills to work with their hearing impaired students. Our mission is to enhance knowledge for teacher training with specialized courses. Our hope is to recruit more universities to collaborate and create new courses to promote hearing health services. This is our mission in progress.

36. Perception Of Lecturers On The Importance Of Using Internet Services For The Teaching And Learning Processes In Colleges Of Education In Nigeria

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The internet is a global system of interconnected computer networks that use the standard protocol suit to serve several billion users worldwide. The interconnection of the department network becomes the internet which resulted in the creation of information technology. One research question and one hypothesis were raised for this study. The questionnaire was the main instrument for data collection. The descriptive survey method was adopted for the study. Population comprises of all lecturers in colleges of education in Nigeria. Purposive sampling technique was used to sample 564 lecturers in colleges of education in Nigeria. Frequency percentage, means, independent t-test and one way Analysis of Variance (ANOVA) statistical tools were used for data analysis. The result showed that, there is agreement in the perception of the lecturers about the importance of internet services in the teaching and learning processes in colleges of education. Findings of the study also indicated that, there is significance difference in the perception of lecturers on the importance of internet services based on the years of experience. In view of the findings, the researcher recommended that, lecturers should be taught on how to use internet to enhance teaching and learning processes across all levels of the Nigerian educational system.

37. Development of Training through Computer Networks for Secondary School Teachers in Teaching to Develop the Career Skills of Students in the Nonthaburi Province

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The purposes of this study were to study secondary school teacher needs in teaching to develop the careers skills of students, to develop a training package through computer network, and to evaluate the training through computer network. The sample consisted of 363 secondary school teachers. The research instruments used to collect data were a need questionnaire, a web-based package, achievement tests, and a learning satisfaction assessment form. Quantitative data were statistically analyzed with the use of the percentage, mean, standard deviation, and t-test; while qualitative data were analyzed with content analysis. The research results indicated that teachers' needs in teaching to develop the careers skills of students were content about careers skills and content for teaching to improve the careers skills, the training package consists three units: career and career skills, teaching style focused on skills and teaching focused on professional skills. Also, regarding results of experimenting with the developed web-based package, it was found that the teachers increased their learning achievement scores by 22.67 percent. When their post training and pre-training scores were compared, it was found that their post-training scores were significantly higher than their pre-training counterparts at the .05 level. Regarding their opinions towards the web-based training, it was found that their opinions toward the training as a whole were at the highly appropriate level.

38. Changemaking in Teacher Preparation for Transformational Times

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It takes a Changemaker to grow a Changemaker. It takes empowered teachers to support powerful students. It takes transformational teaching to spark transformational learning. Changemaker educators help young people know that they can spot a problem, imagine a solution, organize, and lead others, and leave lasting and important change in their communities and across the globe (Ashoka, 2016). The presenter will explain the process followed by a Teacher Education program to become one of the first Changemaker programs in the U.S. The process includes transforming the program's systems, culture, curriculum and mindset of students and faculty. Curriculum changes aimed at providing candidates with concrete strategies and ideas for K-12 Changemaking implementation in everyday teaching and also through projects, will be highlighted. Examples of initiatives for promoting the Changemaking framework that includes empathy, collaboration problem solving and leadership will be shown. In addition, there will be examples of how the values, philosophy, and desired outcomes for candidates as required by CA credentialing standards guided the transformation. The presenter will also share the necessary steps and challenges in aligning the Changemaker- based course content to field experiences. Special emphasis will be placed on the importance of partnerships with K-12 schools as a way to establish a supportive ecosystem for candidates to implement their Changemaking skills. A concrete example of a partnership between the teacher education program and a school district and the journey in Changemaking that they embarked together will be shared.

39. Practicum in a School's Initiative to Reduce "Reality Shock" after Initial Teacher Education

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This study's aim is to increase knowledge about how work is developed within Initial Teacher Education to support student teachers during practicum. The background is a trial in Sweden with practice schools where student teachers carry out practice in their school form, in their subject, in a group of other student teachers and mainly at one school. The idea is to create a safe environment and to focus on subject to increase quality. In addition, there is an awareness that carrying out practice in one school could lead to expectations of 'sameness'. Therefore, there are directives that student teachers should carry out practice in schools with 'different prerequisites'. Initial Teacher Education is mainly university based, but the organizers of preschool, compulsory school and upper secondary school are responsible for organizing practicum, and in this case to arrange practicum in schools with 'different prerequisites'. The term 'different prerequisites' is not specified and open for interpretation. In search for an interpretation, or different interpretations, documents were read and dialogues with supervisors during practicum in two counties were carried out. The reading of document did not result in any detailed interpretation. On the other hand, the dialogues with supervisors led to an abundance of interpretations. These differences in interpretations can have consequences for the student teachers. They can be more or less exposed to schools with 'different prerequisites'. To know how the routines are carried out, the next step in the research is to study how these directives are carried out in reality.

40. Transforming Teacher Education and Learning (T-TEL) Ghana

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Getting well-educated, motivated teachers into Ghana's schools is critical for its continued growth and development. Harnessing the energy and expertise of stakeholders across the teacher education sector, T-TEL incentivises innovation, inclusion, best practice and results ensuring Ghana has high quality student teachers ready to teach and inspire and educate its young people to lead the country's progress and prosperity. T-TEL has targeted 7 areas in the teacher training sector (Policy & Institutional Development, Leadership and Management, Challenge & Payment by Results Fund, Tutor Professional Development, School Partnerships & Teaching Practice, Curriculum Reform and Gender and Inclusion) to improve the standard of training provided at every CoE. The leaders of the T-TEL initiative believe that addressing these areas will ensure a higher level of teachers graduating from each college and raise the standard of pre-tertiary education.

41. Imagination and Reality: Clarification of Children's Folk Culture in Different Communities

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China's folk culture has features of mobility and orality. This article takes the example of performance in modern theatre of Chinese folk story spread orally, combining practice achievement in education field and theoretical application of drama teaching method, exploring cultural theme conveyed in folk story and the conflicts of issues of society and itself focused in creative modern children's culture in the same space and the solution. It also discusses different cultural symbols created in different communities and their significances in culture, education, economy, gender, ethnic groups. The author combines modern children's culture with theater convention in drama pedagogy, creating new, interactive, educational and broader form of theater--- drama education theater of "experiential reading", whose master work is Hunter Guolie based on china's folk story. The performance is divided into two parts. The first part is interactive performance form in the theater. The second part is the form of workshop. Experiential reading drama educational theatre's core significance is creating a co-existing drama space which is imaginary and real, taking the core of drama situation, promoting children or adults to conduct reflective behavior. Five practices targeting different communities in this paper all of which represent different modern explanations of children and adults from different groups on folk culture, analyze the new folk culture symbols created by audience and teachers in theater space and their significance, and exemplify the new demand of modern audience on the future drama.

42. HEB Read 3 Program: Educating Parents and Caregivers About the Need to Read

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Texas A&M International University's (TAMIU) Read-3 Family Literacy Program provides a special opportunity for young children, aged two to four, and their families to embrace literacy and the brighter futures it makes possible. The free program is offered over a six-week period culminating with a special TAMIU Read-3 Graduation. The Read-3 Family Literacy Program, initiated by HEB Stores and delivered in Laredo by TAMIU since 2012, has served some 300 families to date. TAMIU College of Education students and future teachers are supervised in their program delivery by College of Education faculty. As the Program title indicates, the Program goal is that parents read at least three times a week to and with their little ones and that through the Workshop, children are exposed to literacy instruction and acquire basic literacy skills before begin or continue in school.

44. Rhapsody on the Rio grande: A Confluence of Culture – Composer’s Notes on the Exploration of Culture and Education

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In 2016 the author received a commission from Texas A&M International University (TAMIU) for the creation of a new musical composition, incorporating mariachi ensemble with organ and symphony orchestra. A further instruction from TAMIU was that the work should be a celebration of cultural diversity. This followed when the Artists in Residence agreement was signed between TAMIU and Mariachi Nuevo Tecalitlán de Guadalajara.

As the combinations of mariachi with orchestra, and organ with orchestra are not uncommon, the use of this style trio in one music genre was a new and unique endeavor. The composition was recorded in 2016 by KLRN for Public Broadcasting Service (PBS) and formed the centerpiece on which a documentary was made about Laredo and its cultural diversity. This documentary was awarded with an Emmy Award from Lone Star Chapter in 2017.

The purpose of this paper is to investigate the composer’s journey in the discovery of a music narrative in which the cultural diversity is celebrated. It will highlight the cultural differences in the role players and address the often-misguided views on High Art versus Low Art, and, in a broader sense, High Culture versus Low Culture. An understanding of these concepts may lead to a radical paradigm shift taking place in a multi-cultural approach in education, an aspect in which the author had experience as an educator in a South Africa before relocating to the United States of America.

45. Cognitive and Cross-Language Impact of Short-Term Language Training

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Literacy affects aspects of cognition related to reading, attention, and visuospatial processing. However, it is unclear if short-term literacy programs effectively alter cognition. To test the cognitive impact of a short-term literacy program, response times during computer assessments of reading automaticity and visuospatial processing were compared before and after a five-day Spanish literacy program in an immigration detainee center on the US-Mexican border. On the visuospatial task, participants matched one of two visually similar characters to a sample. The Stroop task was administered to assess reading automaticity. Participants indicated the font colour (e.g. red) of visually presented colour word (e.g., the word “green” in red ink) and ignored the meaning of that word (e.g., green). In literate individuals, when meaning and font color are incongruent, meaning interferes with processing and delays response times – a measure of the ability to attend to relevant stimulus features and suppress interference from irrelevant ones. Decreased performance in the trained language (i.e., Spanish) would indicate improved reading automaticity. If training in the dominant language impacts reading in the non-dominant language, performance should also decrease on the English version (the language used at the center). An alternate Stroop consisting of numbers and colours was included to determine if effects were attenuated by gains in attention. Understanding the impact of literacy on cognition will clarify our understanding of mechanisms underlying literacy development, especially that which occurs as a result of short-term interventions administered in diverse, isolated, and low resource settings like that of the detainee center.

46. STEP into the STEM FIELD South Texas Project

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The STEP into the STEM FIELD project is a three-year United States Department of Agriculture (USDA) National Institute of Food and Agriculture grant supports agricultural science education at Hispanic-Serving Institutions (HSIs). The goal of the STEM FIELD project is to develop and provide, to a cadre of mathematics, science, and career and technical education (CATE) rural high school teacher teams (STEM FIELD Teams), an innovative agricultural-based professional development opportunity. The Project Team plans to conduct summer professional development for five South Texas rural school high school teachers. The teachers will be presented with the STEM FIELD Model, a novel professional development strategy that utilizes research-based instructional strategies aligned to curriculum standards that are purposefully centered on: (1) agricultural mathematics, science, and technology knowledge and skills; (2) specific needs of English language learners; and, (3) indigenous, authentic agricultural topics through field-based experiences first. Through education, research, and extension activities, teacher-participants in Project STEM FIELD will receive support that will lead to enhanced pedagogy and self-efficacy in practical STEM application in real-world settings, which will in turn lead to enhanced student outcomes. The Project team seeks to interchange research-based and practical curriculum delivery strategies with South Texas rural school district teachers to strengthen education, applied research, and related community development programs. This innovative enterprise promises to create self-sustainable partnerships with South Texas rural principals and 9th-12th grade teachers and students. Engagement through engaging the community develop and creating gardens, having access to fresh produce, and receiving healthy-living nutrition workshops.

47. Using ISTE Standards for Educators to Develop Digitally Literate Teacher Candidates for Future Ready Classrooms

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The ISTE Standards for Educators help students become empowered learners. These standards aim to deepen practice, promote collaboration with peers, challenge educators to rethink traditional approaches and prepare students to drive their own learning. The ISTE Standards provide a framework for learning, teaching and leading that is amplified by technology. They provide a roadmap for educators worldwide as they navigate decisions about curriculum, instruction, professional learning and the transformation of pedagogy with technology. The Standards for Educators were last updated in 2008, when the focus was on supporting learning with technology. For this update, ISTE received input and feedback from 2,200 educators and administrators from around the globe. These standards reflect an evolution in education focusing on the promise technology has for empowering learning and the teaching profession.

49. Contemporary Challenges and Proactive Preparation for Future Principals

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In an effort to adequately prepare principals to be innovative in their pursuit of educational progression for their respective communities, Texas A&M University-San Antonio educational leaders identify prospective issues and viable solutions. With a population of 5,500 students, where 64% of the student population are first generation college students, Texas A&M University-San Antonio is adjusting to a national trend of matriculating and graduating students of color. Particularly in the educational leadership program, professors are employing a "Ready for Day 1" approach to make sure their leaders are instructionally and culturally competent. To accomplish this feat, the program uses the following approaches: Servant Leadership, Community Connections, Real-life Experience, Collaborative Research, Internships, and building Intellectual Curiosity through research and practice. Furthermore, to crystallize this success educational experience, Texas A&M University-San Antonio professors enhanced their program through the utilization of a Curriculum Crosswalk, test prep integrated into classes, internship created to enhance vital experiences, symposia to connect students to the community and community leaders, guest presenters from the field, increased emphasis on writing, equity and access for all students, and 21st century curriculum.

50. Teacher Leadership Roles that Impact Student Achievement

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How can you retain your most talented and experienced teachers and improve student achievement? Identifying impactful and meaningful teacher leadership roles and pathways is the answer for many school systems. Teachers tend to have the same job description their entire career. Without opportunities to grow professionally, take on new responsibilities and expand their influence teachers become dissatisfied with their jobs. According to NNSTOY's "Teacher Career Advancement Initiatives," teacher leadership opportunities help districts retain more effective, experienced teachers. In addition, MetLife's Survey of the American Teacher (2012) showed that 51 percent of teachers are interested in a hybrid role that combines classroom teaching with teacher leadership roles or responsibilities. Please join this interactive session to learn what the latest research from New Teacher Center and the Consortium for Policy Research in Education at the University of Pennsylvania says about the importance of teacher leadership in improving student achievement and identify specific roles for teacher leaders that improve student learning.

51. The Impact of the Principals as Literacy Leaders (PALL) on the Leadership of Reading in Tasmanian Schools

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Since 2010 more than 2000 school leaders from across Australia have undertaken the professional learning called Principals as Literacy Leaders (PALL). A number of research studies that are brought together in *Leadership and Literacy: Principals, Partnerships and Pathways to Improvement*, which was published by Springer in 2017. The current paper addresses the work of new research, conducted in Tasmania over 2017-2019. New approaches to PALL are considered, the first being associations of secondary schools and feeder primary schools and the second, focusing on family involvement in the learning of reading. Participants in the program were given a questionnaire, based on the specific elements of the program, (the Leadership for Learning Blueprint (LfLB)), at the start of the program (in term 1) and again at the end of the program (term 4) to establish the growth in their perceived understanding of the leadership roles associated with supporting high levels of teaching learning for reading development. In addition, both leaders and teachers from their respective schools were asked to consider issues associated with the teaching of reading in their contexts. This paper will identify the early results of the study (using 2017 data) and highlight subsequent research activity to be undertaken in 2018 and 2019, which will involve intensive case study research aimed at providing a fine-grained understanding of how schools, and associations of schools, approach the teaching of reading.

