University of Dar es Salaam Library Journal
Vol 13, No 1 (2018), pp-69-87
ISSN: 0856-1818

Efficacy of Information Provision Strategies for Promoting Mathematics Education in Tanzania: A Case of Selected Secondary Schools in Dar es Salaam.

By
James J. Masele, Department of General Management,University of Dar es Salaam
Emails: masele2000@yahoo.com
and
Julius Tweve, Department of Library & Information Studies, Tudarco
Email: julius.tweve@gmail.com

ABSTRACT
This study examined information provision, as an important strategy for promoting mathematics education in Tanzania. A sample of 90 respondents from five secondary schools namely Saint Mary's, Makongo, Kambangwa, Green Acres and Jangwani Secondary Schools was selected. To supplement questionnaires, face- to- face interviews, and documentary review were used to collect data. Findings revealed limited use of various sources of information in promoting mathematics education and there is no specific session which discusses the importance of mathematics' importance for career development. Dependable sources of information for students are mainly teachers, parents and peer groups. There was poor usage of media and the internet in promoting mathematics. Challenges related to mathematics subject improvements include motivational, technical, managerial and financial. Furthermore the stereotype belief that mathematics subject is difficult for women but easy men, a situation which discourages girls to participate fully in mathematics education. Efficient use of media is emphasised for mathematics education promotion. The study urges the need to harness the Web and available media in the publicising mathematics education information. Information professionals are urged to liaise with policy makers to rally together in influencing other practitioners in mathematics education to promote this subject.

Keywords: Efficacy; Information Provision Strategies; Mathematics Education; Mathematics Education Promotion; Tanzania; Secondary Schools

Introduction
Mathematics occupies a crucial and unique place in human societies and is strategic in the development of mankind. It is a fundamental pillar of civilization, in both the practical and esthetic sense. According to Abioum (1997) mathematics is (1997) is major tool for formulating theories in science and other fields. It is used to explain observations and experiments in other fields of inquiry. Adeyegbe (1987) observed that there is hardly any area of science that does not make use of mathematical concepts to explain its own concepts, theories or models. Johnson (1989) asserts that, mathematics and other science subjects are vital to an understanding of modem technology.According to Bermant in Harbour-Peters (2000), an important feature of an application of mathematics to science is that it enables users to make scientific predictions that can be drawn on the basis of logic and with the aid of mathematical methods, correct conclusions whose agreement with reality is confirmed by experience, experiment and practice.

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Mathematics is used in most other aspects of daily life. Many of the top jobs such as business consultants, computer consultants, airline pilots, company directors and host of others require solid understanding of basic mathematics, and in some cases require detailed knowledge of mathematics. It also plays an important role in business, like business mathematics by commercial enterprises to record and manage business operations. The ability to compute, related to power of technology, the ability of social organization, and the geometrical understanding of space-time, that is the physical world and its natural patterns, show the scientific and cultural role of Mathematics in the history of civilization and in the future development of the Information Society (Fatima, 2012). An important part of learning mathematics is solving problems. Ukeje (1997) in acknowledging the importance of and contribution of mathematics to the modern culture of science and technology argued without mathematics there is no science, without science there is no modern technology and without modern technology there is no modern society. In other words, mathematics is the precursor and the queen of science and technology and the indispensable single element in modern societal development. Mathematics education is therefore crucial in nation building. It is the creation, mastery and utilization of modern science and technology enhanced by mathematics education that basically distinguishes developing from developed nations.

However, despite the importance and inseparability of mathematics knowledge from other fields (e.g. economics study, statistics, medicine, geography, agriculture, and computer science, to mention a few) and its significance to socio- economic development of any single society (Gatt, 2002), experiences show the extent to which students major and are involved in mathematics is increasingly going down. Besides passes in mathematics are below average. For example, according to National Examination Council of Tanzania (NECTA) report, in 2015, out of 383,851 candidates who sat for the Basic Mathematics paper, only 64,332 (16.76%) candidates passed, while in 2014, out of 240,160 candidates who sat for the examination, only 47,001 (19.58%) candidates passed. The BEST report (2011) also indicate that only 17.8% of seating candidates in 2009, and only 16.1% in 2010 passed the mathematics examination as compared to all other subjects where passes were always more than 30% in each.

There are a number of reported negative perceptions towards mathematics, leading to unsuitable decisions and lowering efforts and morale, school to join, subject to select for further studies, and career to select (Kaiser-Messmer, 1993; and Leach and Scott, 2002; Masanja; 2004). Besides; even though there is a general consensus that information is an important promotional tool (Manda, 2006; Mchombu, 2003; and McDaniel, 1996), the extent and means of information provision to promote mathematics education, in Tanzania is blurred. Sources and appropriateness of information provided are not clear. This study examined Information provision practices in promoting mathematics education in selected secondary schools. The studyinvestigated sources and appropriateness of information, as catalyst/inhibitor to pupils or students' participation in mathematics education. The purpose of this paper is to assess the effectiveness of existing information provision strategies for promoting mathematics education in Tanzania, that would enable students, parents, teachers, government, communities, responsible ministries and other stakeholders to play an active role in promoting mathematics education in the country. According to

Consumers Affairs Victoria (2006), ensuring that stakeholders effectively use information may involve; making people aware that they need information; and must be provided at the right time in the decision making process.
This study was guided by the following research questions

- What are the main sources of information used to promote mathematics education to students?
- To what extent is the information obtained persuades students from taking mathematics?
- What informational promotional aspects discourage students from engaging in mathematics education?
- What is a suitable informational strategy for promoting mathematics education in secondary schools?

Literature Review

Mathematics education in Tanzania:Brief over view

Elementary mathematics has been part and parcel of the education system in most ancient civilizations, including Ancient Greece, the Roman Empire, Vedic society and ancient Egypt (Sriraman, 2012). Its evolution might be seen to be an ever-increasing series of abstractions, or alternatively an expansion of subject matter. From the beginnings of recorded history, the major disciplines within mathematics arose out of the need to do tax and commerce related calculations, to understand the relationships among numbers, to measure land, and to predict astronomical events. These needs roughly related to the broad subdivision of mathematics, into the studies of quantity, structure, space, and change. Today, it is a reality that it is the creation and mastery and utilization of modern science and technology that basically distinguishes developing from developed nations. That is to say the standard of living of a nation is largely dependent on the level of science and technology and therefore application of mathematics of that nation (Aguele and Usman, 2007).

