Gambians don’t like maths?

A Minor Field study on how mathematics is taught in a primary school in the Gambia

Jenny Borén
Education is the most powerful weapon which you can use to change the world.
– Nelson Mandela

Education is the key, to the door of success
– African proverb
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Abstract

In this text about the mathematics education in a primary school in the Gambia, I am researching what this mathematics education consists of and what surrounding factors might be affecting it. The pupils of the school in question speak several different languages. This language situation is one of the factors considered in the research. A connection between the real life led by the pupils and their mathematics education was a second factor. The third factor is financial resources or the lack thereof. I wanted to see if a lack of sufficient financial resources was visible in forming the education and the teaching of the pupils. The teaching of mathematics in the school seemed to be based on behaviourism, but could perhaps take benefit from the ethnomathematics perspective. Through observations, analyzing documents and an interview, I realized that the government had set ambitious objectives for the teachers to follow, but due to lack of economical resources, as far as my study found, these are not achieved. As ambitious objectives, which are not followed by sufficient funding is an issue not only applicable in Gambian schools and since Sweden is a growing multicultural society, I can use my knowledge from this study in my work in Swedish schools.

Key words

Mathematics Education, The Gambia, Primary school, Minor Field Study, Frame factors
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Introduction

Acknowledgements

Firstly I want to thank SIDA and Stockholm University for leaving me with the great opportunity and responsibility of travelling to the Gambia to do my research.

I would like to thank all of the employees at the primary school, for being of my assistance in every single way possible including; my contact in the field – the general manager of the school, the accounts manager, the head teacher and all the other teachers and volunteers helping out at the school. A special thanks to the friendly janitors looking after school grounds who always made sure I would feel welcome. However though the teacher of mathematics, deserves big thanks for allowing me to follow him wherever he went during my eight weeks in the school and completely bombard him with questions. Last but certainly not least, the pupils of the school, without whom I ever would have been able to go through with this project. I want to thank each of you in your own language, in addition to English.

Jërë-jël! ¹

Abarka! ²

Jaaraama! ³

Ngokonjal!⁴

Thank you!

In addition to this, I will of course like to thank my amazing tutor Eva Norén for all the help and great advice she has given me as far back as when I was applying to travel to the Gambia. Also, Birgit Aquilonius has helped me with correcting the English language in the text and she deserves great thanks for this. I will thank you both in your language, in all fairness.

Tack!

Disposition

I will start by describing my aim and my research questions. Further I will get the reader familiar with what previous research has been made about the Gambia, Sub-Saharan Africa, education and mathematics in different constellations. The background of the country, village, language and school is then described in detail. This description I feel is important, in particular

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¹ Wolof
² Mandinka
³ Fulani
⁴ Serer
in this case, because most readers of this text are not familiar with the country, its villages and the education there. After this, I will describe my choice of methods and the reasons to why I made these choices. Further, under methods, I will describe what ethical dilemmas I might have encountered or avoided in the part of the text called Ethical perspective. This will also entail a brief text on the reliability of the study. I will then write about the actual research and firstly describe what teaching I have seen in Primary School 1. This I will analyze using the behaviouristic and the ethnomathematics perspectives of teaching as well as investigating how the frame factors language, economical resources and teaching based in everyday experience affect the teaching. I will, before analysing though, explain what I mean by these different expressions. I will after this discuss what I have found and draw a conclusion of the results. Lastly I will inform on what needs to be further researched from the study.

**Aim and research questions**

My aim with this Minor Field study was to do research in a primary school in the Gambia for 8 weeks to see what kind of mathematics teaching there was and why the Gambian people did not seem to like the subject of mathematics. I chose to use the title Gambians don’t like maths, because I had heard through informal conversations with villagers in Village 1 that the idea of Gambians not liking mathematics was the general understanding. The term maths is used as short form of mathematics because this is the way the subject was referred to in conversations with the villagers. The following were my main questions in the project:

*How is mathematics taught in a primary school in the Gambia?*

*How do the frame factors economical resources, language and teaching based in everyday experience form what is being taught in the primary school?*

**Background**

**Previous research**

**Education in the Gambia**

There has been little research about the Gambia and mathematics. Pagano (1999) writes about early childhood teachers’ education in the Gambia and three nearby countries. The research includes socioeconomic and political issues, current and emerging policies and teacher preparation strategies.

*Challenges they face to provide care and education for their children are monumental at a time when new levels of education are essential for individual and national survival in the global society (p.1).*

On The Gambia, Pagano says:
The child's development is not in isolation of the total community, and all aspects of a learning environment are important. Programs for young children (from birth through ages of six or seven) emphasize indigenous education and the use of local languages (p.20).

There is also a report on how to introduce new curricula in West Africa with articles written by Adeniyi & Umeano (2001) and Njie (2001), where the obstacles in the Gambia are narrowed down to the following:

- Lessons are academic and lack practical activities;
- very little teaching/learning materials exist in the classroom;
- most teachers need to be trained in use of the teachers’ guide;
- supervision by Senior teachers is lacking in most schools;
- the mode of teacher preparation leaves much to be desired in some schools;
- for the new curricula not all teachers can speak all the local languages and will therefore need to be trained which will require more time and resources;
- a large percentage of pupils only speak English in school but, since most parents are illiterate in English, there is no continuity and support for the pupils at home.

(Adeniyi & Umeano, 2001, p.14)

Adeniyi & Umeano (2001) also suggest that the area languages Wolof, Mandinka, Jola and Fula are to be adapted into the curriculum. This adaption of tribal languages is according to Adeniyi and Umeano something that is being tried at the time being, the year 2001, in five of the six regions. This is also confirmed by Njie (2001) in the same report. Both reports tell that the reason for the policy to be advocating for a change is the poor performance in English in Gambian schools. It is proven through the Monitoring of Learning Achievement study (MLA) which showed a national score of 39.83%, whereas the mastering level was 73.33%. The MLA-study took place in 2001. The MLA-study was conducted for assessing the knowledge, skills and values acquired by pupils, in this case in the English language.

**Mathematics education in Africa**

Paulus Gerdes is an ethnomathematician who did research in Africa. He has written a dissertation called Ethnomathematics and education in Africa (1995). This dissertation contains nine of his educational articles in an African context. He uses the theories of D’Ambrosio and Zaslavsky in his dissertation which I will do also. I will also explain these theories briefly under the chapter dedicated to theories. Gerdes explains ethnomathematics using two main points; the first concerns the mathematical traditions that survived colonization and mathematical activities in people’s daily life and ways to incorporate these rural mathematical activities into the curriculum. The second point is that there are culture elements that may serve as starting points for doing and elaborating mathematics in the classroom. He uses examples of patterns, games and things that can be used without much cost whilst demonstrating the theories of mathematics to rural villagers. In one example he explains that when the children are playing with a tyre, pushing it in front of them with a stick, they need to know different calculations i.e. at which angle one has to push the sticks in order to run faster, at which angle one has to push the sticks to be able to break or stop or how to hold the sticks to be able to make a curve or to turn round etc. He further explains how to find what he calls ‘hidden’ mathematics. Hidden mathematics,
Gerdes means, is the mathematics that is there but is not spoken of, thus perhaps not reflected on.

**Swedish research on education in Africa**

Kilborn (1991) writes about Mozambique and his work there regarding its relationship to teaching of mathematics in what for the pupils is a second language. He found that in Mozambique Portuguese was used as the language of teaching. The languages spoken by the people though, were of different Bantu kinds. He points out that since children in Mozambique do not have the same opportunities to quantify their surroundings like children in the western world, they do not have the same understanding for calculations. This means that the step from real life to school gets larger. Added to this difference in what information is spread in the lives of the children depending on where you live, is the language problem. The pupils in Mozambique cannot use the language from their experiences and thus, have to start over in Portuguese. In school mathematics is formalized, thus lacks a concrete base and also a base in the language, in this case. He also points out benefits in teaching in a Bantu language. The base of the number system is five and this system makes it easier, logically, for the children to figure out numbers up to 19. The base of five will also assist the pupils when learning to count up to 99. In addition and subtraction, it can also be a benefit. It might be easier to count $5+2+5+2 = 10+4 = 14$, rather than $7+7=14$. Because that is the way you state the numbers, this way is the way you logically would to the calculation. It could be more logic to the pupils if they thought about it in this way. The downside of using a local language in teaching though, is that for some of these languages a written version does not even exist. Literature is also very limited in local languages.