52. Educational Leaders on the Edge of Chaos: A Sensemaking Approach to Managing Uncertainty

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In the proposed presentation, I will provide an overview of a new book entitled, *Navigating Uncertainty: A Sensemaking Approach for Educational Leaders* which my colleague, Shelley Hasinoff and I have submitted to Brill Publishers for publication later this year. In the book, we introduce a 5-step sensemaking approach that educational leaders can use to manage the kinds of challenging problems, dilemmas, and crises that they face regularly in the K-12 and post-secondary systems. Drawing on the literature on complexity theory and complex adaptive systems (Davis & Sumara, 2008; Mitleton-Kelly, 2003; Shaked & Schechter, 2017), social capital (Adler & Kwon, 2002; Putnam, 1993; Woolcock, 2001) and sensemaking (Colville & Pye, 2010; Maitlis & Christianson, 2014; Weick, 1995), I will make the case that in the complex, uncertain world in which we all live and work, educational leaders can no longer rely on traditional scientific principles or just their own instincts to manage complex problems. Instead, they need a new way to think about their certainties and the working relationships they have with others in educational settings. The presentation will be interspersed with scenarios based on the real-life experiences of principals, superintendents, and deans of education and I will provide several practical tools to help educational leaders better understand how to navigate the uncertainties they face every day.

53. Changemakers Symposium on Teacher Education

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What if our schools prioritized empathy as much as they did reading and math? What if young people were given regular opportunities to apply empathy as changemakers in their schools and communities? Our world is changing fast. New rules, new openness, and new connectivity require different sets of skills just to keep up, let alone thrive. While we do not know what tomorrow's problems are going to be, we know there will be many, and we know we will need everyone equipped to deal with them—collaborating, creating, and leading in fluid environments. Knowledge alone is no longer enough. Despite this new reality, only a handful of children are consistently provided with the learning environments and opportunities necessary to help them develop the skills they need to thrive in today's world. This has to change. Fortunately, a growing number of schools in the U.S. and around the world are giving us a window into what education for a changing world looks like.

54. The Role of Jamaican Teacher Educators in Preparing Teachers to Be Agents of Social Change

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The SDG 4 of UNESCO's Agenda 2030 characterizes teachers as “one of the most influential and powerful forces for equity, access and quality in education and key to sustainable global development” (<https://en.unesco.org/themes/teachers>). Drawing on a critical perspective that believes teachers should aspire to be transformative intellectuals (Giroux, 2001), I posit that a key to achieving SDG 4 in Jamaica is educating teachers to espouse a social justice agenda that addresses oppression of marginalized students in schools. This brings into question the role of teacher education institutions which remain for the most part traditional and conformist – to what extent do their teacher educators see themselves as responsible for preparing trainee teachers to be agents of social change? This paper reports on the findings of a survey of fifty teacher educators in Jamaica that seeks their views on the role of teacher education as a space for challenging social injustice towards LGBTQ students. The results highlight the difficulties involved in including a social justice agenda in the Jamaican teacher education curriculum.

55. Defining Educational Isolation: Exploring the Challenges for Sequestered Schools

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Research on coastal academies in England (Passy & Ovenden-Hope, 2016; Ovenden-Hope & Passy, 2015) suggests that the major challenges to improving student educational performance in these schools stem from their geographical, economic and educational isolation. There is now emerging evidence that rural schools and small schools in England, and schools facing similar ‘educational isolation’ in the US, have comparable challenges to coastal academies. Location in areas of socio-economic deprivation and the absence of educational support from local universities or high-performing schools can lead to a ‘feeling of disconnection and anomie’ among staff and students (Muijs, 2015, p.297). This paper will share findings from a qualitative study that explored, from the perspective of school leaders, the challenges and solutions associated with being a school isolated geographically, economically and socially. We will offer a definition of education isolation that has come from the ground up. We will discuss how education policy changes have impacted on areas specific to schools experiencing educational isolation, such as teacher/leader recruitment and retention, pupil attainment and progression to higher education.

56. Trapped in the Hall of Performativity: Challenges in Developing an African University?

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The logic of globalization and neoliberalism sparks a number of debates when applied to the nature and identity of the university, especially when such an identity is understood within the context of developmental states such as South Africa and many other African countries. While scholarship around issues of the relationship between the university and some thrusts of a neoliberal mind-set creates the impression that the African university, in particular, sits uncomfortably with the assumed new marriage with this logic of the new market economy, this paper argues that the policy directions currently being pursued in most South African universities and other African countries, and the pressures that academics have to withstand are such that they naturalize this marriage. This paper argues that the current university reward systems such as performance bonuses, performativity indicators and regimes of university competitiveness, and of late the drive towards the 4th Industrial Revolution, and many others have naturally evolved to reinforce a pure market logic and the game of numbers. In the process of maintaining global competitiveness, excellence, irrespective of some merits in them, university traditions around mentorship, autonomy of the academy, collegiality have continuously been eroded. The university has redefined itself in an irretrievable fashion. The paper further interrogates the double bind African universities find themselves in and the extent to which a universities social good can still be sustained. This papers uses philosophical analysis that employs hermeneutical analysis and critical theory on African universities' policy directions and practices.

57. Innovative Enterprise Education and STEM: A Post-Colonial Orientation to Global Citizenship

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With the elevation of Western science to universal science through, for example, STEM outcomes, Blackfoot knowledge forms are essentially cast aside epistemologically based on assumptions that formalise the universality of modern Western science (Gough's (2003). Importantly, this serves to discount the recognition of "knowledge systems (including Western science) as sets of local practice so that it becomes possible to 'decentre' them and develop a framework within which different knowledge traditions can equitably be compared" (Gough, 2000:335) and drawn on to produce new knowledge equitably. It is rather preferred that knowledge and learning take into cognisance the performative character of all knowledge forms (Gough, 2000) and promote a kind of internationalisation wherein transculturation is emphasised. Innovative enterprise education is invaluable in this regard. It is from this standpoint that we argue that global citizenship can be promoted by constructively acknowledging the value of innovative enterprise education to dismantle boundaries amongst global citizens by creating critical postcolonial learning spaces. In so doing, "the "inter" space and the "locality" required in harnessing global citizenship can facilitate a remapping of knowledge and representation of STEM. In the paper, first, we discuss the significance of STEM to innovative enterprise education. Second, we reflect on the relationship between these two aspects, and argue that the curiosity and innovative character that are likely to result from this relationship may lead to global citizenship that underpins Gough's views of internationalisation.

59. Education and Quality of Life for Unschooled Girls in the Dominican Republic— A Humanistic Approach

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In the fight for quality education and gender equality, Texas A&M International University (TAMIU) students embarked on two international service learning (ISL) experiences in Barahona, Dominican Republic (DR) during the 2017 academic year. Students' experienced ISL in the DR while taking a semester-long course on campus investing seven days midcourse during the spring semester. The goal was to work with and teach children who live in sugarcane bateyes (plantations) where their parents work in contemporary slave-like conditions to survive (Simmons, 2010, p. 11), and have been marginalized because of their Haitian heritage and socio-economic status. Children in bateyes only receive schooling two or three times a week for half days and live in extreme poverty. The ISL team spent 2 days implementing a literacy Spanish lesson and integrated numeracy and language into several workout activities. With this new-found awareness, students decided to take further action and return to the DR in the fall, with a new team, on a one-week ISL experience with the purpose of teaching Spanish literacy and numeracy skills to women and their children through a non-profit organization that builds hurricane-resistant homes for families and provides entrepreneur opportunities for women to become economically stable. Once again, students exercised their global citizenship applying their liberatory pedagogy and research skills to teach literacy and numeracy skills. Activities included creating a collage with the use of Dr. Mary Pipher's "I Am From" poem, and lessons that revolved around Dr. Seuss' books the subjects of equality and overcoming differences and/or obstacles.

60. Teacher Efficacy and Instructional Attentiveness: Exploring Perspectives Of Academic Advising at a Tertiary Institution In Jamaica

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The purpose of this study was to explore the perspectives of academic advising at a tertiary institution in Jamaica and how it has influenced teacher-efficacy and instructional attentiveness among student teachers. The participants included twelve student teachers and four lecturers who have been intimately involved in academic advising. The student teachers selected have been engaged in academic advising for two to four years while the lecturers have been advising for ten to sixteen years. This qualitative study explored how academic advising is related to teacher efficacy and instructional attentiveness among second to fourth year student teachers at a teacher training college in Jamaica. All participants were actively receiving and giving academic advising in a government-owned teacher training institution. The primary source of data was unstructured interviews with student teachers and lecturers. Data were acquired over a two-month period using unstructured interviews and field notes. These tools afforded the opportunity to extend the conversations and generate meaning from the responses thereby providing rich descriptive notes of the phenomenon. Data were prepared using triangulation matrices, data coding and the Constant Comparison Approach to generate categories showing patterns and relationships of meaning. The findings on the perspectives of the study participants indicate academic advising has significantly influenced teacher-efficacy among student teachers as their level of confidence increased, appreciation of teamwork blossomed, instructional competency broadened and misbehaviors controlled. Additionally, their valuing of self and acceptance of other personalities grew immensely which positively affected their relationship with various tiers of staff in the learning environment.

61. Training for Teachers and Tutors in Aboriginal Schools in Northern Australia

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The Aboriginal Literacy Foundation has developed a Certificate course (known as the Certificate 11 in Teaching and Tutoring of Aboriginal students) with particular reference to teachers trained in mainstream city based colleges in Australia. The course has three parts: The first is a specific introduction to indigenous cultures in Australia. This part of the course has to be geared towards whichever area the tutor or teacher intends to work. There are more than 200 aboriginal languages, although only 2 or 3 are widely spoken as a first language. As well as the different languages, of which knowledge is essential, there are also quite strong cultural differences. Often mixing students from a different cultural group can result in disruption in the classroom, in the school yard and also amongst parents. The second area involves the modus operandi of teaching in the aboriginal environment. Teaching in closed classrooms, or in two storey buildings is problematic for many aboriginal students and teaching outside is recommended whenever possible. School attendance for aboriginal children is always problematic. This is not to say the students are not working, it is simply that social and cultural factors prevent attendance. For these reasons, homework and assignment work increase in importance as do home visits by the teacher. Despite all these differences, many aboriginal students succeed well, attend university and often enter the professions. Thirdly, it is important that students have a practical understanding of teaching indigenous children. We require all our students to undertake an assignment involving them in some aspect of aboriginal education. It may not be possible to travel to the north of Australia but undertaking a week or 10 days in a city school with a large aboriginal student attendance can be an important factor in understanding indigenous education.

62. Curriculum Leadership - A Condition Necessary for Improved Student Performance: Insights from an Ethnographic Study of a University Department in South Africa

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The aim of this study was to explore how curriculum leadership serves as a condition that fosters improved student performance. The study followed a qualitative ethnographic design to examine how an institutional departmental culture characterised by sustained curriculum leadership by senior professors and lecturers helps students to better understand the content presented to them. The data for the study were collected through focus group discussion interviews (FGDIS) and lecture observations (LO) in the department of curriculum studies. A total sample size of 10 university lecturers purposefully sampled took part in the study. The data analysis process followed a thematic approach with themes emerging from the FGDIS and LO being clustered into superordinate themes that guided the discussion of findings. The key findings of this study included that a department where senior professors take an effective curriculum leadership role to lead in matters of pedagogy and pedagogic content knowledge (PCK), junior and inexperienced lecturers tend to benefit immensely in their classroom practice. However, where senior professors and lecturers are selfish in terms of knowledge dissemination, their inexperienced or junior lecturer counterparts tend to endure the disadvantage culminating in their students sometimes coming out half-baked in the final analysis. The main conclusion arrived at was that effective curriculum leadership is key in the professional development of inexperienced or junior personnel in a university department as learning organisation.

63. The Early Childhood Bilingual Education 2030 Initiative

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The Early Childhood Bilingual Education 2030 Initiative reflects the goals and principles of SDG4-Education 2030, which ensures that all girls and boys have access to quality education in both early childhood and global citizenship. The global taskforce advancing this agenda recognize how early childhood bilingual education (ECBE) helps to raise the awareness of the crucial role of the bilingual education. They believe providing access to quality early childhood bilingual education is a key approach to the global citizenship skills and cultural diversity. Providing access involves investing in the professional learning of early childhood bilingual educators in order to provide quality early childhood bilingual education to all including those children living in monolingual, social-economically disadvantaged region and groups. The long-term success of The Early Childhood Bilingual Education 2030 Initiative relies on involving parents via home based early childhood bilingual literacy interventions

64. Promoting Access to Quality Education in Refugee, Post Conflict/Reconstruction and Settled Environments.

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Education is the most powerful weapon which you can use to change the world. For vulnerable populations, including refugees, education is often not an automatic human right; living in a foreign country fleeing violence and persecution creates a challenge for accessing quality education. Classrooms may be non-existent, congested or in disrepair. Qualified educators may not be present promoting parents or concerned adults to fill this important role. In many cases refugee-specific issues regarding language, gender, and culture provide additional challenge for those assuming the responsibility for providing quality education in refugee, post conflict/reconstruction and settled environments.

68. Engaging Teachers in Literacy Professional Learning Communities

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The South Texas Writing Project, affiliate of the National Writing Project, fully understands that teacher support services for novice and experienced teachers alongside collaboration among teachers and administrators at all levels can have a significant impact on learning environments. Professional learning is the catalyst for on-going teacher support in providing a trajectory for teachers towards developing into reflective experienced master teachers that can impact school effectiveness and overall learning environments. Professional learning trajectory begins when educators transition from moving away from being told what to do as educators towards a trajectory moving towards directing their own learning and problem-solving agendas. Risko and Vogt (2016) claim that this view of educators taking responsibility for their own professional learning through problem solving or inquiry is framed within the social constructivist view and the transformational learning theory. Professional learning is situated within the transformative learning theoretical framework. The following presentation proposal provides teacher narratives (middle school level) of their experiences in receiving support services within a professional learning environment including mentoring and professional development support through the Write for Texas (TEA) and National Writing Project Models.

69. Integrating Coding into Elementary Teacher Education

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The Code.org Computer Science Fundamentals courses have between 14 & 28 lessons (varies by age) that may be implemented by unit or over the course of a semester. Students create computer programs that will help them learn to collaborate with others, develop problem-solving skills, and persist through difficult tasks. They will study programming concepts, computational thinking, digital citizenship, and develop interactive games or stories they can share. Our curriculum was created with the 2017 Computer Science Teachers Association (CSTA) standards in mind, but also includes opportunities to support national Math, English Language Arts, and Science standards. Our elementary school curriculum can also help students succeed in other subjects as well; a recent research study by Outlier Research & Evaluation found that 3rd–5th-grade Code.org classrooms with resourceful teachers see higher scores on English, math, and science standardized tests. Our courses are available at no cost for anyone to teach. For more information about our goals and the approach to our courses, please see our curriculum values and our professional learning values.