In Tanzania, evidences indicate that students form about their own competence in mathematics to a great extent affect the goals they set, as well as their achievement. For example, according to the University of Dar es Salaam Undergraduate Prospectus 2017-2018, apart from science related careers, a student may only be admitted to undertake business and economics related degree programmes in Tanzania, if that student passed mathematics in either form four or form six studies. This means a student failing to pass in mathematics narrows his/her possibilities into admission for further education.

Although there are a diverse studies on mathematics education in Tanzania: for example (Pythiam, 1971; Mmari, 1978; Mmari, 1980; Mmari, 1991; Seka, 1987), much of the research done in this realm has been under the auspices of the history and pedagogy of mathematics group (Sriraman, 2012). Like other African countries, whose history of mathematics education in Africa is characterised by subsequent 'transplantation of curricula', on mathematics education impacted by neo-colonialism, the history of mathematics education in Tanzania has not been static (Pythiam, 1971; Mmari, 1978, 1980, 1991); Seka, 1987 and Masanja,2004). Until the end of 1960's British syllabus was used and all primary schools did new mathematics. By 1974, a

common syllabus had evolved in response to the findings from the experimental period, eflectng views of teachers, examiners, the public and professionals. The idea was to improve application of mathematics in real life of school leavers (grounding in useful mathematics) and no advanced concepts were desired for this case. However, there was little systematization or consolidation of existing literature aimed at mathematics education promotion, and roles the different actors had to play.

Currently available studies Kisakali and Kuznetsov, 2015; King'alu, 2014; Masanja, 2007) that investigated influencing mathematics learning and performance in Tanzanian secondary schools. A study by King'aru (2014) on factors contributing to poor performance in science subjects including mathematics in Kinondoni Municipality identifies the following; availability of teaching and learning materials, the teaching and learning environment, students' negative attitude towards science subjects, and poor involvement of curriculum implementers in curriculum reviews. Kisakali and Kuznetsov (2015), modeling factors influencing mathematics learning and performance in Tanzanian secondary schools associated failure in mathematics to lack of interest in studying mathematics, triviality and lack of practice by students, lack of drive and enthusiasm for teachers and students, perception and attitude towards the subject, terming it to be difficult and lack of qualified mathematics teachers. Veloo, Ali, & Krishnasamy (2014), consider negative perception by students that, mathematics is a difficult subject to understand, as an important reason for failures in mathematics.

A study conducted by Masanja (2004) observed very low enrolment rates in science, engineering and technology-based subjects and disciplines at tertiary level, especially those requiring mathematics and physics knowledge and skills. According to Masanja (2004), there is a negative perception among Tanzanian students that science and other technology related subjects including mathematics are difficult , with a wide gender gap in science and mathematics with females lagging far behind males. The most influencing factors for the under representation of females are low participation rates in advanced courses and lower performance in examinations (Masanja, 2007). Despite recent progress in female enrolment owing to positive actions and sensitisation campaigns, disparities still exist and are quite striking in some communities especially in marginalised areas where traditional attitudes are more predominant (Masanja, 2007).

Studies (Kaiser-Messmer, 1993; Leach and Scott, 2002) further argue that the main challenges include the widely held and deeply rooted belief that female students are inherently incapable of attaining high pass levels in Science Mathematics and Technology (SMT) Consequently, it makes them feel be less confident and with higher anxiety levels in their ability to solve mathematical problems. In their findings (ibid), girls were also less likely to believe that mathematics would be useful in their future employment endeavors and are more likely to report lower levels of interest and enjoyment in mathematics. These differences may play a vital role in shaping the educational and occupational choices made by boys and girls. This may be internalised by policy makers, students, parents, community members, educators and female students themselves.

In fact, all mentioned factors are more information based. If mathematics education stakeholders (including students, parents, teachers, the general public , policy makers and others) are well informed, their attitude towards mathematics education and what it can do to improve performance would be positive. Responsible institutions ought to allocate enough resources including adequate teaching and learning materials to ensure a conducive teaching and learning environment that increases drive and enthusiasm for teachers and students. Involvement of curriculum implementers' in curriculum review adds a lot of value to the end result. Eventually students' negative attitude to mathematics as a subject would lessen and generate interest in studying mathematics, including having more practicals for students. Ultimately, it would change perceptions and attitudes towards the subject from being difficult to a normal subject.

Information as a resource

Information, defined as knowledge in communicable form, is recognised today as one main requirement for development that everybody needs on a daily basis to carry out any activity or business. According to Nyam, Akawe and Tyonun (2015), it is indisputably one of the necessities of life just like food, shelter, and cloth. Information is needed in all spheres of life to facilitate decision making and for engendering progress (Evans, 2001). Every single society needs information for their socio-economic undertakings and to improve on existing practices and better their lives. It is information that makes a difference between developed and developing societies. Indeveloped countries such as the USA, the UK, Germany and France information is used as a basic resource which supplements the familiar natural resources of matter and energy and they spend a large portion of their resources and budget on information systems (Aguolu, 1997). This is in contrast to most African and other developing countries who lag behind in modern information generation, dissemination and utilization. Developing countries have also remained largely underdeveloped, under-industrialised and poor.

The value of information is in the hands of the manager or any person concerned with decision making to use it in appropriately. As a raw material for the mind; information is one of the in-puts to our minds we work with when we are thinking. Information takes place alongside beliefs, interpretations, commands, advices, questions, opinions, theories, forecasts and the products of creative imagination. According to Mchombu (2003), information is knowledge put to use, which may produce good or bad results. Information is one that interacts with the inner mind, and should not just be passively received. Rather, emphasis should be on process of alteration of the inner mind with that of the outer world. Information reduces uncertainty.

It is a fact that information uses include the following: Positively, information is useful in learning and understanding; teaching/instruction; discovery and invention problem solving; decision making and informed choices (Nyam et al, 2015). It is also used for informed action and operations such as in industrial undertakings; promoting, selling and marketing; image creation, persuasion , influencing, and manipulating. Moreover information is important in evaluating, analysis and justification of some phenomena. However, information can negatively be used for domination, subordination; misleading, deceiving, betrayal and derivation of emotional dissatisfaction.