Another research has been made in Mozambique by Linde (1995). He wrote about how to best spend economical resources in primary schools in the poorest country in the world at that time. He wanted to find out what the spending of economical resources was dependent of and what it meant for the actual problem. The pupils in Mozambique were forced to speak another language, as Kilborn (1991) also wrote and Linde (1995) referred the problem of which language to teach in class to the language politics of the entire country. By language policy, I interpret Linde, as the government wanted the teachers to use Portuguese in their teaching. So that the schools cannot teach in another language whether the teachers want to or not. Other problems in education in Mozambique were that there was too many pupils in each class, there are no textbooks and that many of the pupils quit school at an early age. According to Linde some of the different improvements that could be spent resources on were to build new schools or extensions to the once that were there, to supply sufficient amounts of textbooks and to improve the quality of the teachers through education in how to handle the language problems and also to educate the teachers who already worked further in new methods and approaches to teaching.

**Area background**

**The country**

The Gambia, a small country compared to my own country of origin Sweden (The Gambia 11 295 sq km compared with Sweden 449 964 sq km), is surrounded by Senegal and divided by the...
Gambia River that flows into the Atlantic Ocean. The capital is Banjul with around 50,000 inhabitants. The population of the entire country is approximately 1.7 million people, which corresponds to around 164 people per sq km. In Sweden there are 20.6 people per sq km. The GDP (Gross Domestic Product) is $278 per capita as compared to Sweden who has $37,333 per capita (www.fco.gov.uk / www.scb.se). These statistics puts Sweden as number eight on the International Monetary Fund list of countries according to their GDP and The Gambia on a 167th position on that same list out of 180 countries (www.imf.org). The analphabetic percentage of Gambian people over 15 years old in the year 2003 was 59.9% (www.globalis.se).

The Gambia is often referred to as “The smiling coast of Africa”, because the people are considered very friendly and openminded. The Gambia is a republic under multi-party democratic rule. Alliance for Patriotic Reorientation and Construction (APRC) holds a huge majority (47 of 53 seats) (www.fco.gov.uk). The president of the Gambia, His Excellency Sheikh Professor Alhaji Dr Yahya AJJ Jammeh, took power of the country through a coup d'état with his party APRC on the 22nd of July in 1994 and has been in control ever since. The Gambia is still considered a democracy though, because the president was elected by the people in 1991.

The school and the village

The primary school, later referred to as Primary school 1, is situated in a village, later referred to as Village 1. Village 1 is one of the larger settlements in the country, but is still referred to as a village. This is the reason to why I also refer to it as a village. There are 8,000 inhabitants but only one school. The primary school is a part of a larger education centre and the school has around 350 pupils in total. The sizes of the classes are varied, one class has 18 pupils whilst another has 45, the classes are all mixed, boys and girls attend class together. The pupils are divided by age, but a large amount of pupils are held back in classes so the age difference can be up to three years between pupils in the same class. It is a private school in which the pupils have to pay to attend, although many of the pupils have sponsors paying their fees as the school has a sponsorship program. The sponsors are from a whole range of different countries, i.e. Sweden, Denmark, Germany and the United States. Schooling in the country is free should one attend public schools, but there are still expenses such as school uniforms, textbooks and the like. The education centre offers other programs, i.e. the school has a skill centre for older pupils, where they teach skills such as tailoring, carpentry and the producing of commodities that can be sold in the local market, e.g. bee-wax crème, candles and soap powder. The manufacturing and selling of commodities is also used as a source of income for the school. The school was founded as a nursery school and day care centre in 1984 by a local development group because there where no school nearer than the ones in the next village. In 1990 the development group had built three classrooms for older pupils, and in 2005 the school became what it is now.

The languages

The Gambia has been an independent country since 1965. Before, it was a British colony. English is therefore the official language spoken in the country. The other languages spoken in the country origin from the different tribes living there; each tribe has its own language. There are the Mandinkas, the Wolofs, the Fulanis, the Serers and the Jolas, to mention the larger ones. However, there are two official local languages of which everyone in the country must know one, to be able to speak to one another and thus get by in everyday life. These languages are Wolof and Mandinka. Mandinka is what the locals say to be the official tribe language, whereas
Wolof is said to be the popular one. Wolof is for instance used on television programs along with English. Mandinka is the larger of the tribes; which consists of 42% of the population (www.accessgambia.com). The villagers in Village 1 use mostly Wolof in everyday conversations. Now, because of the fact that one language is spoken at home, another one with other villagers, some pupils have to be able to speak two languages even before they start school; the language of their own tribe and one more to understand their peers. Then, when the children start their education, they have to understand a third one, English, which is the official language of the country which means that it is the language used for education, television, newspapers, official documents and the similar. The presence of the English language in the Gambia originates from the previous colonization of the country by the British. As an addition to these languages, the pupils also study Arabic during classes, the language of their religion; Islam. All of these languages have different structure when it comes to counting and numbers. In comparison, when speaking English one will count in base 10, in Wolof the base is both 5 and 10 so i.e. if I should say my age it would be 2 – 10 – 5 – 2 (27). I will try and explain this through the table below (fig. 1). In Mandinka the base is 10 but the number 7 is 5 – 2. In Arabic the base is 10 but the written numbers are completely different. However, I intend only to highlight some Wolof and English differences in this essay, because these are the major languages used in the school. English is used to a major extent in Primary School 1. Only sometimes when the children do not seem to understand, the teacher explains to them in Wolof.

<table>
<thead>
<tr>
<th>Wolof numbers</th>
<th>Decimal notation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bene</td>
<td>1</td>
</tr>
<tr>
<td>Njar</td>
<td>2</td>
</tr>
<tr>
<td>Njeta</td>
<td>3</td>
</tr>
<tr>
<td>Njenent</td>
<td>4</td>
</tr>
<tr>
<td>Djurum</td>
<td>5</td>
</tr>
<tr>
<td>Djurum-Bene</td>
<td>6</td>
</tr>
<tr>
<td>Djurum-Njenent</td>
<td>9</td>
</tr>
<tr>
<td>Fuka</td>
<td>10</td>
</tr>
<tr>
<td>Fuka-Djurum</td>
<td>15</td>
</tr>
<tr>
<td>Fuka-Djurum-Bene</td>
<td>16</td>
</tr>
<tr>
<td>Njar-Fuka</td>
<td>20</td>
</tr>
<tr>
<td>Njar-Fuka-Bene</td>
<td>21</td>
</tr>
<tr>
<td>Njar-Fuka-Djurum-Njar</td>
<td>27</td>
</tr>
</tbody>
</table>

Fig. 1 Table of Wolof numbers and numbers from base 10, or the decimal notation of numbers.
Theory

Main theoretical perspective

The theoretical perspective of frame factors, introduced by Dahllöf (1967, 1969) includes the understanding of how elements surrounding the activities control what is actually done. Therefore the frame factor perspective seemed the most suitable approach to the factors resources, language and real life-based teaching. Dahllöf wrote about the background variables that formed what the teachers were teaching on two different levels; the administrative and the physical frame factors. The physical factors included location, standard and structure in the class according to space, air and noise. The administrative factors included grouping of the class, class size, teacher utilization, the structure and objective of the syllabus etc. The theory was interpreted by Lundgren (1972) and he explained that the concept of frame factors lies in three main points; actual factors from the curriculum, time available for instruction and the composition of the class according to the time different pupils need to reach a certain goal.