70. Exploring the Tools of Leadership by Education Leaders in Public Secondary Schools in Lagos

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This multiple case study explores the tools of leadership used by education leaders to manage schools. It aims to identify the tools that leaders use to enhance performance in schools in the context of Nigerian public secondary schools. The research participants purposively selected based on research criteria were nine teachers, three principals, three vice principals, and an educational administrator in an educational district in Lagos State, Nigeria. The study used semi-structured interviews and an analysis of Nigerian education policy documents to elicit data. The findings provide insights into tools of leadership such as power, authority and influence used by leaders which could make or hinder progress in schools. The findings reveal the power discourses used by leaders on their subordinates as well as the impact of individual differences, ethnicity and micro politics employed by leaders on teaching and learning. The study recommends adherence to ethical standard in administering schools which would enhance the morale of staff and thereby increase performance in teaching and learning. Tools of leadership employed by leaders are of great significance in students' performance and effective leadership in public schools.

71. I hear the train a comin' ... it's rollin' round the bend ...

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With the recent release of another national education reform document, Australian teachers, school principals and teacher educators are most likely to become even more burdened as the education policy train just “keeps on comin’ ...”! All involved in education are aware that the impact of the latest policy, Through Growth to Achievement, published in March 2018, will result in an increase to teachers’ existing workloads. Many educators foresee the publication of yet another new reform as further limiting the time teachers will be able to spend on teaching. This will be the result of increasing administrative demands expected of teachers as they are asked to collect more data, provide more evidence, and develop individual learning programs for each student. An increase in exhaustion and demoralization is the expected outcome for teachers. In this paper the issue of why educators in Australian schools are suffering reform fatigue will be explored. An analysis of the document Through Growth to Achievement: Report of the Review to Achieve Educational Excellence in Australian Schools will include an examination of the social, cultural, political and economic contexts which proved influential in the recommendations made. In addition, the reconstitution of teachers’ work advocated by the policy writers will be reviewed. Given the recent publication of the latest policy document it is not possible to include an analysis of the implementation of the proposals for change. Nonetheless with respect to education reform throughout Australia, it is possible to conclude “that train keeps a movin’ on”.

72. Responding to Childhood Adversity: The Necessity of Trauma Sensitive Pedagogy and Practices in Support of Children, Families and Teachers

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As a precursor to developing a trauma-sensitive curriculum for educators, we undertook a national needs assessment, utilizing snowball sampling, to determine educators’ school and community context, experience with professional development around trauma-informed instruction, knowledge of student trauma, and personal experiences with childhood trauma. Our work is guided by Bioecological Theory, which incorporates dynamic systems that lend itself to the inclusion of educators as important members of the child’s school microsystem (Bronfenbrenner & Morris, 2006). This theory proposes that four interrelated and dynamic properties are involved in promoting growth/development: proximal processes, person, context, and time. We received full/partial responses from 1209 educators across 35 states. Approximately 97% (n = 748) of our participants agree/strongly agree that there is a need for a trauma-sensitive curriculum. Notably, 90.6% (n = 720) said teacher strategies would be essential. Interestingly, although an overwhelming majority of participants felt there is a need for trauma-sensitive training and participants identified several types of trauma as being acute or chronic in their work with students, only 14.7% of participants view trauma as the top reason for challenging student behavior. Instead, 31.9% cite poor parenting and 19.0% cite temperament as the top reasons for challenging student behavior. On a personal level, 40.2% (n = 308) of respondents indicated they experienced childhood trauma and, of those, 84.7% indicated personal trauma influenced their interaction with students. These data suggest that educators need and want to learn trauma-sensitive strategies.

73. Evidence Based Knowledge for Teachers

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This paper-cum-workshop focuses on a current discussion of worldwide interest for teacher education, namely that of teaching as an evidence-based knowledge (EBK) profession: exactly what evidence and how this is generated, acquired and transmitted, by, to and for pre- and in-service teachers. This session will take forward this debate by discussing different theoretical and international perspectives, each exemplifying and illuminating issues of how teachers can engage with EBK to enhance their practice and thus make significant contributions both to school improvement and to enriched outcomes for learners. Addressing as it does the increasing interest in the notion of teacher-as-researcher both as a producer and a consumer of research-generated knowledge, this presentation will be interactive with the audience participants, using the methodologically innovative application ‘Padlet’ in conjunction with participants’ own mobile devices. This online virtual bulletin board securely enables collaboration, reflection and information sharing. Through the session a series of ‘think pieces’ are posed to the audience participants to stimulate a concluding session of structured conversation, the main points from which are recorded live on the Padlet. The results are made available to all participants who supply their email addresses, signaling their consent to provide data by engaging in the discussion. Following a time limit set for contribution, the data will be analysed and coded for each think piece and published through ICET. Conclusions will be drawn concerning the current situation of mobilisation of EBK for teachers and teacher-educators worldwide.

74. Making your research interesting and exciting and getting it published

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This workshop is designed for those interested or involved in education or social research. The object is to enable participants to enhance their research or research proposal and their writing with interest and excitement. The workshop basically consists of two presentations [doing research and getting published] with associated opportunities for individual and group reflection, input and development of research and writing; whether existing, on-going or anticipated. The workshop will be run interactively so as to best serve its members’ needs. Opportunity will be available for subsequent individual consultation.

CHALLENGES FACED BY TEACHERS IN THE TEACHING GEOMETRY

PROOFS IN GRADE 12

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The way we teach Geometry has been debated over many years. Until Van Hiele and his wife (1986) developed a systematic way to approach Geometry, it was a kind of personal way and use of behaviourism and or constructivism was made. One important point that has been missed in the literature is all proofs use an inductive approach. But to use such an approach implies the person must know the algorithmic path to follow. While Van Hiele made some concrete recommended on how to teach Geometry, he did not take the idea a step further and offer guidance of how to solve Geometry problems/ riders. Geometry has been recognised as a difficult part of Mathematics both to teach and learn. The reason could be that procedural and conceptual knowledge appear and ought to be operationalized simultaneously especially in riders. This paper aims at guiding the teacher and the learner with declarative knowledge (theorems) towards solving the rider. The idea is based on a study conducted in 2012 which involved Mathematics structures combined with analysis and synthesis.

Solving Geometric Riders at Senior Secondary High School

Geometry, although a part of Mathematics, might be considered as more complex even though it might appear less abstract than the rest of Mathematics (Hoyles, 1998; Adolphus, 2011), at least in the secondary education level. The problem of the teaching and learning of Mathematics has been researched widely for decades and to a lesser extent the teaching and learning of Geometry. A literature review has shown that although many factors have been identified not much progress has been made in solving the problem of teaching and learning of Mathematics. Such a progress can be considered almost insignificant if one looks at Matric (Grade 12) final results. In fact, performance in Geometry especially the component that

involves proofs tends to be much worse than performance in Algebra, Analytical Geometry and Trigonometry (Adolphus, 2011; Giannakopoulos, 2017). Senk (1989:309) pointed out that,

‘Although teaching students to write proofs had been an important goal of the geometry curriculum for the college bound in the United States for more than a century, contemporary students rank doing proofs in geometry among the least important, most disliked, and most difficult of school mathematics topics’.

Geometry, being part of mathematics, comprises about 30% of the final, Grade 12 National Senior Certificate (NSC) in South Africa. A number of authors (Ali, Bhagawati & Sarmah, 2014; Hoyles, 1996, Ozarem, 2012) agree that Geometry and the teaching and learning of Geometry is complex as it requires the evolvment of many cognitive functions simultaneously. It is a subject that is used in other fields (Adolphus, 2011; Biber, Tuna & Korkmaz; 2013). Adolphus (2011:12) sees Geometry as “the bedrock of engineering and technological development.” It requires abstract thinking, logic, ability to visualize abstract concepts, argue backwards and forwards (synthesis and analysis), justify every step when solving a problem and above all it requires critical thinking (Ozarem, 2012, Ali et al., 2014; Gloria, 2015). In fact Ozarem (2012) goes as far as to say that the reason for fear of Mathematics is mainly due to poor geometrical conceptions. Among the many reasons for teaching geometry in schools, Jones (2000) asserts that the development and use of conjecture, deductive reasoning and proof is the founding principle of mathematics.

A brief literature review on the problem has identified a number of factors which can be classified as, learner’s

factors, teachers' factors and institutional or environmental factors.

Factors that influence the teaching and learning of geometry

The first point that literature reveals is that the performance of learners in Geometry is poor (Luneta 2015; Ali et al., 2014; Adolphus, 2011). This could be attributed to a number of factors such as poor foundation of basic knowledge from the primary schooling (Ali et al., 2014; Amazigo, 2000), lack of willingness and readiness to learn Geometry (Ali et al. 2014; Amazigo, 2000) and learning as well as instruction is mostly instrumental (lack of deep understanding) (Ali et al., 2014; Mayberry, 1983); the teaching environment is not conducive (lack of properly trained teachers (Ali et al., 2014; Amazigo, 2000); imbalanced teacher-learner ratio (Ali et al., 2014); lack of physical models (Adolphus, 2011). Furthermore, inability to instructionally identify learners' misconceptions and the errors they produce is one other factor researchers picked up as a hindrance to understanding of geometry (Herholdt & Sapire, 2014; Luneta, 2015; Ball, Thames & Phelps, 2008; Clements and Battista, 1992). Lim (2011) found that many of the misconceptions displayed by the learners are due to the fact that teachers and learners operate at different geometric levels (here the authors refers to Van Hiele's (1986) levels).

Lack of Pedagogical Content Knowledge (PCK) by the teacher as defined by Shulman (1986) and also by Hill, Ball and Schilling (2008) is another important factor. Ellerhorst (2014) also acknowledged years of experience, degree qualification level and type impact on learners' performance in Geometry. In contrast Ellerhorst (2014) found that the four factors of teachers (though a small number) with few years of experience, lower qualification and certification type did in fact have a positive impact learners' performance. Although Ellerhorst (2014) does not make any suggestion as to why this is the case, based our combined 70 years of teaching mathematics and geometry and having both held heads of department positions a probable reason could be passion for teaching. Passion leads to motivation to improve one's teaching and one cannot teach passion to new teachers, its either they have it or they don't. Ellerhorst suggests more research is

necessary (2014). Ackerman, Heafner and Bartz (2006) state that quality teaching in general impacts learners' performance in Geometry. Other researchers have further asserted that the problems underlying the teachers instructional format is a deficiency in "teachers' knowledge of student cognition in geometry" (Swafford, Jones & Thornton 1997: 468)

Van Hiele's (1986) work could be considered an important breakthrough in the teaching of Geometry. Combining Van Hiele's ideas with Bloom's (1979) taxonomy could provide a window into the teaching of Geometry. However, as it will be shown, these postulates are not sufficient in enabling learners to solve Geometric riders. Van Hiele's statement that higher levels of thinking in Geometry can only be achieved through instruction, then we argue that the instructions should be extended to how to solve Geometric riders.

Van Hiele's theory

This theory was designed by Pierre and his wife Dina Van Hiele in the late 50s as dissertations at the University of Utrecht. For detailed information on the theory De Villiers (1997), Lawrie and Pegg (1997) , and Usiskin (1982) are just few of the many researchers that discussed the theory. Dhlamini (2012: 17-26) gives a detailed account of the theory but we only provide a summary here.

Van Hiele's (1986) theory on the teaching of Geometry identified 5 levels of understanding. 0 being the most basic to level 4 that was the most advanced (Dhlamini, 2012). Dhlamini (2012: 15) gives a very good summary of the theory in table form.

Level 0: Visualisation (Recognises shapes and can reproduce them but not details)

Level 1: Analysis (Can see the details of shapes similarities and differences)

Level 2: Informal deduction (Can abstract relationships between shapes, classify shapes)

Level 3: Formal induction (Can construct proofs using their understanding, not necessarily use existing proofs). Here the learner can follow a certain path based on his knowledge and knows it is a correct justified path.

Level 4: Rigour (Can go beyond the concrete presentations and Euclidean Geometry e.g spherical Geometry).

Alternatively these can be described as

Level 1: The visual level (concrete)

Level 2: The descriptive level

Level 3: The theoretical level

Level 4: The formal logic level

Level 5: The nature of logical laws (abstract).

The first three levels are related to procedural ability. Having achieved these levels the learner knows how to follow a series of justified steps to arrive at a solution. The last two levels are related directly to conceptual understanding (Kilpatrick, Swafford and Fidell, 2001).

Van Hiele (1986) had concluded that these levels follow the above sequence where the preceding level is prerequisite to the next level and that higher levels can only be achieved through instruction. Furthermore, Van Hiele designed certain steps necessary to move from one level to the next. These were:

- 1: Inquiry or information (establishing prior knowledge)
- 2: Direct or guided orientation (Guidance is given on the learning of a concept)
- 3: Explication (Learners can describe/ explain what they learned)
- 4: Free orientation (Learners practice on solving problems on what they learned)
- 5: Integration (Integrating all concepts and relations which serves as the bases for moving to the next level).

This brief description of Van Hiele's theory highlights the importance of teaching of Geometry and that Geometry should be considered as a chain where if one link is missing it is difficult to connect it to the next piece of the chain. Furthermore it is important to note that Van Hiele's theory was based on what was known as the '80s theories of cognitive development, like Piaget's stages of cognitive development.

Assessing whether a certain level was achieved Bloom's Taxonomy (whether the initial (Bloom, 1979, 1994) or the modified one (Forehand, 2010 cited by Dhlamini, 2012:15) could be applied. Bloom (1979) developed a taxonomy which could help educators in evaluating the

thinking levels of a learner. From the lowest level, knowledge (recall), to comprehension, to application, to analysis, to synthesis and finally to the highest thinking level, evaluation (Brown, 2004). Brown (2004: 78-82) discusses the various levels and highlights some of the shortcomings of the taxonomy.

Van Hiele's and Bloom's approaches have implications for the teaching and learning situations. They are significant for this study too because they can be used to determine the level of learners' thinking but the most important is that they form the basis of the strategy in solving geometric riders. Irrespective of how good the teaching and learning is in a classroom the learner still has to write and pass the final examination. If one examines Paper II of the National Senior Certificate (NSC) for the past 40 years the average percent of Geometry is about 30% of the paper and geometry riders make up about 85-90% of the Geometry section. For example in the 2016 final examination the Geometry section was 47/150. For a 1987 Paper II it was 62/200. So the Geometry section is consistently around 30%.

Geometric riders: What are the challenges encountered by teachers when teaching Grade 12 learners solving geometry problems?

A review of the existing literature has highlighted the difficulties that learners encounter in solving geometric riders. The teachers on the other hand follow the 'text book method' in a kind of sub-conscious way. There is a perceived hope that learners can use the text books and understand the theorems and apply them. But that is however not the case. What teachers do not realize is that all text books use the inductive approach, meaning the writer knows the beginning and the end. But to the reader is not obvious why one should start from X and not from Y statement. What we need is a method that the problem solver knows exactly where to start, assuming he/ she knows where to end.