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All stakeholders in mathematics education need information to make informed decisions and give advice. For example, Mitchelmore's study (1965-1970) noted that, at national level lack of information and awareness from teachers, parents, ministry of education officials, and agents of innovations, constrained innovation for mathematics education improvements. In this case, Tanzania's future in mathematics largely depends on teachers, parents, curriculum developers, examination council officials and students' level of information and knowledge they possess relating to mathematics education. The poorly informed they are, the weak their ability to make sound decision and advice. So far, little attention has been paid to systematic organisation and dissemination of information on mathematics education and its importance.

Information Needs for Mathematics Education Various groups of stakeholders require information in order to play an effective role in promoting mathematics education activities. Information users range from senior government officials, chief executive or a mathematics associations to NGO's, CBO's and FBO's. They may need different information in different forms or media at different times. The role of information professionals in this case is to match clients' needs with the right information, in the right format, and at the right time. In fact when every potential stakeholder is well informed, he/she will translate that understanding to the learner. According to the Open Systems Perspective Model any life setting is an example of open system that exchange information or resources with its environment as opposed to a closed system (Burnes, 1996).Mathematics learners also interact with various mathematics education stakeholders, where these stakeholders are well informed it has more positive results to learners than were not.

The main users of information on mathematics education include the government, curriculum developers, examination council officials, parents, teachers, and peer groups to mention a few. In one way or another they have impact on whether to promote or impede mathematics education. Nevertheless, information is of vital importance to other users not mentioned here. From the Lasswell model (1948) by Harold Lasswell effectiveness of any information provision depends on "*Who* "as the source; "*Says what*" the message; "In which channel", the medium of communication; and "*To Whom*", the destination; "*To what effects*". This means mathematics education stakeholders need right/positive information to effectively influence mathematics learners. These stakeholders include: First: The Scientific community: is responsible for the development and evaluation of scientific knowledge. The extent to which this group is informed, determines whether mathematics education is promoted or impeded.

Second: Officials of the government ministry that are not only responsible for policy formulation but also provide needed funding for changes and for implementation. Through its agencies (ministry of education, examination council, and curriculum development sector etc.), the government is concerned with policy making, curriculum development, and reinforcement including rewards and penalties. Governments allocate resources (funds, manpower and time) for research, development, change, innovation and other related issues. The level of information

the government has, determines whether to promote or impede mathematics education.

For example, Fakuade (1989) and Ohuche (1973) observe that in India due to shortage of qualified teachers in every school and due to criticisms from the public, the government allowed modern mathematics for the able only. The Indian government further decided that modern mathematics would be optional, and that should be an integration of the best from traditional and modern mathematics. This has been the case in Tanzania. .It can be recalled that, in its third regime, the Ministry of then, Education and Culture under Hon. Joseph Mungai, decided to reshuffle the curriculum by omitting and combining some of the subjects from form IV curriculum for some reasons known while combining physics and chemistry to be studied as single subject (Nkyabonaki, 2013; Muneja, 2013). Subsequently, in the fourth regime, Hon. Margaret Sitta Minister then of the Ministry of Education and Vocation Training took up subjects that had been abandoned (Muneja, 2013). This shows how the government, political leaders and other top policy makers can impact changes in education development including mathematics if it is politically expedient. However, the resulting impact can be positive or negative depending on how policy makers are well informed in making mature and constructive decisions. Analogy to the government, are other stakeholder mentioned before. Information provision will only be positive if parents, teachers, and peer groups are adequately informed, vice versa will be true.

Third: Teachers whose awareness, knowledge, attitudes, insight and skills are be imparted to students, parents and society at large for mathematics education improvement. Parents, guardians and relatives as the most respected and influential group need relevant information. In addition to being actively involved in their children's education, parents also provide a home environment that can influence learning. Parents serve as role models for learning, determine the educational resources available in the home and schools and hold particular attitudes and values towards education. In this case, parents may play an important role in their children's learning. Literature (Seka, (1987, Kaiser-Messmer, 1993; Leach and Scott, 2002, Masanja, 2007) show that, choice of field to study have mainly been influenced by society's/parents' beliefs, parental occupation as role modelling, socio-economic status, and partly by the characteristics of the schools they attend. For example, in Canada it was revealed that students whose parents worked in an occupation that required advanced mathematics skills in fact performed almost one proficiency level higher than students whose parents had similar education levels and income but whose occupation did not require advanced mathematics. This raises a number of questions. For example, is this the result of parents passing on innate ability to their children? To what extent does role-modelling and creating a home environment that is oriented to mathematics influence children to learn mathematics related activities? Are children in these households more likely to receive assistance from parents in their quest to master mathematical concepts? Various researchers have collected a wide range of information about students and their parents, their home environments and their schools. However, only research that further explores the connections among these can help us to answer these questions.

The importance of relevant information to parents and society is what is being advocated for in this study. Where society/ and parents have the right/ positive

information/ and attitudes, respectively, they influenced and impacted changes to their children. Parents who understand that mathematics skills are important to a child's success both at school and in everyday life play a big role to promote it. For example, a writer of the article 'Helping your child learn mathematics: A parent's guide' published in 'http: //www.edu.gov.on.ca/eng/document/brochure/earlymath/index.html' (retrieved on 28/08/2017) notes that informed parents are always positive about mathematics. Furthermore, informed parents will always make mathematics part of his/her child's day and encourage a child to give explanations and will treat errors in learning mathematics as opportunities to help a child learn something new. The following tips are considered useful to help children: let your child know that everyone can learn mathematics; let your child know that you think mathematics is important and fun; point out the ways in which different family members use mathematics in their jobs; be positive about your own mathematics abilities; try to avoid saying "I was never good at mathematics" or "I never liked mathematics"; encourage your child to be persistent if a problem seems difficult; praise your child when he or she makes an effort, and share in the excitement when he or she solves a problem or understands something for the first time.

Consider involving relatives and friends in helping to motivate children to learn mathematics has been documented by Fennema and Carpenter (1996) to have a positive impact. Older siblings, grandparents, family friends, and your child's caregivers can add their support and encouragement. If your child attends a child care centre or early years centre, the staff there may be able to suggest additional mathematics activities to do with the child.

Similarly, opportunities for teachers to reflect and be part of a supportive community are also important (Ball, 1996; King and Newmann, 2000). A child's teachers can provide advice to both a parent and child him/herself aiming at helping children/students to master mathematics. Some topics for discussion with parents include: child's level of performance in mathematics; the goals the child is working towards in mathematics, and how a parent can support his/her child in achieving them. Others are strategies a parent can use to assist a child in areas that he/she find difficult; activities to work on at home with the child; and other resources provision such as books, games and websites. The issue of computer or any media simulations about learning and importance of mathematics has been widely documented. For example, studies (Ke, 2008), indicated that students developed more positive attitudes toward Mathematics learning through five-week computer math gaming. Recently, computers and social media have been found to be powerful tools to disseminate information. Sudies (Coles, 2015), have shown that a person on Facebook has an average of 245 friends, implying its great potential to promote mathematics eduction if strategically used due to the outreach of the social media.