The frame factor theory has been altered by Lindblad, Linde & Naeslund (1999) to make it more suitable to our school today. Their opinion is that the factor not used in the 30 year old frame factor theory is the one of the practical reasoning of the teacher, thus counting in the variable factor of the actor actually teaching. Löwing (2004) uses in her thesis on the communication between teachers and pupils within mathematics classes this updated version of the frame factor theory and so will I attempt to do in this text. Löwing points out that teachers do not act out of a vacuum, their actions are controlled by a line of frame factors. Should these actions be considered rational or not, can only be interpreted from these frames. Frame factors can be on a micro level or on a macro level. A factor on a micro level is something affecting the actual teaching whereas a macro factor is something affecting the teacher or the writer of the curriculum which then will affect the teaching in the longer perspective. An example of a micro factor is teaching facilities, books, pens etc. An example of a macro factor is when the teacher interprets the curriculum either as it was intended to be read or not and teaches what he reads in there.

Other theoretical perspectives

Whilst analysing my result, I came to use the theories of Skinner (1968) and D’Ambrosio (2001). This is for analysing the teaching on a micro level; what actually happens in the classroom. The radical behaviouristic perspective to teaching according to the former helped me describe the teaching actual right now in Primary School 1. The ethnomathematics perspective of the latter helped me find an alternative to mathematics teaching recommended for rural areas like Village 1, which connects to their everyday life. Skinner (1968) basically considers the human beings to be merely physical forms which are all shaped in the same manner. Psychology then, is something that is measurable. He writes about reinforcement processes, which are, according to him, conditions that shape behaviour. D’Ambrosio (2001) is an ethnomathematician who studies the relationship between mathematics and culture.

Ethnomathematics is the mathematics practiced by cultural groups, such as urban and rural communities, groups of workers, professional classes, children in a given age group,
indigenous societies, and so many other groups that are identified by the objectives and traditions common to these groups. (D’Ambrosio, 2001 p.1)

D’Ambrosio (2001) and Zaslavsky (1973) and also Gerdes (1995) suggest different ways of finding mathematics in the everyday lives of rural communities as a way to enhance students learning of mathematics. The ethnomathematics perspective has an objective to improve knowledge in mathematics and in the own culture of the child, in particular in combination.

Method

When starting my research I chose to use qualitative observations and interviews as a method. By qualitative in comparison to quantitative I mean that I studied only one teacher and only one school in depth instead of investigating many schools at a more superficial level. I chose this approach because my research was only supposed to entail one school and the only approach viable, was one in depth in comparison to one in width. I used an unstructured interview and both participating and non-participating observations for my research. I also chose to analyze some documents to see whether something was written in there about the frame factors language, economical resources and teaching based in everyday experiences.

Qualitative observations

During my time in the school I was both a participating and non-participating observer. By participating observations I mean that I observed the class and the teacher while I was taking part in the activities in the class (Johansson & Svedner 2006). By non-participating observations I mean that I studied the mathematics lessons at Primary school 1 from the back of the classroom for a longer period of time, leaving me with a perspective on how mathematics was being taught in this particular school (Bryman 1997). Because I had a longer period of time (8 weeks), to perform my observations I could do an ethnographic observation, where I tried to understand the new culture and the teaching from as many points of perspective as possible. The ethnographic method often consists of participating observations and taking notes (Johansson & Svedner 2006). The teacher and the pupils where aware that they were being observed, thus, they partook in an open observation. According to Holme & Solvang (1986) an open observation takes time to perform, because you need the observed persons to trust you. After the observed group has gained trust in the observer though, the observer is expected to behave as an observer, ask questions and walk around freely, undisturbed amongst participators in the field and this behaviour is nothing the observed group will consider strange.

My time in the Gambia was however not long enough for me to try to compare this school to others so I decided to stay in Primary School 1 for the entire duration of my stay. I observed mathematics lessons in all grades, rating from one to five and also in the skill centre where the pupils are between 18 and 23. I also chose to analyze some of the material used in mathematics teaching at the school by using my initial research questions as a point of perspective to analyze from. In addition to this I also observed in a non-participating way and informally interviewed two shop keepers in the market. One was selling fish and the other was selling everyday
commodities. I did this to find out to a little extent what mathematics in everyday life in Village 1 actually could entail.

**Qualitative interview**

An unstructured interview is one that only uses a few loosely put together questions that lead the interview into more of a relaxed conversation than a formal interview. Holme & Solvang (1986) wrote that an informal interview is the type of interview that is the least controlled. I interviewed the teacher of mathematics in the school informally and unstructured and I waited until my last week of field studies to do the interview so that I had time to build as much trust as I could. Why I chose to only interview him, was that he was the only teacher of mathematics working at this particular school and my research questions did not concern anyone but him. The reason why I did the interview unstructured was that I wanted to control as little as possible and let the respondent form his own replies and comments as much as possible (Bryman, 1997).

When I informally interviewed the teacher of mathematics, we sat down in his couch in his compound. I wanted to be in a place where he would feel comfortable and relaxed and thus, answer my questions in a way that is not formal or too prepared. Trost (2005) says that the home of the interviewee is good from a perspective of her or him feeling safe and comfortable. This feeling of safety and comfort also might decrease the powers of position that the two of us have, me as an interviewer with an objection in writing about what takes place in his classroom and him with a long teaching experience and owning all the information that I want to know. The home of the teacher as a choice of place could perhaps make us both neutral participants. Kvale & Brinkmann (2009) writes that the social relation between the interviewer and the interviewee depend on the interviewers ability to create an environment where the interviewee feels free and secure enough to talk about private events which will be registered in a public report. I brought with me some green tea, ‘Attaya’, which we drank during the interview. This tea takes a central part in socializing in the Gambian culture. I recorded the interview with my mobile phone, but I did not take notes, which is a part of the definition of a qualitative interview (Johansson & Svedner 2006). Much information had also been communicated to me through everyday conversation, both through pupils and the teachers at the school. Everyday conversation is in comparison to informal interviews, informal talk where I used no notebook or recorded conversations (Ibid.).

**Documents**

The documents I analyzed, using my research questions, were a textbook for grade four (2006), a syllabi for grade three (2006) and an education policy valid between 2004 and 2015. Also, I used a personal letter, written by Adama Jimba Jobe about education in mathematics in primary schools in the Gambia. I have consequently not done a close reading of the complete documents as Johansson & Svedner (2006) suggests one to do, but I have read the documents closely with only my research aspect at mind. Why I chose only to do this was that these documents are merely a compliment to the qualitative research I have done in the field.
Learning environments

Eskola (2010) wrote about learning environments in her thesis. Her thesis is on the transmission from teacher-centred to student-centred teaching within higher education in Finland. I will only use it to explain the terms; teacher- and child-centred education. I will do this, in the part of the study where I analyze my results.

Ethical perspective

Ethical demands

I am aware of the fact that the employees at the school had expectations of me leaving their names in the text. Especially in the acknowledgement part of my text I felt strongly that I wanted to thank them by name. I could however not do that, because of the safety and privacy of the teachers themselves. According to the demand of confidentiality (my translation) I cannot leave names in the text or any other information that can connect the people partaking in my project to who ever they are. I cannot know what information is sensitive information from the ethical perspective, in another culture or in another time, since this study is on paper for all time as I know it. As I was doing my research I informed the participants of what I was doing or what I intended to do and thus I filled the demand of information. Regarding to my interview with the mathematics teacher, he agreed to be interviewed by me and he was informed that the information I found was to be used only for this study and nothing else and that he could withdraw his participation at any time, which includes the demand of usage and the demand of consent (Vetenskapsrådet). He will also receive a copy of the study to ensure that I comply with these demands.

Reliability

An observation can obviously be coloured by the observers own conception of the world. I think by now we have realized that all world conceptions are far from the same. I have tried to keep an objective approach, where I keep an open mind and do not let my own ideas affect my perspective, but to keep an open mind is never fully possible, since I cannot erase my past whether I want to or not. As this is a research performed in a country that does not share my own background and culture, the most difficult part for me is probably not to think the ways I have been taught to be correct, is the correct way everywhere.