When we deal with geometric riders in Grade 12, they can be considered as geometric problems which comprise of a combination of various theorems, definitions and axioms. It can be argued that the greater the number of theorems involved the more difficulty it is to solve the rider. Being in possession of knowledge of the theorems (factual or

declarative knowledge) is a necessary but not sufficient condition for solving rider; not only theorems that one encounters in Grade 12 but all theorems that are learned from Grade 8 such as those related to intersecting lines. This is why Van Hiele emphasized the importance of continuity in the learning of Geometry as it forms a chain of knowledge. For example if a rider involves 2 theorems from Grades 11 and 12 and many other theorems from previous grades (parallel lines, intersecting lines, angles in a triangle, exterior angles) all come into play. A learner has to have conceptual knowledge of all these theorems as that facilitates the choice of information that is necessary to solve a problem. But even that is still not enough. The sequence that the learner uses the information is necessary (procedural knowledge). There could be many paths to the solution and he/she must choose the best (strategic knowledge) and this could form the first link in the chain. Furthermore, studied and literature for the past three decades has ignored two important aspects about Geometry: a) The fact that all geometric proofs use the inductive approach (from unknown to known), which we call the 'forward approach', and b) drawing extra line/s increases the difficulty. For example, if we think of the proof about a cyclic quadrilateral. Unless the learner joins two adjacent points to the center he/she cannot prove the theorem unless he/she uses another method such as proof by contradiction or analysis and synthesis, which are not taught in the high schools.

Having examined Grade 12 NSC final examinations for the past four decades it was only on two occasions that the examiners asked learners a question that required a line to be drawn in order to solve the rider. Further analysis of the Geometry questions also showed that the questions are designed in such a way that they guide the learner step by step towards answering a complex question. For example if a certain angle is 60° but one has to first prove that a triangle is equilateral, but this could perhaps be part of a rectangle's interior triangles and one has to prove they were congruent. To arrive at an answer one has to prove that certain angles are equal. In the examination they would have asked the question in 3 to 4 sub-question and hardly a question like prove $\angle A = 60^\circ$. This of research report should assist learners to solve the rider with greater ease.

Before one suggests an alternative way of solving geometric riders, it is necessary to make two assumptions:

- a) The learner knows and understands and can apply the learned theorems. With geometric riders 90% or more are about theorems. A learners who does not know the theorems will not be able to solve riders.
- b) The teacher is competent in Geometry (Ali et al., 2014). Geometry can only be learned by instruction (Van Hiele, 1986).

If (a) is true and the teacher is not competent, then the learner stands a little chance of understanding Geometry. Hoyles (1998) asserts that teaching Geometry is more complex than numerical operations. There is need for the teacher to possess a visual and multimedia approach to teaching as visualization is the most basic and necessary condition to understand Geometry, as shown by Van Hiele (1986).

In order to simplify the problem of solving riders, we can divide the information of a rider (assuming there is a diagram given) into:

- a) The visual part (diagram) (explicit). This is the most basic level of Van Hiele's theory.
- b) The given information (e.g. $AB = 20m$, $\angle ABC = 30^\circ$) (explicit)
- c) Information that theorems are involved (parallel lines, intersecting lines, cyclic quadrilaterals and so on) and stated (e.g. given ABCD is a cyclic quadrilateral) or not stated (for example if two lines intersect, or a triangle it is not necessary to state the lines intersect or ABC is a triangle).

A lot of Geometry involves making deductions from certain primary information. This is what Van Hiele calls formal or informal deduction. For instance, we cannot prove two lines are parallel, a triangle is isosceles, a quadrilateral is cyclic. These concepts are constructs. Constructs are indicators (variables) that measure something. These indicators depend on factors. It is the factors that are measured. In Geometry geometric constructs have attributes. It is the attributes that we try to determine whether they are possessed by a shape. Therefore to prove that two lines are parallel (construct) we can try to prove is that certain angles are equal (e.g.

corresponding); A triangle is isosceles (construct) if base angles are equal; A quadrilateral is a cyclic quadrilateral (construct) if exterior angle is equal to interior opposite (implicit, information has to be deduced).

d) Information to be derived. i.e Given all the information determine X, or prove Y. (implicit)

The (c) part is the most critical one, because the learner must be able to derive all possible information but at the same time use only what is necessary and chose the best path to the solution. The suggested method assists the learner to: Use only necessary information and know the path to follow. It must be stressed here that we are not encouraging that only the shortest paths should be followed. The aim is to solve the problem (whichever method/path one uses) as long as the steps are justified. Normally a learner that is competent (like an expert) with solving riders would chose 'automatically' the shortest path. At the end of the paper it will be argued that it is possible to choose the shortest path by applying the deductive approach.

A certain technique (procedure) could be added when one has to solve a rider. Using an inductive approach for solving a geometric rider does not necessarily have a fixed beginning, so one does not necessarily know where to start. That could be a reason why some learners do not attempt certain riders. The technique is based again on deductive thinking or analysis and synthesis. For example if we have to prove that $\angle A = \angle B + \angle C$, using analysis we assume that the statement is true and then find angles equal to $\angle A$, to $\angle B$ and $\angle C$ and arrive at a given (or derived) information. That is, we can look for alternative problems to solve, and if solved then we can solve the given problem. If we happen to have $\angle A + \angle Y = \angle B + \angle C + \angle D$ then the question could be: Can we prove that $\angle Y = \angle D$? If yes then the problem is solved. Other times we can add something to both sides. Perhaps adding to the given equation something, say $\angle F$ we get $\angle A + \angle F = \angle B + \angle C + \angle F$ and perhaps $\angle A + \angle F = \angle G$ but also $\angle G = \angle B + \angle C + \angle F$. That means we derive 2 equations for $\angle G$ and from there on we can prove what is required.

Examining the riders that appear in a National Senior Certificate (NSC) for the 40 years, as stated earlier the questions are asked in such a way that they are guiding questions. On the other hand as a rule one need not draw

any extra lines (like proving that the sum of the opposite angles in a cyclic quadrilateral are supplementary). In a way the examination questions are leading and provide the learner with the path to follow in order to answer sub-question 1.1.5 (say). Therefore one had to answer (or use the previous derived information) the first 4 before answering the 5th sub-question. However, in all sub-questions one needs to determine the path, the inductive or deductive way. Since the inductive method is applied as a rule by most rider solvers there is no need to discuss it. The deductive or as better known as analysis and synthesis approach would be used. Analysis and synthesis feature explicitly in Bloom's taxonomy and implicitly in Van Hiele's theory. This method is not taught in South African schools. To use this method it is necessary to understand Geometric structures. In fact probably Van Hiele was prompted by understanding geometric structures (in his 'structure and insight' book, 1986) when he was developing his theory.

It is necessary though to define what is meant by analysis and synthesis in the context of Geometry. Literally speaking analysis is the breaking down of something into its individual components, like 'dismantling' a car. One has to follow a certain sequence in doing so. Putting the parts back together is synthesis. Whatever sequence was followed in analysis the reverse sequence has to be followed as well. But geometric sense is more than that; it is necessary to understand each construct and its attributes and justify why a certain statement is made and related to Van Hiele's (1986) levels of formal and informal deduction. Furthermore solving a geometric rider can be considered to be a simultaneous application of all 5 levels of Van Hiele.

In solving Geometric riders, the use of assumption is critical. In the analysis part, we can start from the unknown (required to prove) statement and assume to be true. A further assumption can be made and arrive at another unknown statement and so on till we arrive at a known statement (a statement that can be proved, or given information). In the synthesis part we write the solution by reversing the process. Knowing X we can prove Y. Knowing Y we can prove Z and so on. This method has the advantage that the path is constructed during the analysis. The problem solver knows exactly where to start

the solution. But this method cannot be used if the problem solver does not understand the Geometric structure. An important point here is that learners are not encouraged to construct their own accurate diagrams which contributes to getting a better insight into the Geometric structures (Hoyles,1996).

The study of Geometric structures

The idea used by Giannakopoulos (2012, 2015) for differentiation could be applied here to develop the geometric structures. The following rules could be used. If we consider a rider as a geometric structure,

a) It could consist of points, lines and various shapes, special lines such as radius, tangents, perpendicular,

medians, bisectors, circle and so on (the bricks of the structure).

b) These shapes could be fundamentally related (i.e. satisfy various theorems/ relationships) or by construction (i.e Let line $AB \parallel CD$) (the mortar that binds the bricks)

c) The sequence of constructing a rider could follow one and only one route (one way of solving the problem), or multiple routes (multiple ways of solving the problem).

d) It is the synthesis of (b) and (c) that could solve the problem.

In order to solve the problem we need to divide the extracted information into primary and secondary information. We can classify as primary information the one

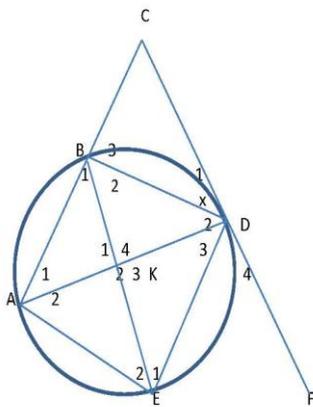


Figure 1: A Geometric rider A

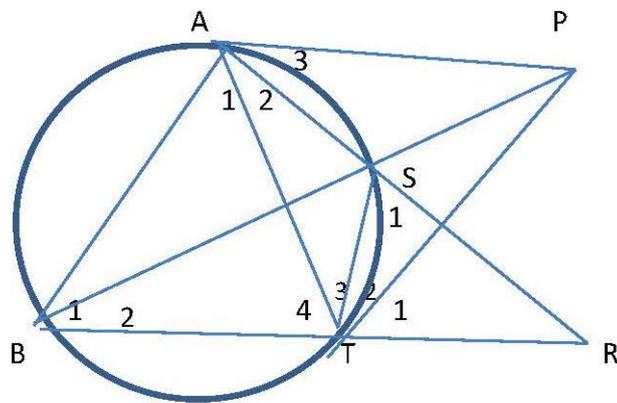


Figure 2: Geometric rider B (1985 NSC)

In Figure 1:

Given Cyclic ABDE CDF tangent to circle at D. diagonals AD and BE.

$AB=AE, DB=ED, D1=x$. Required

to determine:

- a) Angles $E1, B12, E12, C, B1$ and $E2$ in terms of x .
- b) $AKB = 90^\circ$.

In Figure 2:

Given tangents PT and PA . Sides AS

and BT of the cyclic quadrilateral

$BAST$ extended meet at R and $\angle A = \angle B$

Prove: a) $AB \parallel ST$

b) $RS = RT$

c) $T1 = B1$

d) $A1 = T1$

e) $P = B1 - T2$

that is contained in Grade 11 and 12 theorems and given information, while secondary information that is derived from previous grades such as parallel lines, vertically opposite angles, angles in a triangle, supplementary or complementary angles, properties of an isosceles triangle etc..

In order to illustrate this let us use the following two riders (see Figures 1 & 2). From Figure 1, how this rider could have been constructed? (the most probable one based on logical argument; justifying why that is the sequence).

Analysis 1

There is a circle, a tangent, a random cyclic quadrilateral with pairs of adjacent sides equal, its diagonals and tangent (all primary information) meets extended side AB at C. The most probable way to draw the diagram is:

1. Construct circle.
2. Draw cyclic quadrilateral by a) From A draw $AB = AE$ (e.g with center A and some radius (preferably less than the radius of the given circle, it will cut circle at B and E). b) From E (or B) draw $ED = BD$ (here if you draw from mid-point of B a perpendicular (perpendicular bisector) cutting circle at D and from D join B and E)
3. Draw tangent FD (it will be perpendicular to the perpendicular bisector) and extend it.
4. Extend AB till meets tangent at C.

Once we know the structure we can derive the possible primary and secondary information (whatever is necessary) to solve the rider.

Synthesis 1

The above 4 points contain primary information or conceptual knowledge. From (1) we know, radii are equal, radius at the point of tangent is perpendicular to the tangent. From (2), $B_{12} + E_{12} = A_{12} + D_{23} = 180^\circ$. Angles on same segment are equal, viz $A_1 = E_1$, $A_2 = B_2$ and so on. Also isosceles triangles thus $E_2 = B_1$ and $E_1 = B_2$. From (3), $D_1 = E_1 = A_1$ and $D_4 = B_2$. From (4) exterior angle B_3 is formed which is equal to E_{12} .

If we can extract this information we should be able to answer any question. The problem that could arise is answering the question: Where do we start? The answer is simple. Start from whatever you need to determine/ prove and assume it is true as stated earlier. E_1 is equal to what? From (2) is equal to A_1 and from (3) is equal to $D_1 = x$.

B_{12} is equal to what? $B_1 = E_2$ and also B_3 (from (2)). $B_2 = A_2$ and also D_4 which is also equal to $B_2 = x$ (from (3)). Thus, $B_{12} = B_2 + B_1 = E_2 + A_2 = E_2 + x$ but $2E_2 + 2A_2 = 180^\circ$ i.e $E_2 = 90^\circ - x$. Then $B_1 + B_2 = 90^\circ$. Similarly $E_{12} = 90^\circ$.

For $\angle C$? It is involved in triangle CBD and thus in triangles, CBD and CDA. We can choose either. Since CAD involves known angles we can use it instead of CBD (which we could use). $C = 180^\circ - A_1 - D_{12} = 180^\circ - x - x - D_2 = 180^\circ - x - x - 90^\circ + x = 90^\circ - x$. Alternatively, we could use CBD with $B_3 = E_{12} = 90^\circ$ from (4) and thus $C = 90^\circ - x$.

For E_2 , it was determined to be $90^\circ - x$ while B_2 is equal to E_2 .

For angle $BKA = 90^\circ$, there are many ways to prove that. For example in $\triangle ABD$, $B_{12} = 90^\circ$, Then $A_1 + D_2 = 90^\circ$ but $D_2 = B_1$.

Analysis 2

For Figure 2, how could that figure been constructed? 1) Given cyclic quadrilateral with two adjacent angles equal and the diagonals. 2) Since sides extended we have two exterior angles. 3) Two tangents. 4) Given $BAS = B$

What information can we get? From (1) All angles on segments, $A_1 = B_2$, $B_1 = T_2$ etc. Opposite angles supplementary, $B + A_{ST} = 180^\circ$, $B = BAS$ (given) and exterior angle equal to interior opposite. From (2), $T_2 = A_2$, $A_3 = B_1$. From (3) $S_1 = B$, $T_{12} = A_{12}$, $T_2 = B_2 = A_2$, $A_3 = B_1 = T_3$ and $A_{23} = B_{12}$. From (4) Since $B_2 = A_2$ then $A_2 = B_2$.

Synthesis 2

For $AB//ST$..i.e prove corr./altern \angle s equal, or interior angles add up to 180° .

Here corr. \angle s $S_1 = B = BAT$ (S_1 exter. \angle) from (1). For $RS = RT$, isosceles $\triangle STR$.. $S_2 = T_{12}$? $T_{12} = B$ (corr. \angle s) = S_1 , from (1) and (a). For $T_2 = B_1$, T_1 is involved in T_{12} and B_1 in B_{12} , where $B_{12} = T_{12}$ (corr. \angle s). But $B_2 = ?$ $B_2 = T_2$ (from (3)). Then $B_1 + B_2 = T_1 + T_2$ or $T_1 = B_1$. For $A_1 = T_1$, $A_1 = ?$ $T_1 = ?$ From (4) $A_1 = B_1 = T_1$ from (c). For $P = B_1 - T_2$, P is included in $\triangle PTB$, $P + T_{23} + B_2 = T_{34} + B_1 + B_2 = 180^\circ$. Or $T_2 + P = B_1$. Then $P = B_1 - T_2$

These two examples use the same method which is dependent on the analysis (breaking down the rider into primary information and using deductive thinking to extract the information) and synthesis, where we begin from what is required to determine and trace it to something given that was extracted in the analysis.