Type of school which in turn determines the type of teachers and peers is another factor that has been reported to play an important role in moderating student's attitudes towards mathematics education. For instance, The Human and Skills Development Canada, Council of Ministers of Education, Canada and Statistics Canada (2001) revealed that incompetent and frustrated mathematics teachers create

anxiety and may impede learning and avoidance of mathematics. It is further reported that, students surrounded by positive peers are influenced and role modeled. These situations in its totality show that, information in the surrounding community will have a meaningful impact towards learning mathematics, by students.

Mathematics Education Information Communication

Appropriate information sources and thus dissemination is vital to ensure that new findings and changes reach end users/stakeholders discussed above for application to improve mathematics education.

According to UNESCO (2001), the main sources of information on mathematics education include reports, newsletters, handbooks, conference proceedings, meetings, exhibition, radio programmes, television, scientific journals and the internet/website sources. Others are press abstracts, leaflets, brochures from bookseller associations, websites, publications, education programs, advertising, seminars, trade shows and conferences, and compulsory information provision by education providers. However, in Tanzania the extent to which these sources are available and useful in promoting mathematics education is not documented.

Libraries are essential components of any strategy aimed at improving information access, both for the public at large and for specialised groups. Libraries are essential to the free flow of ideas and to maintaining, increasing and spreading knowledge. As repositories of books and other printed material, they promote reading and writing. Libraries and librarians in this case should be core actors in promoting mathematics education through current awareness services, indexing, and abstracting services that attract readers to read. This means that different publications should be available and accessible to all stakeholders who in turn can impart the knowledge and the value of mathematics education in different socio-economic development activities.

In Tanzania, major sources of information on various issues are mainly radio, teachers, parents, television, peers, and family members, NGOs such as *Haki Elimu*, CBOs and FBOs. For example, Manda (2006) study on structure determinants of HIV/AIDS information impact in Babati district in Tanzania observed that radio (70%), TV (34%), Peer (28%), leaders (29%), NGOs (18%), family member (22%) and CBOs (5%) are key sources of information. However, the extent to which these sources are used to promote mathematics is not evident. Kisusi and Masele (2018) however theorized that combination of strategies should be used. For example, television broadcasts, radio broadcasts, exhibitions, audiovisual, composed stories using songs, dance, and poems and others may offer positive results to communities with poor reading culture. Meanwhile, means like printed materials (such as brochures, billboards, posters, and pamphlets, and books), websites, email discussion lists, and blogs; social networks (such as facebook, twitter, and instagrams), news papers, and magazines may have positive results for groups with a reading culture.

Synthesis and research gap

It is evident from the literature acknowledges that information is a resource of immense importance; to decision making and in improving mathematics knowledge among learners. The study conceptualized that, with right information communicated using the right strategy, it could create awareness on the importance of mathematics thus inculcating interest, desire and learners' attitude modification towards the

subject. The literature has however shown that, any information provision strategies chosen must be well planned, committed and equipped, including actively involving different mathematics education stakeholders and communities of interests. Despite this attention, interests towards mathematics attitude and eventually its uptake has continued to be disappointing. Yet, the literature is silent on the efficacy of available information provision strategies for mathematics education promotion in Tanzania. This is a gap which this study, wishes to fill.

Research methodology

This study was conducted in five selected secondary schools in Dar es Salaam. The schools included Saint Mary's, Makongo, Kambangwa, Green Acres and Jangwani secondary Schools. Selection of these schools was because of their diversity in nature in terms of subject combination, nature of ownership (private and government), and except for Kambagwa, the rest are both O-level and A-level schools. Except for Jangwani which is a girls' school only, the rest were co-educational schools. Convenient non-probability sampling technique was employed to select respondents as students and teachers were always busy with their day-to-day assignments. A total of 90 respondents correctly filled out the questionnaire (60 from students and 30 from teachers), a 75% response rate of 80 students and 40 teachers targeted, had been gathered. Questionnaires responses were as follows: thirty (30) teachers (six teachers from each school); forty (40) O-level students (eight O-level students from each school); ten (10) A-level students taking Arts combination; and, ten (10) A-level students taking Science combination with mathematic being part of their subjects' combination. Arts combinations were HGL, HKL, and ECA while science combinations were CBG, PCB, EGM, and PCM. Face to face interviews with key informants including examination council officials; Tanzania institute of education-curriculum developers; parents; teachers; and education policy makers provided rich information that could not be easily captured by questionnaires. Statistical Package for Social Sciences (SPSS) Window 20.0 program was used for quantitative data analysis while content analysis was used to analyse qualitative based data.

Demographic profile of respondent

Respondents' demographic profile as presented in Table 1 indicates that of the students, 40 are O-level students and 20 A-level students. Of the O-level students, 5 (12.5%) and 19 (47.5%) girls were planning to take science and arts respectively. On the other hand, 10 (25%) and 6 (15%) boys intend to join science and arts combinations respectively. This makes a total of 17 (42.5%) and 23 (57.5%) students planning to take science and arts respectively. Specifically, from the findings, only 37.5% of girls were showed interest in science, and 62.5% of students showed interest in science. Specifically from the girls that showed interest in science, only 45% of them were planning to go for combinations that includemathematics.

Table 1: Respondent's characteristics and plans on mathematics education

O-level Respondents							
School	Girls	Plan to join science	Plan to join arts	Boys	Plan to join science	Plan to join arts	Total
Jangwani	8	3	5	-	-	-	8
Saint Mary's	4	1	3	4	2	2	8
Green Acres	4	1	3	4	3	1	8
Makongo	4	0	4	4	3	1	8
Kambangwa	4	0	4	4	2	2	8

	24	5	19	16	10	6	40
A-level Respondents						Total
School	Female			Male		
Jangwani	5			-		5
Saint Mary's	3			3		6
Green Acres	2			2		4
Makongo	2			3		5
	12			8		20
Teachers Respondents						Total
School	Female			Male		
Jangwani	4			2		6
Saint Mary's	3			3		6
Green Acres	3			3		6
Makongo	2			4		6
Kambangwa	4			2		6
Total	16			14		30

Source: Field findings, 2017

Findings and Discussion

Sources of information for Mathematics education awareness

Proper information provision it is generally greed to be one way of helping a person to have the capacity to make quality decisions making. The selection and choice of action largely depend on timely access to information. This section examines sources of information used by students to get proper knowledge and awareness on whether or not to engage effectively in mathematics education. Both students and teachers were asked to mention or point out which sources they mainly use The list of sources of information was provided from which to choose and they were also asked to mention others which were not in the list. The following sources below were identified by respondents.