There were some exceptions to the mathematics lessons performed in the teacher-centred manner. I had long conversations on how mathematics where taught in Sweden and how it is looked upon from my point of view, with Teacher 1. After some conversation about this he altered some of his lessons, which I do not know if he would have done if I had not spoken to him about everyday mathematics, making me perhaps too much of a participating observer,

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5 Konfidentialitetskravet
6 Informationskravet
7 Nyttjandekravet
8 Samtyckeskravet
guiding the observed in a direction that he might not have taken without my influence. Holme & Solvang (1986) points out that there is a fine line between being an observer and being an actor. I am in the field but I am not to take part of it. Fortunately I had already observed the teacher, teaching what I can only assume to be in his typical manner. I can however not assume that he would not have undertaken these lessons should I not have been there. Therefore I also include these later lessons in my study. I will also use these examples of when the pupils practiced more hands-on mathematics as a comparison for how much more motivated the pupils seemed in those classes and what could be done for the pupils with simple changes.

A factor that could lead to misunderstandings in communication between me and the people in my research is the language. Since English is not my, nor Teacher 1’s, nor the pupils’ at the schools first language, misinterpretations could have been made. If I for instance said “Wow!” the Gambian person I was talking to instantly thought I meant yes, because wow means yes in Wolof. Also in reading the body language of another person, if that person is not from the same culture as you, could be misunderstood. Even the small sounds made in informal conversations, for instance, when I said “mhm” as if to agree the Gambians always repeated themselves, because this is their way of saying that they did not hear what was said. This is only to say that misinterpretation could have been made in the text, due to insufficient English language skills.

Result of the study

Environment and surroundings

Walking on the sandy main road of the village, for about 15 minutes, you will find a new bright yellow building taller than all the others. This building is the new part of the school, where the primary pupils reside. Walking a bit further one would see the containers from Europe, emptied but put there in lack of anywhere else to be put. Beyond the new part of the school is the old part of the school, where the younger pupils and the skill centre pupils are being educated. The school has around ten employees and around five volunteers working. In both parts of the school there is a janitor living around the clock to make sure no one tries to enter the school after hours by force. It is a private school, as previously stated, and the pupils have to pay a fee for every year they attend the school. Many however, are sponsored, due to the sponsorship program at the school. To sponsor a child, one will pay 2000 GMD (Gambian Dalasi) per year. 2000 GMD is approximately a month’s wages for an upper secondary school teacher. Due to these sponsorships and other donations, the development group of the school managed to build the new part of the school. The new part has two floors, taller than any other building nearby, every floor has three classrooms. The walls of these are painted white, sometimes there are pictures or rhymes on the wall painted on white paper, but the sunlight has made most of these fade. In every classroom there are a few windows, with no glass, only iron bars to cover them. There is a blackboard or two in front, some classrooms have a refrigerator door in front with magnets on, a contribution from the containers arriving from Scandinavia with the intention of it being used in teaching. There is mostly a desk and a chair in the front of the classrooms for the teacher. There are tables and chairs of many different types placed out in the classroom. The impression I got was that the class used whatever chairs and tables they could find for the
pupils. Some chairs did not have a wooden piece for the back to rest on, making it barely a stool, in which the child sits for about six hours, five days per week. Much of the pupils’ pens and notebooks had printed logos of different companies in Scandinavia and other parts of the western world. The contribution from western countries was visible everywhere, empty containers, clothes on people branded by Scandinavian advertisers and even the newspaper the local salesman used to wrap breakfast bread in, came from Denmark or Sweden and had previously been used as wrapping for things in the containers.

**Mathematics in the school**

In Primary School 1 rotational teaching is very common, which means that every teacher has their own subject and with that they go around the different classes teaching what they know best. The mathematics teacher (later referred to as Teacher 1) teaches mathematics and has done so for over 20 years in different parts of the country. He has a teacher’s guide for most of the grades connected to the textbook which he uses to plan his classes. If there is no teacher’s guide available, which was the case for some grades, he uses the textbook as a guide in what to teach the pupils. The teacher’s guide consists of objectives for the year’s course, background notes and teaching methods (Department of state for Education 2006). The textbooks and teachers’ guides is not to be for sale, but is neither provided to a sufficient extent. Most pupils have an exercise book to copy what is being written on the blackboard in and a pencil, but some do not have pencils and in these cases the pupils have to wait for their peers to finish writing before they can borrow their pencils. There are no pencil sharpeners anywhere; the pupils use bare razor blades to sharpen their pencils with. In the skill centre, mathematics is not taught per say, but mathematics is used in the making of crafts and the like by for instance estimation, patterns and measurements. The pupils also use calculations when taking the commodities to the market to sell them. The existence of mathematics in the work of the skill centre pupils is never pointed out, at least not in my presence, so I did not notice if the pupils reflected on it.

A typical class in Teacher 1’s classroom plays out in the following way:

- Teacher 1 enters the classroom.
- If it is the first class in the morning the pupils stand up and greet the teacher and each other by saying “Good morning teacher, good morning friends”.
- Teacher 1 copies tasks for the pupils on the blackboard.
- Teacher 1 leaves the classroom.
- The pupils work on mathematical tasks if they have a book and a pencil. If they do not have a pencil they have to wait for one of their peers to finish and then borrow their pencil.
- When finished the pupils put their books on to the teacher’s desk and then they are to sit quiet and wait.
- Teacher 1 comes back to the classroom.
- Teacher 1 marks the books. If a pupil has made a mistake she or he is to go back to their desk and correct their mistake.
- Teacher 1 leaves the classroom.
The next teacher comes in to the classroom to teach a new subject. In my eight week long stay this approach seems to be the normal approach to the mathematics lessons. It did not only seem visible in the mathematics classes, but this was what I interpreted as the pattern followed by most teachers in the school. If the pupils are young and thus not able to write, they all chant to enforce what is being taught.

**Monthly tests**

At the end of every month the teachers of every subject, including mathematics, hands out a monthly test which includes what the classes have been taught that particular month. This testing goes on for an entire week. The pupils are then graded with a percentage number, i.e. if one has 40 correct answers out of 80, the score is 50%. The pupils are then compared to their peers, the teacher takes out the tests and reads the result and the name of the tested pupil starting with the lowest score and then going up. This is an initiative taken by the school itself, not by any official institutions, to monitor what the pupils are learning.

**Interview**

My interview with Teacher 1 started with me asking him to describe what happens in a normal mathematics class in a normal day. Trost (2005) says that one can start the interview with a question which need a descriptive answer and from there on ask more specified questions in the subject. Kvale & Brinkmann (2009) also points out that a first question that requires a descriptive answer can give a spontaneous and rich description, where the interviewee talks about what he experiences as the most important aspects of the phenomenon in question. In this interview he sometimes refers to the pupils as ‘they’ or ‘them’.

Teacher 1:

> “An ordinary maths class in an ordinary day is just going into the class, introducing the topic, discussing with the kids. Because we are advocating for the teacher-centred approach, that the children must be involved in what you are doing before you actually start the lesson. This involves talking to the children and then trying to introduce them to whatever you are coming to do and then you get the children involved and they do the practical work themselves. So in the ordinary, an ordinary day, maths lessons could be taught in any form, giving the children materials and then use it. You try, as the teacher, to guide them in order to achieve the goals.”

When I ask him for what reason the classes are shaped this way, with blackboards and the pupils sitting one by one, he answers:

> “Because it is more convenient and our state department and the regional office are advocating for sitting in groups for them and we believe that if children are sitting in groups, some of them would have to strain themselves physically to see what is written on the board. Sitting sideways to see what is on the blackboard. And some would even give their back entirely to the board, so we prefer to sit them in twos and then they face the board.”