Looking at this method which is accompanied by understanding, it relies on the fact that the learner has understood the essence of all theorems and axioms and can use them with ease and confidence. Using construction continuously reinforces concepts learned. This way the learner builds his/ her knowledge of Geometry on solid bases. It also reinforces the argument of why learning Geometry is not easy as it relies heavily on conceptual knowledge. As a rule there will always be more information than is needed. Assuming one can extract all the information from the analysis then the question to be answered determines the path, tracing back the unknown to known. What could be very interesting is to see how many learners can construct a diagram from a given information as accurately as possible! This could be a research problem on its own.

Finally, it is necessary to keep in mind the two assumptions made (which themselves can form the basis for more research). One main point that cannot be disputed is that lack of knowledge of theorems (declarative knowledge) and not being able to make deductions from the theorems (conceptual knowledge) makes it very difficult to solve a rider. Deconstructing a rider (analysis) and subsequent synthesizing the derived information could lead to a successful solution of the rider.

Conclusion

Although a lot of research has been done on identifying factors that affect the teaching and learning of Geometry and how to teach Geometry (e.g. Van Hiele), solution of riders, as a rule, follows an inductive approach if the analysis takes place as part of the thinking process. To solve a geometric rider and follow a specific path, it can only be done using the deductive approach. The deductive approach forces one to rephrase a question asked. For example I can prove $A = B$ if I can prove $A = X$ and $B = X$. So the question is not about proving $A = B$ but about A and B being equal to X . In Geometry we cannot prove a

concept (construct) is true but what attributes a concept has. For parallel lines we cannot prove two lines are parallel, but if we could prove corresponding angles are equal (attribute) then we proved that the lines are parallel. We conclude that through analysis (deconstruction) and synthesis (deduction) it is possible for more learners to be able to solve Geometric riders.

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Innovative Enterprise Education and STEM: A Post-Colonial Orientation to Global Citizenship

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Abstract

With the elevation of Western science to universal science through, for example, STEM outcomes, Blackfoot knowledge forms are essentially cast aside epistemologically based on assumptions that formalise the universality of modern Western science (Gough, 2003). Importantly, this serves to discount the recognition of “knowledge systems (including Western science) as sets of local practice so that it becomes possible to ‘decentre’ them and develop a framework within which different knowledge traditions can equitably be compared” (Gough, 2000, p.335) and drawn on to produce new knowledge. It is rather preferred that knowledge and learning take into cognisance the performative character of all knowledge forms (Gough, 2000) and promote a kind of internationalisation wherein transculturation is emphasised. This knowledge is invaluable to furthering innovative enterprise education because of its local and global relevance. It is from this standpoint that we argue that global citizenship can be promoted by constructively acknowledging the value of innovative enterprise education to dismantle boundaries amongst global citizens by creating critical postcolonial learning spaces. In so doing, “the “inter” space and the “locality” required in harnessing global citizenship can facilitate a remapping of knowledge and representation of STEM. In the paper, first, we discuss the significance of STEM to innovative enterprise education. Second, we reflect on the relationship between these two aspects, and argue that the curiosity and innovative character that are likely to result from this relationship may lead to global citizenship that underpins Gough’s views of internationalisation.

Introduction

Due to global competition and the rapid changes in technologies, there is a need for countries to educate their citizens/workers for the changing requirements of the economy. Education has to promote creativity and innovativeness for the jobs of the future rather than existing ones (Holt, Colburn & Levery, 2012). Since technical knowledge may become outdated very quickly, it has become very difficult to foresee what the occupations and occupational needs of the future will be. Science, Technology, Engineering and Mathematics (commonly known as STEM) are crucial as content of education or knowledge that is worthwhile to fulfil the requirements of the new technologies (Hytti & O’Gorman, 2004) and rapidly changing world of work (Breiner et. al. 2012). For business innovation and career success, the importance of the scientific knowledge and engineering skills provided by these subjects cannot be underplayed (see, for example, the “Oslo Manual”, OECD, 2005). As argued by, for example, the Global Competitiveness Report, 2012-2013, p. xiii (Schwab, 2012), “the complexity of today’s global economic environment has made it more important than ever to recognize and encourage the qualitative as well as the quantitative aspects of growth, integrating such concepts as social and environmental sustainability to provide a fuller picture of what is needed and what works”. Therefore, according to Zollman (2012), the ability to forge relationships across STEM and support each other to connect learning to what is required by future economies and lives. This requires education that develops cooperative authentic learning to enable students to work and learn together collaboratively. STEM literacy is unachievable without a context wherein students are confident to relate across STEM and develop the necessary motivation for STEM literacy. To develop students who are logical thinkers, technologically literate, problem-solvers, innovators,

inventors and self-reliant (Morrison, 2006 cited in Lantz, 2009, p. 3), the curriculum must ensure that all four disciplines are taught to develop the ability to use skills and knowledge such as scientific processes and mathematical problem solving. Such ability is crucial to perform higher-level cognition tasks (Fortus, Krajick, Dershimerb, Marx & Mamlok-Naamand, 2005; Satchwell & Loepp, 2002). As students engage the different subject areas, new orientations are likely to develop within frameworks in which the mediation of different perspectives occurs based on local and individuals' experiences of the areas. Within such orientations or settings, it will be possible to mediate STEM subjects' meanings and develop a deeper understanding through what Jones & Iredale (2010) call experiential action learning. First, there will be an exploration and mediation of the interconnectedness of the areas, second, trans-disciplinary methods and third, integrative rationality that is important for identifying how different concepts can be collectively drawn on to create the new ones needed for technological advancements. The implications for classroom organisation are that students should work in small, collaborative groups while teachers facilitate learning (Lantz, 2009, p. 7).

Holt et al. (2012) argue that the value of STEM education is not as an end to itself but rather in making people innovative and productive in all their undertakings. Innovation in education can help generate new ideas and improved approaches to processes and products. Integral to the success of, for example, Apple's innovative products, was the creative process that combined liberal arts and engineering (see Walter Isaacson's biography of Steven Jobs cited in Holt et al. 2012). Therefore, since STEM education aims to develop students' ability to apply concepts and skills from different disciplines in solving authentic problems that are meaningful and relevant to their lives, according to Vasquez (2015, p. 12), "all STEM learning has one thing in common – it gives students opportunities to apply the skills and knowledge they have learned". Since the different sets of skills required are no longer discipline-bound, students need to be exposed to

knowledge that can enable collaboration and connectivity in various knowledge areas or disciplines. Educational programmes have to promote enterprise education as pedagogy, that is, experiential action learning across various subjects and in the different levels of education. Jones & Iredale (2010, p.7) view this form of education as also promoting "ownership of the learning process" because students are guided through the process of learning in ways that allow them to think and act independently. The acquisition of knowledge that is traditionally assessed or measured through controlled examinations is replaced by evidence-based assessment. Students have to develop the necessary literacy by integrating STEM when learning (see Tsupros. Kohler & Hallinan, 2009; Morrison, 2006). However, amongst others, for Bybee (2013), Hytti & O'Gorman (2004) and Breiner et al. (2012), there is confusion as to what STEM looks like in practice and the educational pathways are not always clear. Therefore, rather than try clarifying what STEM is, it is better, according to, for example, Breiner et al. (2012) to focus on outcomes to determine the success or lack thereof of an initiative (see also STEM Education in Southwestern Pennsylvania Report, 2009, p. 2). This still makes it difficult for educators/institutions to prepare students for the "rapidly advancing technological society" (Breiner et al. 2012, p.10), since at times, the well-educated and skilled workforce has to be prepared also for jobs that do not yet exist (Holt et al., 2012).

Faced with global technological competitiveness, there is a general concern amongst countries as to whether they have sufficient scientists, engineers, and mathematicians to keep up to date with the research, innovation and technology skills required by the fourth industrial revolution (Breiner, Johnson, Harkness & Koehler., 2012; Hytti & O'Gorman, 2004). Global competitiveness also places pressure on countries to grow and innovate production. For example, the publication "Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Future" raised concerns in the United States about educating enough scientists, engineers and mathematicians to remain in the forefront of research, innovation and technology (The National Academies Press, 2007).

The fourth industrial revolution

The revolution requires new scientific thinking as educational consciousness. For innovative expertise and economies to flourish, the integration of machines and human resource development is important (Boiselle, 2016).

- The first industrial revolution (roughly between 1760 to 1820/40) is generally associated with the scientific revolution that occurred in England in the 18th century. It contributed knowledge about the laws of motion, theory of gravitation and thermodynamics and thus inventions such as the steam engine and free trade agreements that resulted in the flow of goods from the north to the south and de-industrialisation of the latter.
- The second (1870 to 1914) -also referred to as the technological revolution- occurred in the USA with the generation of electrical power and industrialisation that brought about a shift in the means of production.
- The third (1960s to the end of the 20th century) ushered in the electronic age and digital revolution. For example, start-ups are responsive, relevant and contextualised to a particular situation but can be used globally e.g. Facebook, Instagram.
- The fourth (beginning of the 21st century) emphasises artificial intelligence (AI) and thus machine-augmented education. It requires an understanding of technology. The concept was first coined by the World Economic Forum (WEF) and involves the integration of digital systems into the real world. For example, smartphones, telematics devices in cars, self-driving cars and robotic process automation are part of this new era. The interception of hardware, software and content make up technology e.g. robotics. In the future computers will provide many other services (not yet known/invented).

Industry 4.0 technologies like machine-learning and Artificial Intelligence (AI) require skills and investment. As the revolution continues, education increasingly becomes automated as regards provision and assessment

because its purpose is no longer knowledge acquisition and mastery. Rather what is important is how to use the available information/knowledge/theory whilst working alongside intelligent machines and systems. Big data facilitates this in a personalised manner and students have to be able to integrate and solve problems drawing on multiple approaches. Such multidisciplinary bringing together the four STEM disciplines/subjects is important for the integration of ideas required for critical thinking, judgement, decision-making and originality in research and innovation. For example, in the UK, this type of education has been promoted as a means to “produce more people with higher-level general skills better able to operate in an enterprising way so as to take advantage of opportunities emerging from the flexible market economy”(Jones & Iredale, 2010, p.9). As described by Price (2004, p.4) in Jones & Iredale (2010, p.10), it “provides students with an attitude towards learning, which rewards and supports innovation, change and development”.

The need for innovative scientific and technological expertise poses challenges to traditional notions of learning, particularly those that continue to emphasise disciplinary knowledge. Disciplinary-bound approaches are no longer considered adequate for the scientific thinking and educational consciousness that is required as foundation for such expertise, that is, “experiential action learning ... across a range of subject areas ...” (Jones & Iredale, 2010, p.7). Significant to this learning is how to engage across the different subject areas in an integrative manner. As put by Schwab (2016, p. 8), it is about “not only changing the ‘what’ and the ‘how’ of doing things but also ‘who’ we are”. It thus requires a shift in the concept of best practice, both as regards purpose and establishing whether it’s been educationally met or not.

- Business Problem Solving Skill

In this paper, we reflect on teaching approaches that are likely to promote innovative enterprise education through STEM. In addition, we identify, amongst others, a curriculum model that is likely to enhance possibilities for developing citizenship that has local and global relevance. In doing so, first, given the disparate conceptual accounts of what STEM is and the challenges of relating it to enterprise education, we provide a brief review of the

literature to highlight these challenges. Our argument is that the lack of clarity about what STEM is, makes emphasis on its outcomes and teaching and learning methods for enterprise education very important. These aspects are also crucial to teacher education that is likely to equip teachers and students with the ability to design, develop and teach an integrated curriculum. To integrate STEM in the curriculum democratically in different contexts teachers have focus on “providing ... the necessary questions that allow the student to identify the critical issue; and where it is necessary to provide advice, it should be presented in the form of suggestions and opinions, with the students making the choices of how to proceed ...” (Hytti & O’Gorman, 2004, p.18).

What is STEM education?

Vasquez, Sneider & Comer (2013, cited in Vasquez, 2015, p. 11) argue, “STEM education is an approach to learning that removes the traditional barriers separating the four disciplines and integrates them into real-world, rigorous, relevant learning experiences for students”. The education allows students the opportunity to “make sense of the world holistically, rather than in bits and pieces ... removes the traditional barriers erected between the four disciplines by integrating them into one cohesive teaching and learning paradigm” (Lantz, 2009, p.1).

STEM teaching requires teachers who are well qualified in their subject area/discipline to be able to integrate the subject areas meaningfully in transdisciplinary ways. Because the integrated approach in curriculum shifts thinking from content pre-specifications and teaching methods bound to traditional subject or discipline-oriented teaching methods, it creates possibilities of teaching across subjects or discipline to enhance relevance to real life situations. As a curriculum design approach, it prevents fragmentation and promotes greater cohesion and wholeness to knowledge development (Tynan & Noon, 2017, Boiselle, 2016, Semali, Hristova & Owiny, 2015). By bringing different knowledge and subjects together, STEM education provides a breadth of the curriculum, disciplined and rigorous ways of thinking across knowledge areas. Teachers’ pedagogical content knowledge (PCK) is crucial and valuable for transformative teaching, learning and assessment to occur effectively. It is in this sense that the curriculum design

and development approach it emphasises distinguishes itself from mainstream ones. Principles that inform it provide a framework for bringing together disparate knowledge or subject specialists, stimulate and motivate them to engage each other’s repertoire of insights and develop ideas in ways that break down taken-for-granted conceptions. The multiple pathways in which it initiates expertise are thus important in sustaining the development of concepts that give a wider perspective of issues or topics.

Significant to such an integrative curriculum design approach and development would be socialisation that is both idiosyncratic and shared. The codes developed inter-subjectively serve as frames of reference and underlie perceptions and behaviour. As collaboratively developed and publicly available conceptual tools for interpretation, once internalised they can ensure understanding of the others and co-existence within and across different knowledge areas. This explains why Kennedy & Odell (2014, p. 253) view STEM education as “... not simply a new name for the traditional approach to teaching science and mathematics ... it is an approach to teaching that is larger than its constituent parts ... it is a meta-discipline”. Kennedy & Odell (2014, p. 256) further suggest that the pedagogical approaches for STEM education should involve the following:

1. Use of integrative instructional strategies in ways that challenge students to innovate and invent
2. Use of problem-based and project-based learning with specified learning outcomes that support student learning
3. Creation of meaningful learning opportunities that provide context learning using applied and collaborative learning
4. Require students to demonstrate their understanding of the 4 disciplines in an environment that models real-world contexts for learning and work
5. Provide students with interdisciplinary, multicultural and multi-perspective viewpoints to demonstrate how STEM transcends national boundaries providing students with a global

perspective that links them with a wider STEM community and workforce.

In short, for Kennedy and Odell (2014, p. 246) engaging students in STEM education is about “an integrated effort that ... focuses on innovation and the applied process of designing solutions to complex contextual problems using current tools and technologies”. Therefore, teachers and students need bilingual expertise appropriate to the scientific thinking required by the new technologies.