Table 2, shows that teachers are the primary sources of information for students in promoting interest and engagement of students in mathematics education. More than a half 32 (53%) of students and 28 (87%) of teachers indicated that teachers are key sources of information on mathematics education for students Based on these findings, it is evident that, timely access to relevant information provided by teachers has a lot of consequences to the development of students, the vice versa is true if the teacher is appropriately informed, and if they clearly understand the subject's role to one's development. Parents were another, informers mentioned. Respondents positive impact in that this influences children to like and study mathematics and also enables parents to encourage their children to study mathematics. About 30 (50%) students and 20 (67%) teachers agreed that parents play a major role in promoting mathematics to their children t. Other sources are peer groups.

Table 2: Sources of information for mathematics awareness creation

Source of information	Respondents			
	Students N=60		Teachers N=30	
	Frequency	Percent	Frequency	Percent
Teachers	32	53	32	87
Books and journals	4	6	20	67
Parents	30	50	20	67
Television	12	20	10	33
Peer groups	20	34	10	33
Etermine career selecti preferences Seminar, workshops	10	16	6	20

& conferences				
Newspapers/Magazines	4	6	6	20
Brochure	2	3	6	20
Radio	4	6	3	10
Internet	4	6	3	10
Posters	2	3	1	3

Source: field findings, 2017

They also added that, career selection by students is usually influenced by parents, relatives, guardians' and/ or surrounding societies. This implies that, any inappropriate information on which and why children should engage, in the study of mathematics impacts their career choices. Parents'/ relatives' occupation and role models, income, characteristics of the schools they attend, peer's influence, gender, and cultural background are equally key determinants.

Even though mass media would have been a good source of information for mathematics education promotion, only 12(20%) students and 10(33%) teachers mentioned television. a factor to mathematics promotion in Tanzania. Specifically, findings revealed a meagre use of various information media in promoting mathematics education. Although, there area number of state-run and private owned radio broadcastin stations in Tanzania which would be very useful for promoting mathematics education in the country, These media ARE under-utilised. For example, although there are a number of both State-run (including Radio Tanzania Dar es Salaam (RTD), PRT Radio Tanzania, Parapanda Radio Tanzania and Voice of Tanzania-Zanzibar etc.) and private owned radio (Radio Free Africa, Radio Kiss FM, Radio Sky FM, and Radio Sauti ya Injili. Others are Magic FM, Radio, Clouds radio, Radio One, Radio Uhuru, WAPO Radio and Praise Power FM), they were narrowly applauded as sources for information for mathematics promotion. News bulletins from international radio stations such as the BBC, Voice of America and Germany's Deutsche Welle, and are carried by many stations. According to this study's findings, only 6% of students and 10% of the teachers who answered this question acknowledged that radio is a source for mathematics promotion or awareness creation. Yet, despite this, respondents mentioned mass media such as radio and TV as their sources of information for mathematics awareness, even after a lot of probing; there was no session in which all respondents mentioned radio involvement in promoting mathematics education.

Even though newspapers are valuable sources of information dissemination in Tanzania, newspapers related to mathematics education development was are almost none existant. From this study, existing and popular newspapers in Tanzania noted include the government-owned Daily News, which is Tanzania's oldest newspaper and; Uhuru, which is also owned by the CCM- political party and published in Swahili. TA private English-language newspapers included The Guardian and Daily Mail; t private Swahili-language newspapers include Nipashe, Majira, Mtanzania, and Tanzania Daima, just to mention a few; and the private weekly Business Times, The Express and Arusha Times. However, there are some variations between students and teachers in their responses on message portrayed in these newspapers. The findings indicate that only 6% of students and 20% of teachers said newspapers are informative about mathematics education. They variation could be caused by accessibility to the source with teachers being more capable financially to purchase

newspapers unlike students . It may also be explained by their newspapers' readership patterns with students' readership is low compared to teachers'. According to Lee, & Wei, (2008), young consumers of newspaper are people with lower socio-economic status, they read less, spend less time on reading newspaper and require smaller amount of information compared to older consumers. However respondents could not mention a specific newspaper, except for the "mathematics tuition questions" for students exercise, published in newspapers like Nipashe.

Despite the fact that, television is increasingly displacing radio as the primary source of information and entertainment, in developing countries, its role has been generally evolving primarily as a source of entertainment, rather than a public service and a disseminator of knowledge, a trend which has been particularly marked in many developing countries over the past decade. Television Channels pointed out from this study included the state-run 'Tanzania Broadcasting Corporation' (TBC), and private networks; Independent Television (ITV), East Africa TV (Channel 5), Clouds TV, Star television (Star TV), Channel Ten, Agape TV, Sibuka, TV1, Coastal Television Network, AZAM TV and others. From this study, only 20% students and 33% of teachers who responded to the question had seen/heard of some mathematics related television programmes. The available programmes in Television were mainly instructive, than mathematics promotional information. Even these were very few. They included 'Classroom session' broadcasted by Star TV-Mwanza daily at 16:30 and the occasionally launched mathematics subject sessions by Channel ten and DTV.

Even though the internet is supported by Web 2.0, it is also expected to be a potential means for supplementing the public service function of television, radio and newspapers, yet developing countries including Tanzania are lagging behind in this aspect. With the emergence of smart phones, a number of applications are available through Web 2.0, online that can be used for education purpose. For example the tHL 2.0, an Android Apps run on Google play and is already used by parents as a tool for teachers/and parents to educate students. These Apps contain primary and secondary school materials and /notes for students to participate in using ICT practically in academics they are more instructional than geared toward promoting mathematics education. Surprisingly, despite the potential the Internet and the Web promises, the use of internet use was acknowledged only 6% and 10% by students and teachers respectively as an important source.