On his education, he says that they teach all subjects and then when you graduate you teach in the area that you most want to specialize in. The normal policy, according to how I interpret him, is to teach all subjects to one class. He says the teachers’ education when he took it,
between 1983 and 1985 included a little bit of psychology and sociology so that the teachers could get to know a little bit about the people they should be dealing with. He also adds:

“I would like to just say, when you teach mathematics, it’s not always easy, because of lack of resources and the concept of mathematics, even with the Gambian school children is bad, they see mathematics as very difficult, some even see it even see it as if this is just coming to kill me. So I think, we are now working, that’s why it is now, the policy is now saying that we change from the teacher-centred approach to the child-centred, where the child does it practically and see what he or she is doing. Now, when the child comes up with a result, then the child enjoys it more. Then they can see that he has done it, not the teacher standing at the blackboard explaining and giving some task and then they do all the work. The child himself is doing the actual work, like multiplication, you ask the child to participate, sometimes they even come up with their own ideas, when you give them one idea, and they can come up with another idea. Or if they would like to test something, whether it would work the same, because, the moment you get them involved in what you are doing, they see themselves as the teacher, not seeing the teacher as the god over there and whatever he says is right but the children get themselves involved and they always participate more for they go home, they enquire, they find out and they come and then they give ideas, they give suggestions and things like that, so I think, the child-centred approach is far more better than, the teacher-centred approach.”

He says that a lot of teachers teach mathematics without having the proper knowledge today, in the Gambia. Teachers take mathematics because it is compulsory and then try to avoid teaching it out in the field because they do not feel confident enough in the area. That is why he likes the rotational teaching system that they use at Primary School 1. I told him the expression I had heard about Gambians not liking maths:

“Yeah, yeah, that’s a big problem. In fact, when I discuss with the principal education officer today, that I was still open to some of these principles that they have problems in mathematics, they can always contact me, so that I’ll see what I can do in order to go and help them. But, he thought he had never heard something like this before. A teacher volunteering to do that, he said that’s too, that’s profession –inaudible-. I told him these are our children, so somebody must have to do it. Yeah, and let us not always, money is nice, everybody likes money, but if we tend to put money too much ahead of everything we end up not working. But sometimes you have to forget about the money, and do it for the betterment and the development of the children and also your nation. But now our president is talking of operation promote the scientists, operation promote education in science. And I believe maths is part of science. So, if science is being developed and being promoted, then what about those of us who are already involved, because we have to do our own quarter, so we encourage the children so that they too will be interested in these things. When you are, if you have a good grafts of mathematics I think subjects like chemistry, would not be difficult. Even biology, because you need some calculations and logics, so a lot of thinking so, I think mathematics is very interesting.”

I also ask him about the option to teach in other languages than English, if there is any other way, he answers:

“You have to be flexible and you use this, you want to ask a question, you phrase it this way and the children don’t understand, you have to rephrase it. But how many teachers can
rephrase and how many times can you rephrase it? So that’s also one area that is very, very difficult. Especially more so, when you come to mathematics, because it’s not easy because personally I believe every subject has its own language. Though it is all English but you have it’s own language, its own terminology and all what not, so you have to get used to those things in order to be able to rephrase…. here you have about, you have the Mandinka, the Wolof, the Serer, the Fula. I think about five tribes. But I think even the state department for education is working towards that. Not to use it 100% but then to be using some of the instructions, to be saying them in the local language. But there is also a very big argument about that and I think that is why they have not even started a pirate scheme, putting in to schools a pirate scheme to see whether it would work or not because not everybody is keen on that, because we believe that the child learns his or her native language at home and he or she speaks it a lot at home so why bring it even in the schools? So that’s the argument. That let us try to, just try to making sure that we continue using English because that’s the one they don’t speak at home….. Except for a very few homes, where you go to and find the father and the mother who are literate. It’s only in some of those homes and they even speak it continuously, like when they chat, from time to time they have to put some little English inside and so on, but not to be speaking it entirely.”

He also tells me that the major language in Village 1 is Wolof, a good number of people speak that, but not all of them. The people, who do not speak Wolof, speak Mandinka.

**Documents**

I tried to find official documents to refer to in my text while I was in the country, but as I went around to different agencies and departments, any thinkable ones, concerning education, the different institutions would not meet these requirements. From the Department of State for Basic and Secondary Education I however received a letter personally written for me about mathematical education in the Gambia by Adama Jimba Jobe. Luckily the school had a syllabus for grade three and I also managed to copy one of the teachers’ handbooks connected to the grade four pupils’ book. On the internet I also found an Education Policy for the Gambia between 2004 and 2015 (http://www.edugambia.gm).

**Education Policy**

In the Education Policy, different objectives and priorities are written to improve education and to try and make education a path out of poverty. One of the areas to spend economical resources in is the quality of the education. The Gambian government wants, amongst other things, to provide qualified teachers through cost effective pre-service teacher education and in-service training programs (2004). Regarding to languages, the policy reads:

*During the first three years of basic education (grades 1-3), the medium of instruction will be in the predominant Gambian language of the area in which the child lives. English will be taught as a subject from grade one and will be used as a medium of instruction from grade 4. Gambian languages will be taught as subjects from grade 4.* (p.35)

Also on different forms of teaching, it is written that:

*While the textbook will continue to be a basic teaching/learning tool, it is now becoming obvious that there will be an urgent need to acquire, develop and make available other*
teaching/learning tools and technologies which are more likely to shift methodology from chalk and talk/lecture, rote memorization to active engaged and collaborative learning. (p.36)

**Syllabi**

The Syllabi for grade three (2006) is divided into four blocks; Units, contents, objectives and activities. These are divided under themes. There is also a box for notes. To clarify the disposition of the syllabi, one page is attached (attachment 2). The activities connected to mathematics and real life is e.g. “Develop simple multiplication word problems relating to shopping, farm and school” and “Develop simple division word problems relating to shopping, farm and school.”

Under Unit 7, Money and shopping, in the theme Number, Numeration and Operation, the objectives are:

1. Recognise all Gambian coins and notes up to ten Dalasi.

2. Perform simple shopping activities involving Gambian currency.

3. Solve word problems involving buying and selling.

The activities to achieve the objectives above are then:

- Model and real Gambian currency coins and notes can be brought to the class for pupils to familiarise themselves and recognize them.

- Combining Gambian coins and notes up to five dalasi to form various amounts up to ten dalasi.

- Buying and giving change, using all Gambian coins together with five and ten dalasi notes in simple shopping activities.

Notes on Money and shopping in the Syllabi are that prices should be realistic and the shopping activities should relate to word problems.

Under the unit of solid shapes in the theme geometry, the pupils are to find shapes in their surroundings and grouping the geometric shapes according to their observations. In the units of length, capacity and time under the theme of measurement, the pupils are to learn from real life elements, i.e. compare, measure and associate with events of the day. There is a theme called Everyday Statistics, where the pupils should collect information from their peers and use real data to make tables.
Teacher’s guide

In the Teachers’ guide for the Gambia Basic Education Course, for grade four (2006), in the introduction it says that the exercises in the textbook will provide sections that use the school/classroom environment and its resources. I also read there that children learn best by doing, thinking and talking and that the teacher should guide, encourage and praise their pupils. Further in the textbook though I cannot find much on practical exercises which include doing and talking. The only thing I saw, suggesting practical activities, is that teacher is to use bundles of sticks in one exercise to explain addition and subtraction. There are also supposed to be abacuses for the pupils to use. It says however, that a valid way of teaching multiplication tables is to use drill and chanting. In the chapter of money and shopping, the book tells the teacher that no specific equipment is needed for the unit. In Unit 9, about angles, the pupils are to be given as many opportunities as possible to investigate the sizes of angles. In Unit 10 about compass and direction, the approach is that the teaching is to be practical and activity based. A world map or an atlas and a compass are to be used. In the units about weight and area, the teacher should use practical material to teach such as sticks, rulers, string, thread, grids, sand, scales etc. Some examples in the textbooks are to be adjusted for real life:

- Lamin has 345 bananas and Fatou has 269 bananas, how many bananas do they have all together?
- Dawda has 112 Butut and Bakary has 43 Butut, how much money do they have all together?