By changing the focus from content to questions and understanding, Vasquez (2015, p. 15) highlights the type of questions that should be at the heart of STEM teaching for it to fulfil the requirements of such expertise:

1. What should students know and be able to do? What are the understandings they will gain through the STEM experience?
2. How will I know whether my students have achieved the desired results? What evidence of student understanding will I need?
3. What prior knowledge and skills will the students need to perform effectively if they are to achieve the desired results?
4. What level of integration will be the most effective to accomplish the learning goals?
5. How will lessons be sequenced? What resources and materials will students need to accomplish the learning goals?
6. How do I assess? What curriculum competences will students have to demonstrate?

With such questions, students will be able to “apply and connect their learning to new situations” (Vasquez, 2015, p. 15) in a trans-disciplinary integrative manner and, at the same time, improve their communication and collaboration skills by working together in small groups in defining a problem, finding a solution and refining a design. Activities for this approach include project-based, inquiry-based and problem-solving based teaching and learning. Implied here might be Bernstein’s (1971) concept of an integrated curriculum. His argument is that when insulation is reduced subject contents stand in an open relationship to each other and constitute an integrated curriculum. Insulated subjects are subjected to a relational idea that blurs the boundaries between them. Although pedagogy targets initiation into specialised subjects, skills

and procedures, which are clearly marked with regard to, form and function, pedagogical relationships move from deep knowledge structures to surface ones in order to expose principles that are necessary for the generation of integrated knowledge. Therefore, since STEM education involves mainly what Bernstein would describe as strongly classified subjects, the recognition and realization rules of the content of the different subjects will have to be explicit. Students will thus have less control when having to acquire knowledge. Emphasis will be on the need to understand how new knowledge can be created in an integrated manner and what the various ways of knowing have to comprise. The texts/products produced, as new knowledge will still be assessed based on the logic that would not be distorting the essence of the different subject contents. Even though this is the case, it is important to understand that integration does not imply conceptually the use of one subject’s theories and concepts in another. Instead, it requires a competence to draw on essential aspects of each subject in creating new knowledge. Learning self-regulation to prevent a taken for granted orientation into particular subject content that might be primary to an individual is thus crucial in the generation of a new consciousness.

The table below gives examples of the techniques/practices that link, support and strengthen STEM teaching and learning through a problem-solving and inquiry-based approach. It is important here to link them to real-life contexts of students to make the experience relevant and responsive to their context. If we look at the Engineering and Mathematics columns in particular, they begin with the problem. It is important for the problem to be interrogated and many questions asked for it (problem) to be fully understood. Then the group can look at designing models and carrying out investigations that respond to the problem etc.

Table 1: Connections among STEM Practices

Science	Engineering	Technology	Mathematics
Ask questions	Define problems	Become aware of the web of technological systems on which society depends	Make sense of problems and persevere in solving them
Develop and use models	Develop and use models		Model with Mathematics
Plan and carry out investigations	Plan and carry out investigations	Learn how to use new technologies as they become available	Use appropriate tools strategically
Analyse and interpret data	Analyse and interpret data		Attend to precision
Use mathematics and computational thinking	Use mathematics and computational thinking	Recognise the role that technology plays in the advancement of science and engineering	Reason abstractly and quantitatively
Construct explanations	Design solutions		Look for and make use of structure
Engage in argument from evidence	Engage in argument from evidence	Make informed decisions about technology, given its relationship to society and environment	Construct viable arguments and critique the reasoning of others
Obtain, evaluate and communicate information	Obtain, evaluate and communicate information		Look for and express regularity in repeated reasoning

(Excerpt from Vasquez, Sneider & Comer, 2013, *STEM Lesson Essentials*. Heinemann, p. 10)

From this array of questions, it is clear that STEM teaching is not a linear process.

What does this imply for experiential action learning or enterprise education?

STEM teaching and enterprise education

According to Jones & Iredale (2010, p.13) "... enterprise education pedagogy accords with liberal ideals ... personal liberty and freedom ... the freedom of the individual to change, grow, develop, act on and adapt to opportunities, circumstances, and contexts". It emphasises the explicit integration of STEM subjects in ways that develop new meanings and understandings that disrupt, deconstruct and resist narrow knowledge, subject or disciplinary-based approaches. Jones and Iredale (2010, p.12) have also argued, "the enterprise pedagogical approach ... is about the broad notion of citizenship and civic responsibilities". An example of what an enterprise education model looks like in South Africa is the "Explore Data Science Academy", an online institution (<https://www.explore-datascience.net/student>) based in Cape Town. On their website, students are encouraged to "Be part of the machine learning movement [and] to develop skills that will reshape our world. Follow a career that will drive the new economy". The academy offers a fully sponsored yearlong Data Science Programme broken up into three parts, a 6-month (Data Science Foundations) and two 3-month courses (Projects and Internship respectively) that combine content and practical experiences and skills.

In the Data Science Foundation's course students learn business problem-solving skills; foundational mathematics; applied science probability; computer science fundamentals; machine learning fundamentals; artificial intelligence and may have supervised or unsupervised learning. As put by Aidan Helmbold, (founding member and Lead Data Scientist, Investment Actuary, Management Consultant Explore Data Science Academy), "data Science, at its core, is about solving real-world problems and we will teach our students how to solve these by applying the latest techniques – from prediction models and artificial intelligence – to the growing amount of data available in business". In the Projects course, the problems they may expect to solve include visualising data; predicting the future and classifying unknown; computer vision and natural language processing. During the Internship course, students will experience placement on site at corporate

sponsors; solve real world business problems; teamwork and business communication skills and, have access to industry mentors.

Currently, however, a WEF study on South Africa's Industry 4.0 readiness found the country was a follower rather than a leader. It is ranked 49 out of 100 countries surveyed and is "one of the G20 countries displaying the lowest levels of readiness. Lack of clarity around government policy is a concern. Its African Renaissance narrative needs to include how technology can assist this dream to be achieved" (see Teddy Daka - CEO of Ansys, a technology company that is developing The Internet of Things and analytic solutions for mining, transport and other industries).

It is on this basis that Gough (2004) has argued that science targeting STEM outcomes requires a rethinking of curriculum work that ensures that the consideration of local curriculum discourses and practices is important. In his view, STEM subjects should not be merely assimilated into a global knowledge economy. They must be used to ensure culturally sensitive and responsive teaching approaches (see for example Ladson-Billings, 1995). Through "sites of emergence" (Gough, 2003, p. 14) hegemonic knowledge systems can be challenged and transnational knowledge prioritised to respond to technological advances that develop "multinational perspectives on citizenship and citizenship education" (Gough, 2004, p. 7) or what Wang (2006) would describe as a multiplicity that should prevail in globalized settings. This view of education defies the monological, totalising and homogenising conception of teaching and learning. It endows individuals with the agency to draw on the possibilities offered by different knowledge areas or subjects taking into account context and professional identities as crucial aspects to a just educational outcome. For this reason, education that continues to cast aside Blackfoot knowledge forms (see for example, Chansonneuve, 2005; Carr-Stewart & Preston, 2010; Brown, 1973), has to be understood as a continuation of historical "epistemic violence" (Seremani & Clegg, 2015, p.2). Discounting the relevance of indigenous/ local knowledges to STEM education is likely to inhibit the critical thinking, judgement and decision-making required for innovation and enterprise education. Such knowledge

cannot be cast aside. It has to be drawn upon to make problem solving both scientifically and contextually meaningful for global citizenship. For example, according to Kendal Makgamathe (Tshimologong Precinct, a start-up incubation hub in Johannesburg), there is a lot more in common between a 25-year old in Johannesburg and a 25-year old in Lagos, than between the 25-year old and the 60-year old in Lagos, because of digital connectivity.

Enterprise education and implications for global citizenship

Gough (2000) has argued that subject universalised knowledge forms have to be open to an epistemic renegotiation that situates, takes into account and facilitates students' understanding as a crucial aspect to a just educational outcome. Decentring different knowledge systems and traditions will make them equally valued. Drawing on Turnbull, he asserts that "all knowledge systems must be seen as sets of local practices so that it is possible to decentralize them and develop a framework within which different knowledge traditions can be equitably compared" (Gough, 2000, p. 335.). It is these elements of STEM-related fields that should comprise the cornerstone of learning in the 21st century for education to be holistic.

STEM education is meta-disciplinary and integrates separate subjects into a new field of study. With this integrative approach, the participants will not be passive recipients of a historically dominant knowledge area. Each knowledge area and the links between individuals and micro-communities belonging to it will be mediated. As it gets articulated, its constitutive logic will work in all directions, have an impact on other knowledge areas and, in turn, be shaped by them too. Since it underscores experiential action learning, its principles cannot be imposed. Participants are expected to be free to pursue their specialisations in building teams that can explore collectively a common understanding of an issue or topic without undermining any knowledge area. In these terms, different knowledge areas will be bound together by a collective identification of concepts for interpreting an issue or topic and skills for developing it innovatively. As put by Jones and Iredale, 2012, p 14), "as a generalised philosophy its actual practice is loose, decentralised, non-

prescriptive and fluid ... helps promote and extend freedom via a pedagogy which encourages participation, learning by doing and asking questions ... the creation of a democratic learning environment, fosters democratic citizenship and community responsibility ... and can further the notion of a good society... via pedagogy ... very much directed at empowering individual students to take ownership and responsibility for their own learning.” This is what the humanist and social constructivists are advocating for classroom pedagogy; not only in the knowledge domain but also to ensure the inclusion of all learners in the process (see for example Snaza, Appelbaum, Bayne, Carlson, Morris, Rotas, Sandlin, Wallin & Weaver, 2014),

The Kuching Declaration on Science and Technology Education released by the International Association for Science Education (ICASE) has also highlighted the need for students to be better prepared for the future. It declared, “access to high quality education is a fundamental right for all. In times of global vulnerability, issues such as sustainability, health, peace, poverty alleviation, gender equity and biodiversity conservation need to be at the forefront of thinking, planning and actions related to strengthening STEM education. While the relative balance and emphases of these disciplines varies around the world, it is the interrelatedness and combination of these that will propel progress” (quoted in Kennedy & Odell, 2014, p. 247). For example, it is interesting to note that in the US “overall graduate enrolments in science and engineering [have grown] by 35% over the last decade ... in particular, [the growth by historically underrepresented groups namely] Hispanic/Latino, American/Indian/Alaska Native and African American students growing by 65%, 55% and 50% respectively” (Kennedy & Odell, 2014, p. 249). Hussar & Bailey (2013 cited in Kennedy & Odell, 2014, p. 249) argue that “projections for fall 2021 enrolments in [STEM education] in grades 9-12 show the highest increase in student population will be represented by Hispanic/Latino students”. Continuing to make STEM education available to, for example, historically disadvantaged students will better prepare them for the jobs of the future. Therefore, Kennedy & Odell (2014, p. 250) call for “all students in all schools to [to] be part of the STEM vision and [for] teachers to be provided with the

proper professional development opportunities that will enable them to guide all their students towards acquiring STEM literacy ... the tools they need to transform teaching and learning in the 21st century” (Kennedy & Odell, 2014, p. 250).

Writing on democratic engagement, Mouffe (2000) argues that to deal with difference requires reworking citizenship in ways that ensure the achievement of equality and freedom for all, with equal access not only to the material resources necessary for self-development but also to meaningful participation in social, cultural, political and economic decision-making. Even though there is a need for various forms of political solidarity, the imposition of the wrong kinds of unity can limit the democratic potential of social movements to achieve unity and preserve autonomy. It is only by conceptualizing unity in terms of hegemonic articulation that the goal of unifying different social and political movements becomes compatible with the goal of preserving their autonomy. Such a process would take the form of continuous negotiations that give rise to new hybridity. Genuine engagement would imply the opening up of values and construction of a new set of shared values through negotiations. In short, Mouffe’s theory highlights principles that clarify the kind of engagement expected by enterprise education and that has to be kept in mind when exploring possibilities in which STEM can be used without distorting the essence of each subject or discipline.

It is thus reasonable to conclude that enterprise education can be associated with Gough’s (2004) notion of transdisciplinary curriculum inquiry (TCI) in which the curriculum is reconceptualised to promote a more democratic transcultural community or citizenship based on the sharing of knowledge and thus underpinned by a notion of interdependence.

To summarise, enterprise education calls for educators who are able to design and develop curricula based on a conception of teaching and learning that is appropriate for STEM and the changing technological global conditions. It necessitates new forms of curriculum literacy, a vastly expanded understanding of how knowledge works within a framework of current technological advances and a keener sense of how teacher education can contribute to

these advances. There is a need for teachers who can address these conditions through teaching that reflects meanings that are vastly different from the representations offered by a modernist version of schooling.

Concluding Remark

Now that educational knowledge has to be understood within new cultural practices, challenges related to curriculum literacy call for a displacement of pre-constituted and fixed knowledge bound conceptions of educator competences. To succeed STEM education must include “parental involvement and support, culturally relevant pedagogy, early exposure to STEM fields, interest in STEM careers, self-efficacy in STEM subjects and STEM-related educational opportunities and support programmes (Museus, Palmer, Davis and Maramba, 2011 cited in Kennedy & Odell, 2014, p. 249). It is only when this is the case, that there will possibilities of teaching STEM subjects in an integrated manner and promote citizenship that is innovative in local and global contexts.

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EXPLORING THE TOOLS OF LEADERSHIP BY EDUCATION LEADERS IN PUBLIC SECONDARY SCHOOLS IN LAGOS

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Abstract

This multiple case study explores the tools of leadership use by education leaders to manage schools. It aims to identify the tools that leaders use to enhance performance in schools in the context of Nigerian public secondary schools. The research participants purposively selected based on research criteria were nine teachers, three principals, three vice principals, and an educational administrator in an educational district in Lagos State, Nigeria. The study used semi-structured interviews and an analysis of Nigerian education policy documents to elicit data. The findings provide insights into tools of leadership such as power, authority and influence used by leaders which could make or mar progress in schools. The findings reveal the power discourses used by leaders on their subordinates as well as the impact of individual differences, ethnicity and micro politics employed by leaders on teaching and learning. The study recommends adherence to ethical standard in administering schools which would enhance the morale of staff and thereby increase performance in teaching and learning. Tools of leadership employ by leaders are of great significance in students' performance in public schools.

Keywords: tools, leadership, power, authority, influence, discourse

Introduction

Leadership is an important concept in organisation due to its significant role in determining the success of such organisation through action and interactions of people and things in achieving its objectives. The leader has the responsibilities to plan, control, direct and co-ordinate the activities of the subordinates in achieving the organisational goals and objectives (Eboka, 2016:25). Similarly, leadership is a process through which persons or groups intentionally influence others in the attainment of group goals (Adeyemi & Bolarinwa, 2013:187). Furthermore, it is regarded as the ability to influence, direct and co-ordinate group activities in such a way that the people work willingly towards achieving the goals and objectives of the organisation (Vroom & Yago, 2007:17). The willingness on the part of subordinates to work in achieving organisational goals depends on the functional behaviour of the leader in his/her relationship with them in facilitating the accomplishment of group goals (Adeyemi & Bolarinwa, 2013:187).