Another important source of information whose usefulness was investigated in this study was seminars, workshops and conferences. As indicated in Table 3, 16% of students and 20% of teachers acknowledged this method to be important and they had attended some mathematics campaigns. Respondents were asked to mention the givers/organizers of seminars in promoting mathematics education in Tanzania. Table 3 shows a summary of responses.

Table 3 Seminar organisers

Seminars organizers	category			
	Students		Teachers	
	Frequency	Percent	Frequency	Percent
Math. Assoc of Tanzania	14	23	6	20
NGOs CBO, or FBOs	12	20	6	20
Ministry responsible for Education	5	8	6	20
School administration	2	3	10	33

School clubs	2	3	6	20
Teachers (teaching mathematics)	2	3	3	10
Students who like mathematics.	2	3	1	3

Source: Field Data, 2017

In Table 3, the percentage score by students and teachers are shown. The findings indicate that 23% of students and 20% of teachers reported Mathematics Association of Tanzania (MAT) as main organisers of mathematics subject related seminars. NGOs such as Haki Elimu, CBOs, and FBOs were reported by 12 (20%) of students and 6 (20%) of teachers as givers/organisers of seminars, workshops, and conference on mathematics; and 20% of students and teachers respectively. This was followed by ministry of education, which was reported by 8% of students and 20% teachers. The findings further indicate that school administration was another organiser. However a variation in response was shown between students and teachers where by only 3% of students and 3% of teachers mentioned school administration as the organiser for mathematics seminar. The findings further indicate variation with regards to school clubs as organisers – where only 3% of students and 20% of teachers rate school club as organisers of mathematics seminars. Again, responses by 3% of students, and 10% of teachers, acknowledged teachers as organisers of mathematics subject seminars. The sources variations in responses could not be established by the researcher. A more or less the same in score was shown with question id about students with interests in mathematics organise mathematics seminar, where only 3% of students and teachers responded. According to Curriculum Development Council (2015), active involvement of the various mathematics education communities is important. Or else, each body may end up doing things separately. This suggestion is also in line with the Open Systems Perspective Model that advocates that the whole is always bigger and better than the sum of its parts (Burnes, 1996). Different stakeholders need to be engaged in order to strengthen the partnership to allow smooth coordination and sharing of knowledge between and across different mathematics communities of interests.

Information Aspects that Discourage Students from Studying Mathematics

This study went further, and sought to find out the information aspects that hinder students from taking mathematics. Most of the respondents 78% of students) and 77% of teachers mentioned t, a number of factors discouraging students from studying mathematics including: (i) uninformed public, teachers, parents and government officials on the role of mathematics in general and student's career development, reported by (59%) of students and 57% of teachers. (ii) Poor coordination and communication techniques by experts in mathematics to persuade reported by 52% of students and 60% of teachers (iii) poor use of ICT and the Web in the dissemination of mathematics education information, reported by (39%) of students and 35% of teachers. (iv) lack of policies that guide and ensure students adapt and learn mathematics, reported by 25% of students and 40% of teachers. They further commented that, mathematics promotion information available at decision making levels, such as schools, ministry is uncertain. This may explain why the low budgets and poor commitment to promoting the subject.

There were many other information factors that were mentioned that negatively affect the success of mathematics promotion campaigns in a culturally diverse environment including teachers' beliefs, values and attitudes toward diversity (62%), involvement

of the community in the lives of their children and their schools (51%), the quality of curricula materials (51%), teaching strategies (60%) and culturally responsive opportunities to learn (31%). During interviews with some teachers at Kambagwa and Green Acres, one respondent commented;

> "...Students come to school with very different experiences, languages, learning styles, and dispositions for learning. Each child has different prior cultural experiences, interaction styles, and frames of reference, which are central to their learning and thinking processes. Many students have less access tomonetary or cultural capital, language, tools and resources, and relevant learning experiences than mainstream students have. Effective teachers are able to acknowledge multiple ways of knowing and honor individual and cultural differences in a positive manner so that students can make links between school and home. Classroom behaviors should be examined in terms of discourse patterns, grouping and instructional strategies. Teachers need to examine their own expectations, practices, curricula, and the kinds of opportunities they provide for students to learn..."

This would only be circumvented if teachers and other responsible personnel are well informed.

The study findings also revealed that wrong perception by students and society towards mathematics that it is a difficult subject or it has to be taken only by students who aspire to be in certain disciplines e.g. engineers, statisticians, physicists etc. Besides, the researchers revealed some stereotypes like "*Hesabu ni tatizo kwa wengi*" implying that, mathematics is a problem to many. The findings are also in line with what Veloo, Ali, & Krishnasamy (2014) documented, that, perception by students that, mathematics is a difficult subject to understand is an important cause that lead students not understanding mathematical concepts which are taught. Moreover, like many other science and technology related subjects, there is a feminism and masculinity perception that considers mathematics as gendered subject a factor that discourages most girls/women from studying maths, and those who have dared tend to lag behind men in terms of performance, . This repellence from Mathematics by the girls compared to boys was also noted by Masanja (2004).

Superiority complex of some teachers was another controversial argument reported by 20% of students. Mathematics teachers were reported to be feeling superior to other teachers who do not teach mathematics. This leads to empire building spirit by respective teachers. As a result these types of teachers discourage and lower morale of t students who want determined to learn.

Summary of findings

A well structured information system is an important tool for capturing, generation, processing, packaging and dissemination of information in any social system. The study revealed inadequate information infrastructure has not entrenched the provision of information as an important component. There is no model that is participatory and end-user oriented. There are top-down approaches developed without any prior assessment before its implementation. There are no in-built structures that would allowed for efficient coordination and sharing of knowledge between and across different mathematics communities of interests such as tertiary institutions, NGOs, education boards and curriculum advisory committees, professional bodies (e.g.

MAT), and other government departments/government related organisations. There is no strategy for managing mathematics education information and knowledge in schools at, district, regional and/ national levels. Consequently, there is underutilization of means and media available in Tanzania was revealed in promoting mathematics education.

This study argues that content and accurate information avoids misinformation about the subject while sharing of strategies and networking are critical factors inf information provision but all these are lacking. Developing collaboration and coordination strategies to improve mathematics information, creation, collection and dissemination need to be addressed if information is to have the desired impact. Within a collaborative and sharing framework best strategies for generation and dissemination of Mathematics education information must be developed in the local context.