Personal communication

“The current situation of Mathematics Education in the Gambia is, to say the least, very unsatisfactory, and most unlikely to be able to support any scientific or technological advancement of this country” (Jobe, 2009)

Adama Jimba Jobe (2009) writes in the personal communication with me (attachment 1) that the resources in the country are so poor that teaching and learning materials are inadequate. The inadequate material is a problem, he says, both when teaching the teachers and in the schools. This material problem, he means, is leading to poor performance. He would also prefer it if the teachers were teaching with the more modern method, which is child-centred, as opposed to the teacher-centred method which he says is most common in the Gambia today. In primary schools, he says, the classrooms are overcrowded and teachers there are de-motivated in terms of salary and fringe benefits. The children is according to him, deprived of the pleasure of learning by doing and relating what one is learning to one’s own environment. Jobe (2006) means that this unfortunate situation not only deprive children of the joy in learning mathematics but equally limit the number of potential mathematicians that would have been produced supposing mathematics was taught using a more interactive approach.

Analysis of the result

The following are the research questions I wanted to use in this research. I will now analyze my results using the research questions and connect these to the theories previously mentioned.
Environment and surroundings

D’Ambrosio (2010) and Zaslavsky (1973) write about ethnomathematics. As I described earlier, ethnomathematics is the mathematics connected to the everyday life of any people. An example of ethnomathematics is what I find when I was observing the shop keepers in the market. Mathematics was used for, for example, to calculate how much change to give back to the customers and measuring how much goods to give for that much money. The importance of being able to calculate correctly is high, because the profit is always low. A bag of rice, for instance, is 925 dalasi, and a cup of rice costs 5 dalasi for the purchaser. In a bag there are 200 cups and the cost of freighting the rice is 15, leaving a profit of 60 dalasi. 60 dalasi will feed a family for one day. Since the profit is so small, a miscalculation is without a doubt noticeable, thus making mathematics something important in the everyday life of the Village 1 people.

Mathematics in the school

Teacher-centred approach

The teacher-centred approach to teaching that normally takes place in the classroom of Teacher 1 is what Adama Jimba Jobe (Department of State for Basic and Secondary Education) refers to as the teacher-centred approach. Pupil-centred education entails both group work and individual work whilst in the teacher-centred class the pupils has to adapt what the teacher teaches and work individually, but collectively. Koskenniemi & Hälinen (referred to in Eskola, 2010) write that when deciding if the teaching is child- or teacher-centred; one looks at who is responsible for the contents of the class. Snowman & Biehler (referred to in Eskola, 2010) says that behaviourism includes when the teacher presents knowledge to the pupils who have to adapt the knowledge to be theirs. Thus, I interpret the teacher-centred approach to be influenced by behaviourism. The teaching in Primary School 1 is based on exercises and feedback. This usage of only blackboard and chalk is according to Jobe (2009), to a very large extent a resource issue but it is also because the teachers are lacking skills and techniques. In a way this makes the teacher-centred approach a factor on a micro level, because the teacher reads the teachers’ guide and plans his lesson accordingly but a factor on a macro level when looking at it from a resource point of view. The fact that there are not enough resources for the pupils to have their own textbooks leaves the class with the major time eating obstacle to have to copy everything written on the blackboard all the time. So much time could be saved and more opportunities for learning would appear if the economical problem should be solved. Even a simple matter such as pencils is affected by this. If all pupils had pencils with them to class or had free access to pencils at school every day a lot of more school work could be done. The shortage of material makes the lack of resources a problem on a micro level, since the teaching is suffering due to the lack of e.g. books and pencils. This time consuming material problem could perhaps be an obstacle that stops the teacher from teaching the pupils what has been written in the syllabus.
Language

The pupils have to understand two or three languages to understand what is being taught in the school, language is also a major obstacle. Language is a frame factor on a micro level, because it is the communication between the teacher and the pupils that is suffering. I believe the language problem can be traced to the resource factor to some extent, because resources can be put in teachers’ education, where specializing in the language problem is possible. Kilborn (1991) says that if children get to use their mother tongue they can within this language build their own cultural background and thus a base for their identity and way of thinking. As I was describing earlier, the number system is different in different tribal languages, according to base. Some languages have base 10 whilst others have base 5. Wolof, the language mostly used in Village 1 uses base 5 whereas the English number system is in base 10 (see fig.1, p.6).

Mathematics in the everyday lives of the pupils

In the Skill centre department of the school where the older pupils prepared for a working Gambian life, there was a lot of what Gerdes (1995) refers to as ‘hidden mathematics’. The pupils were sewing, learning to cook, making batik and tie-and-dye to cloth and making soap. These exercises all include measuring, estimation, logic and patterns, to mention a few mathematical elements. The pupils also needed to calculate how much profit they would make of selling the merchandise when going to the market. Real life mathematics was everywhere, but went by unnoticed.

Monthly tests

The tests executed every month, seemed to create a tense mood in the classroom. The mood seemed to be there when the tests was taken but more so, when the results where announced by the teacher. These tests however is how the teachers see what kind of pre-knowledge the pupils bring to the class, but only in a collective way. In the follow up, the approach to mistakes that has been made in the tests remains the same; the calculation is taught in the same manner as previously, leaving repetition as the approach to learning. The use of repetition as reinforcement could be interpreted as inspired by the theoretical perspective of behaviourism. I am referring to Skinner (1968) and his theories on operant conditioning processes, described earlier. Skinner writes further that, to form responses of pupils - to get them to correctly pronounce and write the responses – the most important thing is to control the stimuli of the behaviour. This control of stimuli is what he means happen when the pupils are taught to rattle off or repeat tables or objects. The reinforcement is supposed to be created by the teacher, in this case through marking the pupils’ books or reading out the results of the tests in front of everyone. The latter could also be considered as aversive conditioning, when something uncomfortable happens to the pupil to have an experience that might prevent her from making the same mistake again (Skinner 1968).

D’Ambrosio (2001), on the other hand, finds standardized tests as an evaluation of groups of individuals absurd. He means that testing the pupils as a group effectively amounts to an attempt to pasteurize new generations. My interpretation is that he thinks standardized tests is sterilizing the pupils, leaving them without nuance. Children should, according to him, not even be placed in grades or follow a curriculum, according to age.
**Interview**

The *resource factor* emerged in the interview is the lack of teachers’ education, or further education for teachers already working. He states that the school uses the teacher-centred approach but he wants to use the child-centred approach. He uses the blackboard and the pupils are seated in rows because he does not want them to strain their necks when looking at the blackboard, which would be the case if they were seated in groups. I interpret his opinion about group work as a lack of teacher education. He has not been taught how to teach in a child-centred manner and should the pupils be seated in group constellations the only thing that comes to his mind is that the pupils would strain themselves when looking at the blackboard. The purpose of peer work is nothing he shows awareness of. The fact that the school has a rotational teaching schedule where the teachers go around the classes teaching only one subject is a way of solving the fact that some teachers are not educated enough in some areas without using resources. However, the reason for the problem emerging is resources.

When it comes to teaching based in everyday experience, he speaks about how he wants the children to be involved, test things for themselves. He means that if he gets them curious the pupils go home and enquire their parents or another adult and come back to school with their own ideas. He is of the opinion that the child-centred approach where the teaching is linked to the child’s experience and conception of the world is a better approach to teaching than the teacher-centred approach. He is also connecting mathematics to other subjects, such as biology and chemistry are subjects easier taken on, should one have a good grasp of mathematics, because you need calculations and logics. The fact that he grasps mathematics as a subject that could be integrated with other subjects shows that he understands that mathematics is something more than abstract algorithms and can be used in many different ways.

*Language* is also an issue addressed by Teacher 1. He explains how the English language gives him difficulties in always needing to rephrase everything differently so that all pupils will understand him. Especially in mathematics with its own terminology, language is a huge issue. Because of conflict, he says, the language remains English in schools and none of the areal tribal languages are yet being used in spite of the policy changes from 2001 suggested in Adeniyi & Umeano (2001) and Njie (2001).