In the school system, teachers assume leadership roles as principals and perform administrative, social and educational roles as head of school administration. These roles undoubtedly have a profound influence in the attainment of school goals and objectives. In the school system, leadership is indispensable due to its significance in the achievement of goals. Therefore, school goals and objectives can only be achieved through effective leadership provided by the principal. School leadership is about providing vision, direction and

support towards attainment of pre-determined school goals and objectives. This could be achieved in the atmosphere of love, harmony and co-operation among key stakeholders in the school. School leadership is also the process by which school heads influence their followers to act for certain goals that represent the values, needs, aspirations and expectations of both leaders and followers (Oboegbulem & Onwurah, 2011). In this regard, leadership involves the process of influencing, directing, acquiring normative personal characteristics power and co-ordinating group activities to make individuals which are stakeholders in the school systems to strive willingly towards the attainment of organisational goals.

Therefore, leadership is the ability to get things done with the assistance of and cooperation of subordinates in the school. Literature has shown the prevalence of the three dominant leadership styles used by principals in schools and this has a significant effect on staff performance in schools (Wilson, 2017:115). The study of Adeyemi and Bolarinwa (2013:187) reveal that the democratic style of leadership was prevalent among school principals understudy while the autocratic style of leadership was found to be significantly related with students' academic performance. Similarly, the study of Eboka (2016:25) found that principal's leadership style and gender jointly influence teacher's morale. However, the study by Udey, Ebuara and Edet (2009) reveal that the positions occupied by school managers are not well utilised for the survival of the educational system because, the managers are not result oriented, their managerial and administrative skills are ineffective to enhance achieving educational policies and programmes. Similarly, Alimi, Alabi, Festus & Ehinola (2011) study shows that school principals have low level of leadership effectiveness in pedagogical and community relations skills

effectiveness. Wilson (2017:115) reported that principals face leadership challenges in the discharge of their administrative functions in schools. The study of Olujuwon (2016) noted that most school leaders assume leadership position without training which has made some of them not to be effective in their job.

The tools of leadership to be employed by principals should be the one that will motivate, inspire and influence staff to work willingly to achieve set goals and thus improve staff morale and students' performance. Tools are processes or procedures put in place to achieve a stated goal. In the context of this study, tools of leadership refer to power, authority and influence that education leaders use to improve performance or hinder it in their schools.

Literature Review

Leadership is a process that involves influence, occurs in a group setting and involves goal attainment (Northouse, 2007). Similarly, it is bringing about change, shaping the goals, motivations and actions of others and striving towards new goals in the organisation (Bush, 2008). Therefore, leadership is about transforming people and organisations towards a desired change. This is significant in the transformation of the Nigerian education system. However, leadership is beyond headship or formal position in the organisation but essentially has to do with the ability to motivate, inspire and influence others towards achieving educational goals (Olujuwon, 2016). The above definitions reveal that leadership is an operational tool used by school leaders in influencing staff which will make them to strive willingly and enthusiastically towards the achievement of the organisational goals in secondary schools". This shows the importance of leadership as an instrument in the initiation and implementation of educational

policies and philosophy of secondary schools. Thus, the leadership styles and traits to be adopted by the principal influence the job performance of staff in the school (Yahaya, Osman, Mohammed, Gibrilla & Issah, 2014:2). This is possible through the leader creating an enabling environment for himself/herself and for others to take the lead. This is evident in the personal qualities of the leader, the behaviours they enact and the functions they perform.

Leadership is a continuous process and multiple people can exercise leadership through demonstrating influence and effective leadership values in an organisation. In demonstrating influence, Robinson (2007:15) explains that the more leaders influence teachers and focus on teaching and learning, the greater their influence will be on student outcomes. The study of Louis, Leithwood, Wahlstrom and Anderson (2010:5) revealed the influence of school leadership on schools, teachers and classroom conditions. They view leadership as being central to enhancing teaching and learning as well as managing influences related to work outside the school. In Nigeria, the principal is recognised as the administrative, social and academic head of school and such wield power, influence and authority over their subordinates. Similarly, they monitor and supervise the activities and progress of the school societies (PP-TESSCOM, 2003:57).

The principals as the head of the school set the tone and thus responsible for all that happens in the school. The principal is a manager, administrator, a public and liaison officer of the school. The principal assigned duties to those he/she believes could the job; however, the responsibilities still resides with the principals as the accounting officer. The study of Olujuwon (2016) reveals that appointment in to key positions in schools were characterised by social and religious affinity, power,

authority and influence and not based on capabilities or efficiency of the staff concerned.. This is also portrayed in the Nigerian larger society where ethnicity, favouritism and god-fatherism held sway in appointments and selections.

In this regard, the principal is expected to create an enabling environment for the realisation of human potentials within the organisation, influence the behaviour of staff members and provide leadership for curriculum development as well as supervising instructional activities in the schools as specified by law. Literature has shown that all these activities were treated with less vigour (Arikewuyo, 2009:76). Also that principal in most African countries does not have regards for instructional supervision and view it as not part of their duties. However, Togneri (2003) discovered that principals focus more on administrative part of their roles but when further to say that they still play in ensuring instructional quality.

In performing their duties, principals adopt various patterns of behaviour in the process of directing the efforts of subordinates towards the achievement of school goals and objectives (Olagboye, 2004). According to Mullins (2007:371), there are three general leadership styles identified in literature. These are the autocratic, the democratic and the laissez-faire or the free rein styles and these are the dominant styles of leadership employed in schools. The attainment of school objectives is dependent on the leadership styles adopted by the principal but I am yet to see in literature the tools of leadership adopted by principals and this is a gap. Mullins (2007) informed that these leadership behaviours as perceived by teachers determine considerably their mental and emotional attitudes towards their job. This is consistent with the findings of Olujuwon (2016) that teachers enjoy working with principals

that values them as human beings and as colleagues than those that did not.

Leadership is regarded as a process by which a leader “influences others, inspires, motivates and directs their activities to help achieve the organisation’s goals and objectives, in spite of resistance” (Bateman & Snell, 2009:434). This definition shows that leadership is about goal attainment through the participation of group members. This is achieved by the “leader through mobilising and working with others in the group to achieve shared goals” (Leithwood & Riehl, 2003:3). In addition, it is by motivating and inspiring members through creating the energy and commitment to drive the process in the organisation that will achieve the vision and goals attainment for the school (Bateman & Snell, 2009:436-437). However, leadership is beyond headship or formal position in the organisation but essentially has to do with the ability to motivate, inspire and influence others towards achieving educational goals (Olujuwon, 2016). The working definitions of leadership adopted in this study show that in the school system, leadership is about a leader inspiring and giving direction to members of a group to achieve stated organisational goals and objectives. A leader must be able to influence others to follow his or her lead based on his or her personal and professional values and vision. A well-articulated vision endorsed by all members in a school can develop the school and enhance student learning.

Thus, leadership as an emerging issue has to do with the influence leaders have on subordinates to achieve organisational goals. The necessary ingredient to improve performance and to effect a change is for a leader to develop respect by showing an appreciation and interest in the welfare of others. The various models of leadership reflect the

behaviours, skills and standard operating practices that leaders employ in exercising leadership. There are different approaches to leadership and there is no single theory that captures the reality of leadership in a school (Bush, 2003:50). The model used depends on what needs to be achieved, the situation at hand and the available resources. Research shows that leadership is about achieving stated organisational goals through people with a focus on the values, beliefs and ethics of an organisation (Barnett, 2006: 445-449). Thus, leadership emphasises links with the political ideology of systems with the mutual relationship of teachers, administrations and pupils in a school system. Traditional approaches to leadership reveal that those in designated leadership roles are best understood in terms of power, authority and influence.

Power

Power as a concept is at the heart of political models as decisions made are based on the relative power of individuals and groups. There is a process of bargaining and negotiation as interest is promoted in committees and numerous unofficial encounters and decisions are reached. It is here where differences are resolved after negation and bargaining. Power influences how, when and who gets what. The sources of power are rich and varied (Morgan, 1997:170-1). Moreover, it emphasises the prevalence of conflict as personal objectives may vary from the aims of other sub-units in an organisation which may lead to conflict (Bush, 2003:93).

Gibson, Ivancevich, Donnelly and Konopaske (2012:290) describe power as follows:

A daily occurrence of human endeavour by which managers in both public and private life acquire and use power to accomplish goals of the organisation or to strengthen their own position. To the authors, a

person's success or failure at using or reacting to power is largely determined by understanding power, knowing how and when to use it and being able to anticipate its probable effects. The authors are of the view that power is not a dirty secret but is actually a mechanism used continually to achieve organisational, group, and individual goals.

Watkins (2005:14) contends that leadership should be considered as a subset of power because everything is concentrated on a leader and the followers "like sheep before shearers are to be silent and not be heard". However, Prilleltensky (2003:195-196) refers to power as "the capacity and opportunity to fulfil or obstruct personal, relational or collective needs". Davidson, Evans, Ganote, Henrickson, Priebe, Jones, Prilleltensky and Riemer (2006:38) note that power is often discussed in the context of oppression. These authors view one aspect of power as oppression while other aspects of power include wellness, liberation or the power to resist oppression. Power is also a relative concept as people may be oppressed in one context, at a particular time and place, but may act as oppressors at another time and place. This study advocates for teachers to liberate themselves from hegemonic tendencies that inhibit them from leadership positions in public secondary schools.

Kondalkar (2007:210) describes power as "the ability of a person to possess what she or he feels as valuable and deprive another person of the same". In a school setting, power is acquired through the position held by an individual. It is a tool as well as a resource used by a leader to achieve organisational goals, through promotion and appointments. French and Raven (1959:263-268) suggest six bases of power that leaders use: coercive, reward, expert, legitimate, referent and information. Authority is seen in terms of legitimate power, while power is

generally seen in terms of potential influence (French & Raven, 1959:265).

Authority

Lowe (2006:63) contends that "authority is often considered to be the ability to demand obedience or influence the action, opinion and beliefs of others. It is regarded as the legitimate power of a supervisor to direct subordinates to take action within the scope of the supervisor's position. It is a socially given right to command and exert obedience. It is also a right and privilege attached to a position occupied in an organisation" (Lowe, 2006:63). This shows that there is a link between authority and leadership. In the public secondary school in Nigeria, the principal is recognised as the administrative, educational and social head of the school as well as the accounting officer of the school.

The principal has authority based on his or her position and is backed by law and has the right to enforce authority within the school (Section, 24, Lagos State Post-Primary Teaching Service Law, 2005; PP-TESCOM, 2003:32). Max Weber identified three types of authority: legal, rational authority, charismatic authority and traditional authority. These identified types of authority are based on the form of control in an organisation and regarded as legitimate by the subordinates and their acceptance of the powers of their superiors.

Influence

Influence is the "force one person (the agent) exerts on someone else (the target) to induce change in the target, including changes in behaviour, opinions, attitudes, goals and needs and values" (Basit, 2011:2). According to Northouse(2007) influence is the sine qua non of leadership. It is an essential ingredient in leading people and without influence a leaders is merely an individual. Influence is the

bedrock upon which leadership is built, but this alone is not enough. Luthans (2011:314) explains that “influence is usually conceived as being broader in scope than power. It involves the ability to alter other people in general ways, such as by changing their satisfaction and performance”. This is in line with DuBrin’s (2010:299) assertion that “influence is the ability to affect the behaviour of others in a particular direction”. Luthans (2011:314) emphasises that influence is more closely associated with leadership than power is and both are obviously involved in the leadership process. As a result, authority is different from power because its legitimacy, acceptance and influence are broader. However, it is so conceptually close that the two terms can be used interchangeably.

The various definitions highlighted show that influence has “the ability to affect the behaviour of others in a particular way either towards accomplishment of organisation goals or the goals of the leader. Luthans (2011:344) and Barrett (2007:4) inform that the power to influence comes from the employee within the organisation granting authority to the leader”. Higgins, Judge and Ferris (2003:90) note that there are many factors that determine which influence tactics a leader will use, under what circumstances the tactics would be used and the effectiveness of the choice of tactics. These factors include “the relative power of the parties, the direction and objectives of the influence attempt as well as the political skill of the influencer” (Higgins et al., 2003:90). Leaders use tactics both soft and hard to influence for organizational change.

The above discussions have shown that leadership is about power, authority and influence. Leaders must use their power to ensure that goals are accomplished in schools. Leaders should delegate work to their subordinates through the division of labour. If required, it might be necessary to modify

organisational structure and give functional powers to all the individuals so that they feel empowered and develop a sense of responsibility. A leader must create favourable conditions in a school so that all staff members are free to contribute to the school’s goals based on their capabilities. Reward systems in a school should be equitable and based on achievements to motivate others to contribute to the school’s goals. Vesting power in a single leader will not help to explore teachers as leaders. A leader must use his or her authority to advance professional standards in an organisation. In addition, a leader must master the art of influence and understand the appropriate tactics to use in any given situation.

Research Background and Methodology

This paper emanates from the study on Teacher Leadership in Public Secondary Schools in Lagos, Nigeria. The aim of the study was to explore teacher leadership practices, policies and teacher challenges in the context of senior secondary schools in Nigeria. It is within this context that the study examined the tools of leadership by education leaders in public secondary schools in Lagos, Nigeria. Many researchers have investigated leadership roles of school leaders and in the administration and management of schools (Udey, Ebuara, Edet, 2009). According to Udey et al, (2009) there is inadequacy in the quality, status of managers’ leadership roles in the management and administration of schools as this impact negatively on the management of educational system. Furthermore, that the position occupied by school managers is not well utilised for the survival of the educational system because, the managers are not result oriented, their managerial and administrative skills are ineffective to enhance achieving educational policies and programmes. In a related study Akomolafe (2012 :25) inform that school

principals require more strengths of leadership in their responsibilities in schools.

This study was a qualitative multiple case study and the findings were drawn from the experiences, perceptions of participants on teacher education and the Nigerian teachers in public secondary schools in Education District V. The use of qualitative methods enabled an understanding of life experiences of participants in their natural environment and the meanings they bring to issues that affects them, individually and collectively. Participants for the study were purposively selected based on their willingness to participate in the study, their years of teaching experience, seniority and current leadership positions. The leadership positions include, the position of a Tutor-General/ Permanent Secretary (TGPS), principal, vice-principal, head of department, year tutor and union representative. In addition, 11 of the participants for the study had more than twenty years of teaching experience and four of them had been in leadership positions for more than ten years. In the study, participants were comprised of nine teachers, three principals, three vice principals and an educational administrator from Educational District V. All the participants were experienced and professional male and female certified members of Teachers Registration Council of Nigeria (TRCN). In the study, there were sensitisation sessions with the research participants about the research, data management and dissemination of findings. Semi-structured interviews and documentary analysis were used to gather data. This helped to provide a better understanding on the nature and challenges on teacher education and the Nigerian teacher. The semi-structured interviews conducted with participants were one-hour long at locations freely chosen by participants for their convenience and also to put the participants at ease. The locations include the school sites during the participants' free

periods and after schools hours and the interviews occurred in an eight month period. The interviews conducted elicited information on the participants' biographical information, their perception on teacher leadership and their understanding on the current leadership practices in schools as well as current state of teachers and the teacher education in Nigeria. The interviews were audio taped for easy verbatim transcriptions of participants' responses in order to enhance credibility and trustworthiness.