Conclusion and Recommendations

Findings reveal a meagre use of information and media available for mathematics education promotion. Moreover, stakeholders, government, parents, teachers, policy and curriculum developers are not well informed; not only on the necessity of doing and understanding mathematics to learner's career development and national development in general. This in turn affected the decision makings and advices given on mathematics education. The most observed challenges were mainly motivational, technical and managerial. Informational aspects that would motivate students doing mathematics are highly encouraged. Teachers', technical barriers and other arrogances about the subject must be confronted through training, information sharing and resources development with emphasis given on the subject's importance. This can only be achieved through adequate planning in terms of curriculum, infrastructure; policy, budgeting and timing s to motivate the learners and stakeholders.

.The study findings have s a number of implications for responsible ministries, departments and various organizations responsible for information, education and communication. These must come up with suitable policies and directives: (i) to develop the Information Education and Communication (IEC) strategy an important link in shaping positive attitudes towards mathematics education. Use should be made of multimedia including the Web and existing mass media; (ii) To set up an IEC programme that will provide guidelines, coordination and technical support to all mathematics education activities and to maintain working links with other sectors; (iii) To prepare inventories and conduct complete evaluation of all IEC START HERE materials on mathematics education and development existing in the country. This exercise will include an assessment of the coverage and efficacy of the various methods used. This would constitute the basis for revision and updating the IEC strategies to suit changing circumstances; (iv) Mathematics education shall progressively be incorporated into primary, secondary, teachers' education and higher learning curricula and in all education activities in other levels, and; (v) to give priority including funding for training of specialists in mathematics education information and dissemination. This will help to attain the hidden value and role mathematics education can play in the socio-economic development of the region and Tanzania at large. Also, instructors should avoid messages (such as mathematics for a few talented) that end up turning inhibitors to love mathematics as a subject. Also

COSTECH as Commission for Science and Technology has a great role to educate and promote mathematics education information and dissemination initiatives in Tanzania. Others commonly done in developed countries are computer simulation of science subjects and mathematics at large may be used to motivate pupils and students to have interest on it.

References

Abiodum, R.F.A. (1997). The challenges of Mathematics in Nigeria's Economic goals of Vision 2010. *Keynote address presented at the 34th Annual National conference of the Mathematical Association of Nigeria, Sept, 1-6.*

Adeyegbe, S.O. (1987). Mathematical Competence as a Predictor of Performance in Solving Chemical Arithmetic Problems at Ordinary Level. *Journal of Research in Curriculum, Special Edition*, 2, 23-30.

Aguele, L..I. and Usman, K. O. (2007). Mathematics education for Dynamic Economy in Nigeria in the 21st Century. *Journal of Social Sciences*, 15 (3), 293-296.

Aguolu, I. E. (1997). Accessibility of information: A myth for developing countries? *New Library World*, 98(1132), 25-29. 3 *Aldrich, HE 1979.*

Ball, D. L. (1996). Teacher learning and the mathematics reforms: What we think we know and what we need to learn. *Phi Delta Kappan*, 77, 500-508.

BEST (Basic Education Statistics of Tanzania) data, (from 1998 to 2012), published by the Ministry of Education and Vocational Training (MOEVT).

Burnes, B. (1996). No Such Thing as …A 'One Best Way' to Manage Organizational Change, *Management Decision*, 34(10), 11-18.

Coles, L. (2015). Marketing With Social Media. 10 Easy Steps to Success for Business. Australia : John Wiley and Sons Australia Ltd.

Consumers Affairs Victoria (2006). Information Provision and education strategies. *Research paper No. 3 March 2006*

Curriculum Development Council (2015). Promotion of STEM Education: Unleashing Potential in Innovation. Kowloon Tong, Hong Kong.

Education Matters, December 2004, Number 5. "First Results from the 2003 Programme for International Student Assessment ," *Catalogue number 81-004-XIE*

Evans, J. (2001). Information as Resource - a contribution to the Information Technology Seminar 10-11 August 1992. Papua New Guinea Books Useful Articles & Information.

Fakuade, A. (1976). Uses of Mathematics. *Journal of Curriculum Studies*, 2(2), 2- 4.

Fatima, R. (2012). Role of Mathematics in the Development of Society. National Meet on Celebration of National Year of Mathematics. Organized by NCERT, New Delhi, December 20–22, 2012.

Fennema, E. & Carpenter, T.P. (1996). A longitudinal study of learning to use children thinking in mathematics instruction. *Journal for research in Mathematics Education, 27 (40, 403-435.*

Gatt S. (2002). 'Building on children's Ideas : Examples of Constructivism in Primary Science' CASTME (Commonwealth Association of Science, Technology and Mathematics Education) conference, Linking Science, Technology and Mathematics Education and their Social Relevance,Malta, 10th -13th April 2002.

Harbor-Peters, V.F.A. (2000). Mathematics: Language for the New Millennium, implication to the society. *A paper presented at the 37th Annual conference of MAN*, Sept. 4-7.National Council for Teachers of Mathematics, NCTM 1995. *Assessment Standards for School Mathematics.* New York: Author.

Helping Everyone Learn Mathematics (2006). A conference organized by the Subject Network of the Higher Education Academy and two FDTL4 projects *held on 14-15 September 2005 at Loughborough University*

Human Resources and Skills Development Canada, Council of Ministers of Education, Canada and Statistics Canada (2004). Measuring Up: Canadian Results of the OECD PISA Study: "The Performance of Canada's Youth in Mathematics, Reading, Science and Problem Solving, 2003", *Vol. 2, Catalogue number 81-590-XIE2004001*.

Human Resources and Skills Development Canada, Council of Ministers of Education, Canada and Statistics Canada (2001). "Measuring Up: The Performance of Canada's Youth in Reading, Mathematics and Science". *OECD PISA Study: First Results for Canadians Aged 15, Catalogue number 81-590-XIE.*

Johnson, J. R. (1989). Technology: Report of the Project 2061 Phase I Technology Panel." Washington, DC: American Association for the Advancement of Science.

Kaiser-Messmer, G. (1993). Results of an Empirical study into gender differences in attitudes towards Mathematics. *Educational studies in Mathematics,* 25 (3), 209-233.

Ke, F. (2008). "A case study of computer gaming for math: Engaged learning from gameplay?" *Computers & Education,* 51 (2008) 1609–1620.