**Documents**

I wanted to look at these documents from a frame factor perspective, because the documents are supposed to play an important role, thus becoming a frame on a macro level in the education of the pupils (Löwing 2004). Lundgren (1999) writes on the formation of a curriculum that in modern society today we cannot just reproduce basic values and legacies but we also have to create openings for citizens to find work and to be a part of society, we must shape school systems so that it gives equality among the pupils. Of course, Lundgren wrote this on formation about the Swedish school system mostly but I do not see why it should not be applicable to the Gambian.

Jobe (2009) says that it is the unfortunate lack of *resources* that is the source of the problems regarding to real life based education. He means that it is lack of resources that is depriving the children of learning by doing and relating to their own environment. Therefore I can here link the resource factor as a macro factor in forming the education in a real life based way.
In not only the Education Policy (2004) but also in the previous research by Adeniyi & Umeano (2001) and Njie (2001) there are points about teaching in a language familiar to the pupils. There are objectives on adapting the education to the, especially the younger, children. By now, since this research was conducted some time ago the school boards should be adapting the new tribal languages in the schools.

When the curriculum is formed in a country that is one of the 15 poorest countries in the world, I believe that the government must be forced to take resources into consideration. If I analyze the documents using the frame factor of teaching in real life experience, the syllabus (2006) tells me that there are only a few activities involving real life experience and even fewer objectives. In the unit money and shopping, there seem to have been a misinterpretation on a macro level, the syllabus says that coins and notes are to be used when teaching about money and shopping and examples applicable to real life should be in the textbooks. In the teachers’ guide (2006), however, it is written that no material is needed for the unit. The examples are not applicable to real life, since the wrong type of the currency is used and unimaginable amounts of everyday commodities are owned by the ‘real people’ in the assignments. A family is lucky to have one cluster of bananas and in the Gambia the Butut is not used in the way described in the text, because of inflation. The only coins that even exist, are the ones of 50 Butut, other than that the notes and coins of Dalasi are the only ones in use. In the syllabus for grade three there are some real life based objectives such as under Unit 7. It is written that the pupils should work with money and shopping and with real Gambian coins and notes. The teacher is to bring some to school for the pupils to see and to hold. What if the teacher does not have any money? What if he has such small amounts of money, that if he brings them to school, he cannot afford it if the pupils will not give the money back to him? Fake money could be made, but then an access to a copy machine is needed, which is another resource issue. Jobe (2009) wants to leave the previously described teacher-centred education for active engaged and collaborative learning. He believes however, that the resource factor stands in the way of teaching in a child-centred manner.

Discussion

Frame factors

Language

The fact that the English language is still used in the country since the English colonization, in my perspective, I can only be thankful. If it was not for colonization, I could not have fulfilled my research in the Gambia. For the pupils, however, it makes subjects in school, including mathematics, so much more difficult to understand. An abstract subject such as mathematics is difficult even if it is being taught in your mother tongue. I can only imagine how abstract it would have been for me to be taught mathematics in English during my Swedish schooling. The language problem is a very common problem in Swedish schools as we know it so research on teaching pupils with another mother language, than the one taught in, has already been made,
not only in Sweden but all around the world. Teachers’ education in the Gambia could easily take part of this research about language and education, should the economic resources be sufficient. However, there is no tribal language spoken by all Gambian people according to Teacher 1. He says in his interview that there is one certain way of telling if a person posing as a Gambian is telling the truth. One should speak to the person in either Wolof or Mandinka and if the person does not understand either, she or he is not Gambian. What I interpret from this statement about languages in the Gambia, is that there is no tribal language spoken by all citizens of the Gambia. That there is no language spoken by all seems to be the public opinion also. No language is understood by all, so English will have to do. Would it not be better should the language spoken by teachers in the schools be one that at least a majority of the pupils understand just like some of the official documents say?

In an example mentioned by Löwing och Kilborn (2008) a group of pupils in Mozambique was given mathematical exercises both in their home language and in Portuguese. Almost all of the children did it better in their own language than in Portuguese even though the pupils never calculated in school in their own language before. These children did the same exercises twice, first in their own language and then in Portuguese, but they did worse the second time because of the foreign language even though they had done the test once before. This research could perhaps transfer into Primary School 1? Maybe if the pupils were taught in their home language would their results improve? To teach in a familiar language has also been a pressing issue since 9 years back according to Adenyai & Umeano (2001) and Njie (2001), so why teaching in another language than English has not been at least tried is a question raised in my study. This language issue could perhaps be traced to the lack of teachers’ education in the tribal languages. As Löwing and Kilborn (2008) write about the situation in Mozambique where neither the teachers nor the pupils are allowed to speak other languages than Portuguese, the situation in Primary School 1 is similar. The tribal languages are not forbidden, officially the pupils must speak English, but the teachers do realize that only speaking English is impossible and thus the pupils are not punished for speaking their own language. The benefit of speaking English is that it gives the opportunity for a wider communication and with that a connection to the western world. Wolof is the unofficial, official language spoken on television and amongst most people in Village 1, so Wolof could be a language to use, but somehow the teachers of Primary School 1 seem to treasure the fact that the pupils have to speak English in school. One explanation found in the interview with Teacher 1 is that the pupils do not speak English at home, so the pupils must speak it in school instead. This opinion about language lets me believe that he is not aware of the importance connecting language and learning which I previously described in this text.

**Teaching based in real life experience**

Ethnomathematics connect the mathematics education to the real world image of the pupils. The pupils are already finding mathematics difficult and unlikeable because they do not understand it, why make it more difficult by only teaching abstract algorithms? There is plenty of mathematics to find in the everyday life of a small child living in Village 1. The pupils have to calculate, how long to walk to school, will they have time to cross the road before the truck comes? How much money can I spend on fruit and bread if I need to buy a pencil when I get to school? How many times do I have to switch my feet when playing a dance game in the school yard if I am to win against my peers? How long before I get home and have to go help mother sell in the market? How much money do I and my mother have to make tonight to survive
tomorrow? Logic and mathematics is everywhere in all parts of the world, algorithms are only a mere part to help calculate these mysteries and why else would we use them?

As I was describing earlier, Teacher 1 and I had long conversations about teaching based in real life. He decided to try the real life experience-approach with the pupils; he took all the first graders out to count trees whilst the class were practicing what is more than and what is less than. He then used it when practicing sets, with the second graders and the pupils got to go out to get two rocks or three sticks at a time, several times. This lesson was an attempt to introduce the multiplication table to the pupils. Unfortunately I could not see how the attempt to connect real life to the teaching of mathematics developed in a longer perspective since I left the school not long after this method had been tried, but as the lessons went on, the pupils were involved and paid attention. This engagement of the pupils he hopefully took as a sign that he needs to do connect mathematics to the lives of the pupils more often. I also hope he will study up on ethnomathematics since I left my Zaslavsky (1973) and D’Ambrosio (2001) with him.

Economical resources

Of course, economical resources are a problem in Africa, especially in the sub-Saharan region. There are however changes that can be made without having to spend more money. Even though these changes might not be making very substantial changes to the teaching, a small difference can be made. Teacher 1 said in his interview, “... these are our children, so somebody must have to do it. Yeah, and let us not always, money is nice, everybody likes money, but if we tend to put money too much ahead of everything we end up not working.”. Things can be done without spending money. By only comparing to Sweden, where we actually have economical resources, a lot in comparison to the Gambia, we know that the problem is larger than only economical resources. We have problems in Sweden too, but we have money. What is our excuse? The school has already started trying to accomplish something without economical resources in Primary School 1. By teaching in rotation, because the teachers of the school realized that all teachers were not specialized in all subjects, the school managed to make the teaching more efficient without spending more money. Should the teachers all speak a language that at least almost all pupils understand; it would be another not very costly attempt to solve the dislike of a now non-understandable subject. During assembly, I noticed that the languages spoken by the teachers are Wolof and English, except for the prayers which are in Arabic, which should mean that all pupils do understand at least Wolof even though a lot of people say they do not. In these cases economical resources is not a direct micro factor affecting the teaching, but should one look at it from a macro point of view, the education to teach in a tribal language is needed and to find education, one needs money.