The data from the semi-structured interviews and documentary evidence were triangulated in order to establish the credibility of findings. Data was analysed using content and discourse analysis so as to understand the interaction and the literal meaning of language of people in their day-to-day activities. Relevant approval from the Ethics Committee in the Faculty of Education, University of Johannesburg, and Education District V in Lagos State of Nigeria, as well as the schools for the study with that of the voluntary consents of the participants were obtained. Pseudonyms were used to protect the identities of the participants and the schools in the study. Against this background, this study attempted to answer the questions:

What are the current understanding of leadership practices and the tools of leadership used by leaders in schools? The themes that emanated from the study are discussed below:

Individual Background

An individual's background refers to an individual's place of birth, world view and education qualification. Four teachers discussed the role that individual background plays in leadership. Ade explained that, "A person's background will definitely affect him. It will affect his leadership traits". Thus, Ade believes that an individual's background and world view affects his or her style

of leadership and characteristics. Similarly, Boladale informed that as a result of the ethnic diversity of the country, a leader may want to work with or appoint people from the same ethnic background as himself or herself. Thus Boladale believes ethnicity has a role to play in leadership. This is corroborated by Massarawa that the school leader being a clique person will appoint people only from his background. Massarawa explained that principals appoint people from their own geographical area or religious or social affinity. On the other hand, Okoli said that, "There are, there are, like in some schools, they will form cliques based on their political and socio-religious affinity to undermine the school". All these practices does not augur well with effective teaching and learning and it erodes standards. Provisions are made in the Teachers' Code of Conduct against discrimination based on religion, culture, race, gender or political inclinations and the code enjoins teachers to be tolerant of the diverse cultures in the country (TRCN, 2013:6). Section 42 of Nigeria's 1999 Constitution guarantees the right to freedom from discrimination based on place of origin, ethnicity, sex, political or religious opinion.

Micro-Political Strategies of Schools Leaders

Micro political strategies refer to the use of formal and informal power used by school leaders to achieve personal goals in organisation (Blaise, 1999:11). This provides a new way of understanding on how power, influence, conflict and negotiating process are used in schools.

Kondalkar (2007:210) is of the view that politics is a process through which power is acquired and used to influence the behaviour of others. This is endemic to the survival of any organisation. As a result of this, people form groups, camps or cliques when they play politics. Thus, where people play politics for power, ethics and moral values, organisational

goals are of little concern. Thus, where people play politics for power, ethics and moral values, professionalism and organisational goals are of little concern. Kelchtermans and Ballet (2002:106-108) acknowledge a host of micro political strategies and tactics that school leaders skilfully and effectively use to influence the education environment. Sixteen participants in the study describe micro politics as a product of ethnicity, the formation of cliques, also as part of human nature while the school leaders sees it as a managerial strategy schools' administration. Furthermore, they also highlighted its effects on teaching and learning. Njoku, a teacher lamented the lopsidedness in the promotion of staff in schools and its effects on the morale of staff. This is corroborated by High another teacher that micro politics has a deep root in the selection and appointment of school leaders and school prefects.

Njoku noted that:

It influences us negatively. We have a situation where a junior officer is directly placed over a senior officer. The possibility of the latter carrying out instructions from the former will be very difficult. Look at this scenario, you are a Level 16 officer and a Level 15 is made a principal above you and she is giving directives, can you take it?. There must be an adjustment in the organogram where people are put in positions fit for them.

High supported Njoku's view and said that:

I must say this that micro politics have a role to play even in the appointment of teachers, in the appointment of vice-principals, principals, even in the appointment of prefects, especially the head boy and the head girl. In the schools around this area, you know, it has really gone a long way.

In the larger Nigerian society, appointments into public office are still characterised by many factors such as religion, socio-cultural issues, politics and

ethnicity. This is in spite of the establishment of the Federal Character Commission with Act No. 34 of 1996 and entrenched in Section 153(c) of the Nigerian Constitution of 1999, there still exists favouritism, ethnic consideration and formation of cliques in appointment and selection. Two teachers in the study group underlined the level of ethnicity in schools. Ade commented that, “We know somebody is better suited for this particular role and not being given, because he is from a particular state.” Njoku supported Ade’s view on the role of ethnic consideration in appointments in schools. Njoku explained that, “The factors are tribalism and the issue of sacred cows. Two people committing the same offence and only one party is favoured while the other is punished.” These teachers believe that qualified people are not always given certain roles because of their ethnicity. They also highlight the issue of double standards and preferential treatment.

Ethnic bias runs contrary to the overall philosophy of education in Nigeria, which emphasises principles of freedom, equality and justice. Perumal (2014:2-3) explains that these acts show how professionalism and pedagogic experiences are trivialised due to images that are associated with ethnicity and favouritism. The social transformation needed by teachers to promote the ideals of democracy is rendered complex in contradictory discourses.

The Sixteen participants explained the negative effects of micro politics on stakeholders in the education system. Bayo said that:

It brings uncertainty, especially for the principal who often finds himself or herself in a dilemma when it comes to recommending certain people for assignments. There was a time the principal was to recommend somebody, although he knew who to recommend, yet he was afraid not to step on toes and this also led to bickering among the teachers.

Furthermore, Boladale also pointed out the negative effects of micro politics in schools when he stated that:

It affects it in a great deal. We believe that in a system where certain people appear to be more favoured than others. It creates bitterness and lack of trust by some people in the system. Anywhere you find teacher leadership so strong; there is justice and equity to balance it.

The excerpts highlight the level of micro politics being employed by the principal who is not appointing qualified people so that he will not offend some particular people in the organisation. It shows the prevalence of double standards among colleagues. Moreover, the practice of micro politics in an organisation creates internal strife, anger, resentment and mistrust among colleagues. However, the practice of teacher leadership can be effective in an atmosphere of equity and justice.

Participants felt disturbed and disappointed that nothing is being done to put an end to the use of micro politics in schools. This study found that micro politics play a significant role in the way leadership is distributed in schools and in the way and manner school affairs are conducted. Some principals use micro politics as part of their leadership strategies to gain influence and build trust in their decisions among teachers. Moreover, some of the interactions between teachers and principals have a cultural, social and religious undertone, which has, in one way or another, affected teaching and learning processes. Micro politics brings about sole and undemocratic attributes and dissent in appointments, hence teacher lobby and gossip exhibits tribalism and inhibits teacher leadership. It also leads to betrayal and lack of trust among teachers and is a violation of teaching ethics and the constitution.

Power in Discourses

Weninger (2008:145) describes critical discourse analysis “as a critical perspective geared towards examining the subtle ways in which unequal power relations are maintained and reproduced through the use of language”. Its focus is on “how social relations, identity, knowledge and power are constructed through written and spoken texts in communities, schools and classrooms”. Thus, the goal is to understand the contribution of language (discourse) and the way in which it replicates social inequalities. Weninger (2008:145) asserts that globalisation, power, ideology and hegemony are often revealed in critical discourse analysis studies that attempt to capture the interconnections among discourse, power and social organisations.

Discourse analysis also helps to document the interplay of power among school leaders as well as their perception and understanding of teacher leadership. Moreover, it helps to document the various factors that inhibit exploring teachers as leaders and the changes required to explore teachers as leaders. Shaw and Bailey (2009:413-415) note that discourse analysis involves the explicit interpretation of the meaning, as well as the functions of human actions, the product of which mainly takes the form of verbal descriptions and explanations. The study reveals the way in which school leaders use power in their interactions with teachers and their perceptions of teachers.

The narratives of the principals and the Tutor General/ Permanent Secretary interviewed in the study reveal power, authority and influence used by these school leaders over their staff.

Okoli, a principal highlight the strategies used to replace subordinates from their position. Similarly, Adebayo another principal revealed how

punishment is meted out to staff that arrives late to work. Related the TGPS inform how staffs that do not “co-operate” were transferred to remote areas within the district just to be seen and not heard. It is a way of silencing dissent voices that refused their bidding.

Okoli a principal asserts that huh ... like year tutors now, I change them, I used to change them. Like in my SS1 this person ...woman, so I used to change them, I use to reshuffle.

Adebayo, another principal in a similar manner noted that: I place myself as a role model to make my teachers and students look up to me. I am very punctual so I can punish teachers that habitually come late to work.

Aladelola, the TGPS remarked that: I transfer anybody that is not co-operating with me or stand as clog in the wheel of progress to remote areas, to be checking files. This person will be seen but not heard.

The above highlight the discourses of school leaders as seen in phrases “I change them, I used to change them”, “in my SS1”, “so I used to change them, I reshuffle them” and “so I can punish teachers who habitually come late to work”, I will transfer...to remote areas”. It reveal the type of leadership strategies adopted by school leaders in their relationships with the teachers. They also illustrate oppressive tendencies or subjection of school leaders of their colleagues and the power wielded as school leaders. In addition, the authority, power and influence school leaders have over their colleagues could affect relationships and may not allow school objectives to be archived.

Conclusion

The study revealed the tools of leadership employed by schools leaders in public secondary schools Lagos, Nigeria. The findings of the study emphasise the importance of using an appropriate tool by the leader that would enable the teachers to work willingly towards achieving the school goals and objectives. The study shows the role principal's leadership style and behaviour plays in enhancing teacher's morale and effectiveness in achieving goals. School goals and objective are effectively achieved where there is an enabling environment for creativity, harmony and co-operation among the staff. Therefore, power, authority and the influence of the principal could either make or mar the progress in schools. Therefore, a democratic environment in which staffs have a voice devoid of oppressive tendencies would help in the growth of the school and thus help in students' outcomes. The research found that the narratives of school leaders are negative and reveal autocratic power relations among staff. It is recommended that principals should see teachers as colleagues and as partners in progress in achieving school goals. Similarly, that good leadership enhance students learning outcomes through the co-operation of all and sundry in the school. The findings reveal that micro-political strategies employed in selection and promotion of key staff in schools should be minimised as it negates constitutional provisions and thus create acrimony among staff and hinder creativity. It is recommended that adherence to ethical standard in administering schools which would enhance the morale of staff and thereby increase performance in teaching and learning should be pursued. The findings show that individual differences should be used in effective and efficient way in achieving school goals and objectives as this would offer stability in moving the school forward.

The main findings is that effective leadership involves school leadership working with the subordinates as colleagues and being concerned about their morale, staff development and ensuring that qualified people are put into positions based on their capabilities and not based on micro-political strategies. If this is done, it will ensure quality teaching and learning and thus increase students' outcomes. The findings will benefit Education District V (EDV), teachers, principals, and government officials in Lagos State. The research will add to the existing knowledge of tools of leadership employed by school leaders in school administration in the state. It will inform school leaders that the tools to be employed should be to enhance school growth and goals not the ones that would enhance their personal or selfish goals. The study will inform stakeholders to adhere to professional standards in appointment and promotion of school leaders. The study helps to cover a significant gap in literature on tools of leadership in Nigerian public secondary schools and thereby assists in reconceptualising school leadership in Nigeria.

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Notes^a The *United Nations Educational, Scientific and Cultural Organization*

(UNESCO) together with the United Nations Children's Fund (UNICEF), the World Bank, the United Nations Population Fund (UNFPA), the United Nations Development Programme (UNDP), the United Nations Entity for Gender Equality and the Empowerment of Women (UN Women), and The UN Refugee Agency (UNHCR) organized the World Education Forum 2015 in Incheon, Republic of Korea, from 19-22 May 2015, hosted by the Republic of Korea. Over 1,600 participants from 160 countries (including over 120 ministers, heads and members of delegations, heads of agencies and officials of multilateral and bilateral organizations, and representatives of civil society, the teaching profession, youth and the private sector) adopted the Incheon Declaration for Education 2030, which sets out a new vision for education. (For more details see *Incheon Declaration Education 2030: Towards inclusive and equitable quality education and lifelong learning for all*,

<http://unesdoc.unesco.org/images/0023/002338/233813M.pdf>, see also<http://unesdoc.unesco.org/images/0024/002463/246300E.pdf>)

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Learn more about TAMIU at www.tamtu.edu.

About the TAMIU College of Education

The TAMIU College of Education has over 1100 students and over 40 faculty and staff devoted to preparing competent and ready teacher to serve the South Texas Area. Located in the Sue and Radcliffe Killam Library building, our departments work collaboratively to prepare students to educate future generations in a variety of capacities. Our new and exciting initiatives include a



new professional core, aligned to the PPR for all certification areas. In addition, we work very closely with the TAMIU College of Arts and Sciences to prepare those interested in teaching at the middle and /or high school levels, in a specific content area, such as math, science, and English. Current statewide and national critical shortage areas include teachers with specializations in math and science, as well as in special education.

The College also shares a strong partnership with the Hector J. García Early College High School, which serves local high school students allowing them to take up to 60 college credit hours during their high school years. Annually, we have between 20 and 30 students enrolled in the LISD ECHS who have been inducted to the College's Pre-Education track.

About Laredo, Texas, U.S.A.

Laredo

T E X A S

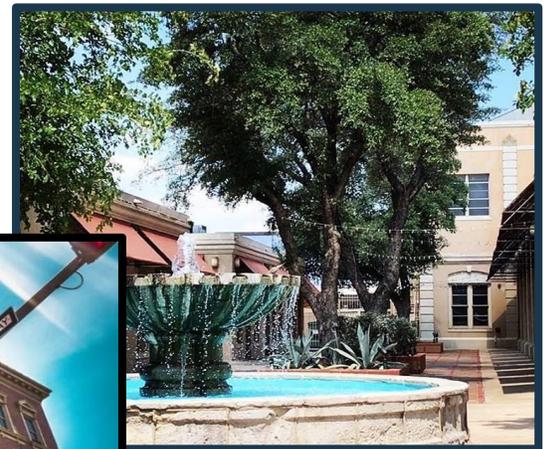
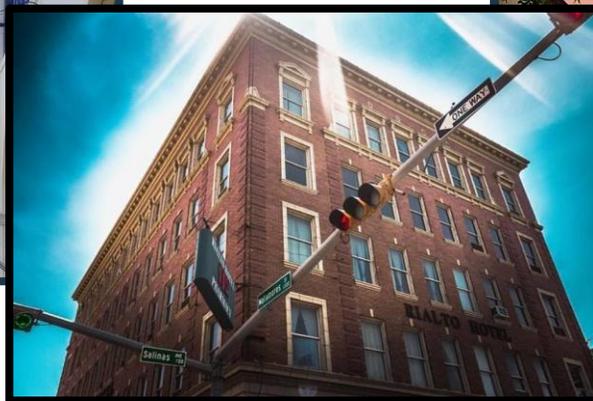
Many things distinguish the 65,000 acres where Texas real estate begins from the other 106M that comprise this great state. Laredo is *quite* on the edge, located on mile marker 1 of Interstate Highway 35, on the southern U.S. border and at the beginning of a tourism experience that is as unique, as it is charming.

The streets of downtown Laredo will absorb you in a history lesson, with architecture and museums that tell the tales 261-years-in-the-making, from our Republic of the Rio Grande Museum to the 119-year old Washington's Birthday Celebration and its museum, all found within Laredo's establishing epi-center, the Villa de San Agustin Historic District. More stories are to be discovered in five other significant historic districts throughout an easy distance from Laredo's iconic San Agustin Plaza. Refer to the history section of this guide to find them all!

In between food, history and hotels, there are so many options for activities to take in while you are here, that it may take multiple trips, so plan several trips to a place where cultural confluence is an outstanding example of modern-day living.

You can learn more at www.visitlaredo.com.

While you are here, we encourage you to share your experiences on any social media using the hashtag #HolaLaredo.



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