King, M. B. and Newmann, F. M. (2000). Will teacher learning advance school goals? In *Phi Delta Kappan*, 81(8), 576-581

King'aru, J. M. (2014). Factors contributing to poor performance of Science Subjects: A Case of Secondary Schools in Kawe Division, Kinondoni Municipality. A Dissertation, Open University of Tanzania

Kisakali, J & Kuznetsov, D. (2015). Modeling Factors Influencing Mathematics Learning and Performance in Tanzanian Secondary Schools. Asian Journal of Mathematics and Applications Volume 2015, Article ID Ama0244, 11 Pages ISSN 2307-7743 Http://Scienceasia.Asia

Kisusi, R. L. & Masele, J.J. (2018). Efficacy of public awareness strategies for promoting existing cultural heritage tourism assets in Dar es Salaam. *Journal of Heritage Tourism.* DOI: 10.1080/1743873X.2018.1491980

Lasswell, H. (1948). "The Structure and Functions of Communication in Society: the Communication of Ideas" In L. Bryson (Ed.) ideas (p. 117). New York: Institute for Religious and Social Studies

Leach, J. and Scott, P. (2002). Designing and evaluating science teaching sequences : An approach drawing upon the concept of learning demand and a social constructivist perspective on learning. *Studies in Science Education*, 38, 115-142.

Lee, T.-T. & Wei, L. (2008). How Newspaper Readership Affects Political Participation. *Newspaper Research Journal*, 29 (3), 8-23.

Ma, X. (2000). A longitudinal assessment of antecedent course work in mathematics and subsequent mathematical attainment. *Journal of Educational Research*, 94, 16-29.

Manda, P. A.(2006). Socio-Cultural Determinants of HIV/AIDS information impact: experiences from Babati District in Tanzania" *SCECSAL XVII. Librarianship as a bridge to an information and knowledge society in Eastern, central and Southern Africa. Hosted by Tanzania Library Association.* Diamond Jubillee Conference centre, Dar es Salaam-Tanzania, 10-14 July, 2006.

Manitoba Education, Citizenship and Youth, (2004). Helping your child learn math: A parent's guide. Queen's printer for Ontario (http://www.edu.gov.mb.ca/k12/docs/parents/learn/math.pdfretrieved on 28/08/2017)

Masanja, V. (2004). Bridging the Gender Gaps in Science and Mathematics Education. HakiElimu Working paper Series No. 2003.10.

Masanja, V. (2007). Gender disparity in science and mathematics education. Retrieved from http://www.hbcse.tifr.res.in/episteme/episteme1/themes/vedianamasanja%20modified.pdf

McDaniel, S. E. (1996). Providing awareness information to support transitions in remote computer-mediated collaboration. Proceeding CHI '96 Conference Companion on Human Factors in Computing Systems Pages 57-58. Vancouver, British Columbia, Canada — April 13 - 18, 1996 ACM New York, NY, USA

McDowall, P & Fourie, L. (2005). "Regional information and knowledge management workshop". *28th November-2nd December 2005*, Arusha- Tanzania.

Mchombu, K.J. (2003). "Information dissemination for development: an impact study"*: Information Development Journal*, 19 (3), 111-126.

Mmari, G. (1978). "The United Republic of Tanzania: mathematics for social transformation" *In: F.Swetz (ed.), Socialist Mathematics Education, Burgundy Press, Southampton PA, p301-350.*

Mmari, G. (1980). "Secondary Mathematics in the United Republic of Tanzania" *In: Studies in Mathematics Education, UNESCO,* 1, 106-126

Mmari, G. (1991). "On the history of the Mathematical Association of Tanzania", *MAT, Dar es Salaam, p55*.

Muneja, M. S. (2013). Evaluation of Tanzania Curriculum: An analysis Using Ornstein's View on Educational Philosophy. *Studies of Changing Societies: Educational Integration: Theory, Practice, Cases.* 1 (11), 15-36.

NECTA (2015). Examiners' Report On The Performance of Candidates in (CSEE) 2015 041 Basic Mathematics – NECTA

Neuendorf, K. A. (2002). "Review of The content analysis guidebook", London: Sage Publications, Inc

Nickols, F. (2000). "Strategy: Definitions and Meaning" *retrieved from* (*http://home.att.net/~nickols/strategy_definition.htm* on 30/08/2006)

Nkyabonaki, J. (2013). The space of politics in Tanzania`s Curriculum. *Scholarly Journal of Scientific Research and Essay (SJSRE).* 2 (7), 109-117.

Nyam, S.S. A. Akawe, M.N., & Tyonun, N.M. (2015), "Information Needs and Seeking Behaviour of Medical Students", Makurdi. *International Journal of Innovative Research development.* 4 (11), 158.

Ohuche, R.O. (1973): Geometry, estimation, and Measurement in traditional Sierra Leone. In Education in Developing Countries of the Commonwealth (pp. 329-338). London Commonwealth Secretariat.

Ohuche, R.O. (1978). Change in Mathematics Education since the late 1950's - ideas and realisation: Nigeria, in*: Educational Studies in Mathematics, Dordrecht*, 9 (3), 271-282

Pythiam, J.E. (1971). Mathematical Kujitegemea in Tanzania. *Educational Studies in Mathematics*, Dordrecht Boston, 4 (2), 187-200.

Sayers, R. (2006). Principles of awareness-raising: Information literacy, a case study. Bangkok: UNESCO Bangkok.

Seka, B.R.(1987). History of mathematics in Tanzania, Institute of Education, Dar es Salaam, 12 p. (mimeo)

Sriraman, B. (2012). Crossroads in the History of Mathematics and Mathematics Education. Monograph Series in Mathematics Education. 12. IAP. ISBN 978-1-61735-704-6.

The United Republic of Tanzania Ministry of Communications and Transport (2003) "National Information and Communications Technologies Policy"

Ukeje, B.O. (1997). "The challenges of Mathematics in Nigeria's Economic Goals of Vision 2010: Implication for Secondary School Mathematics". *Paper presented at the 34th Annual National Conference of the Mathematical Association of Nigeria (MAN*), Sept. 1-6.

University of Dar es Salaam (2017). Undergraduate Prospectus 2017-2018. Directorate of Research and Publication, Dar es Salaam.

Urasa, J.E (n.d) tHL 2.0 Revised edition. https://play.google.com/store/apps/details?id=com.twiga.eschool&hl=en

Veloo, A., Ali, R. M., & Krishnasamy, H. N. (2014). Affective determinants of Additional Mathematics achievement in Malaysian technical Secondary Schools. *Paper presented at the International Conference on Education & Educational Psychology 2013 (ICEEPSY 2013)*, Malaysia.