Conclusion

How is mathematics taught in a primary school in the Gambia?

In Primary School 1 in the Gambia today, mathematics is taught in a manner that agree with the behaviouristic theory described by Skinner (1968). Aversive control and reinforcement processes are clearly visible in the classrooms. The rattling and chanting of rhymes and tables sometimes seen in the classrooms is something also promoted by Skinner. The aversive control in reading results aloud to the students to make them uncomfortable also comes from
behaviourism. This is also referred to by Jobe (2009) as the teacher-centred manner in teaching. Teacher-centred teaching is when the pupils have to adapt to what the teacher does individually and collectively.

How do the frame factors resources, language and teaching based on everyday experience form what is being taught in the primary school?

Without money one can only go so far. In the end, almost everything costs money. To change the language, one needs new education and to find solutions that do not cost one might need education and to base the teaching in real life, one needs education, which has a prize. Education comes from education but in the end there is a resource factor stopping you whatever you do. The three factors are connected to each other; however they all button down to the resource factor, both on a micro and a macro level. Should there be more resources put into the right places in education in the Gambia the teachers should probably have better education and know better how to handle problems with languages and mathematics and know how to prepare pupils for the lives they are likely to lead. The economical resource problem leaves the teachers and the writers of the curriculum no choice. The circle begins in not spending economical resources in teachers’ education and from there few exits can be found. One needs to be resourceful, but how could you be resourceful without having been taught what resources to use? If the teachers at Primary School 1 would be teaching ethnomathematics, the material would be right there, in their everyday lives, but to know how to find the needed material the teacher needs education. Teachers’ education needs economical resources, so we are back with the resource factor again. Lundgren (1999) writes that modernity is about making choices, to be able to make choices for yourselves and not only have choices made for you. There is no modernity in not being able to make a choice for oneself, due to lack of resources. To answer my question on what the reason can be that Gambians don’t seem to like maths: I cannot say that should the mathematics teaching be in a language that the pupils understand or based in the real life of the pupils or be funded better from the government, should it be a better liked subject because I do not know every child in the Gambia. But since Jobe (2009) means that the situation of mathematics education in the Gambia is very unsatisfactory, and most unlikely to be able to support any scientific or technological advancement of the Gambia, I can only say that an ethnomathematics approach would be worth trying.

Adaptability

This new knowledge of mine about surrounding factors affecting the teaching: Can I take it with me into Swedish schools? Certainly I can. Economical resources, language and teaching based in real life are all factors applicable in Swedish schools. This is not only Gambian problems or problems of developing countries. We do have money in Sweden, especially in comparison to a country in Africa, but how do we spend it? Teachers in Swedish schools today face multicultural classrooms, with many different languages and even numeral systems for the mathematics lessons. In the Gambia, the situation is almost the same, many cultures exists along side each other and has to integrate with one another and still the pupils need to be reaching the objectives, yet the cultures should still be preserved. It is a dilemma of course.
Need for more research

What I would like to know, which I also stated earlier is why teaching in tribal languages are not even tried? The research in Adeniyi & Umeano (2001), Njie (2001) and the Education Policy (2004) was conducted a long time ago, still nothing has happened. Why will the teachers of Primary School 1 not try to teach in another language but English in Primary School 1? Do the teachers normally teach in tribal languages, only change when I am there observing? Perhaps things are similar in other schools in the country also? In all documents I have found, there is written that these issues are to be solved. With funding, the language and the issue of teaching to be based in real life is supposed to be invested in. How long does it have to take to make something happen? Are official documents such as curriculums, syllabuses and policies for education not provided to the schools to a sufficient extent? Is it an issue on a macro level that documents such as these are not delivered to the schools at all or is the lack of sufficient funding completely the deciding factor?
References

Literature


Web references


Other references


1 (2). Personal letter

How is Mathematics taught in the Gambia?

Generally, mathematics and science are viewed by many as difficult subjects even in developed countries. This wrong and unfortunate notion has affected the way mathematics is perceived by both students and parents. This is further reinforced by the methods or techniques used in the delivery of the subject at the school level (Primary school). In the developing world which the Gambia is no exception, teachers teach using mainly blackboard and chalk.

However, this is attributed to a very large extend to the inadequacy in resources (teaching and learning materials) in schools and the form of training teachers received while in college. Such unfortunate circumstances resulted to teachers finding it difficult to achieve their objectives, poor performance, and visa-vis negative attitude of students to the subject.

Mostly, teachers used the traditional method. That is, the teacher centred approach at the expense of the modern approach which is more preferable (child-centred approach) in which the student is always involved in the teaching and learning process due to the inadequate supply of resources and lack of skills/techniques on the side of the teachers.

The current situation of Mathematics Education in the Gambia is, to say the least, very unsatisfactory, and most unlikely to be able to support any scientific or technological advancement of the country.

At the primary level Mathematics is taught/learned in overcrowded classrooms by teachers who have been deemed to be poorly trained and highly de-motivated in terms of salary, fringe benefits and other career-related issues. Mathematics is taught/learned as a core subject in grades 1-6.

Like other core subjects at this level the ability of the teachers to adopt the appropriate/modern teaching/learning methods/strategies professed by the curriculum development and planners (and dubbed as child-centred, integrated etc) has been found to be most wanting, and not surprisingly the performance of students in mathematics as measured by a national assessment tests has been very poor.

Having understood that Mathematics is a real life subject, tells me that children are deprived of the pleasure of learning by doing and also relating what one is learning to one’s own environment. This unfortunate situation not only deprived children of
the joy in learning mathematics but equally limit the number of potential mathematicians that would have been produced supposing mathematics was taught using a more interact approach.

However, I would like to highlight that there are significant gains registered by the Ministry of Basic and Secondary Education (MoBSE) in the areas of teaching and learning materials provision in schools, teacher incentive/motivation, teacher welfare as well as the teacher training programme at the college (Gambia College) during the last few years.

For the question on School, I would not be in a position to throw light on what prevails there until I have the opportunity to visit them. However, I would want to observe that virtually the trend is the same in all schools with a few exceptions. Example in well established private schools.

I am equally convinced that using qualitative interviews and observations would be a good approach and methodologies that will enable you have an insight into the matter. This approach will avail you the opportunity to interact with both students and teachers and at the same time probe into their daily activities and experiences and relate them to the teaching and learning of mathematics in school. However, you may be required to seek clearance from the office of the Permanent Secretary and Regional Director in order to be able to do work in schools.
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<td></td>
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<td>1. Perform division of 2 digit numbers by one digit numbers without remainder.</td>
<td>• Using place-value trays or equivalents of Dienes apparatus (counters, abacus, bundles of sticks also or number lines) to divide numbers represented exactly without involving remainder.</td>
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<td>2. Divide whole numbers up to 1000 by one digit whole numbers with or without remainder</td>
<td>• Using place-value trays or equivalents of Dienes apparatus (counters, abacus, bundles of sticks also or number lines) to show division with remainders e.g. 33 ÷ 2</td>
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<td>3. Solve word problems involving division</td>
<td>• Develop simple division word problems relating to shopping, farm and school.</td>
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<tr>
<th>Unit 7</th>
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<td></td>
<td>Recognise all Gambian coins and notes up to ten Dalasis.</td>
<td>• Model and real Gambian currency coins and notes can be brought to the class for pupils to familiarise themselves and recognise them.</td>
<td>Prices should be realistic.</td>
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<td></td>
<td>Perform simple shopping activities involving Gambian currency.</td>
<td>• Combining Gambian coins and notes up to five dalasis to form various amounts up to ten dalasis.</td>
<td>Relate shopping activities to word problems.</td>
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<td></td>
<td>Solve word problems involving buying and selling.</td>
<td>• Buying and giving change, using all Gambian coins together with five and ten dalasis notes in simple shopping activities.</td>
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