THE INFLUENCE OF TEACHERS' EXPECTATIONS ON MATHEMATICS LEARNERS' MOTIVATION TOWARDS MATHEMATICS

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ABSTRACT– This paper examines simultaneously the influence of teachers' expectations and behaviour on learners' experiences and motivation to learn Mathematics. Extensive research concerning the influence of teachers' expectations and teaching behaviour was done in other countries such as Canada and Israel. The fact that research into this phenomenon in South Africa was limited, motivated me to explore the influence of Mathematics teachers' expectations on Mathematics learners' performance. In literature, most of the researchers agree that some learners experienced SFP during the teaching and learning process and that teachers' behaviour correlates with their suspected expectancy of the learners' academic (Mathematics) abilities. In other words, teachers react and teach according to the information they believe is true about the learners. The analyses confirmed that Mathematics learners responded positively to, and experienced constructive positive criticism by the Mathematics teachers as motivational. However it is necessary to clarify that the effect of positive SFP is not always immediately visible during the teaching and learning process.

Keywords: self-fulfilling prophecy (SFP); teachers' expectations; teachers' teaching behaviour; learner motivation.

1. INTRODUCTION

The "Pygmalion effect", as Robert Rosenthal puts it, is that what one person expects of another can come to serve as a self-fulfilling prophecy" (Rosenthal & Jacobson, 1968). Rosenthal and Lenore Jacobson (1968) invented the word to define the conspicuous outcomes of an investigation they done in a California school in 1965. In 1968, these two researchers piloted a study that showed the degree to which teacher expectations influence student on learners' experiences and motivation to learn. Positive expectations influence leaners' experiences, motivation to learn and performance positively, and negative expectations influence learners' experiences and motivation to learn and performance negatively. In educational spheres, this has been labelled the Pygmalion Effect, or a self-fulfilling prophecy. The investigation by Rosenthal and Jacobson (1968) and the investigation by Schrank (1968) only focus on the positive expectations, while Brophy considered the negative expectations of the Pygmalion effect. In his investigation (1985, p180), Brophy establish that negative expectations and behaviour can be destructive to learners' experiences and motivation to learn. From his investigation, he itemized 8 forms of negative expectations which can made unfavourable and harmful learning environments. These forms of negative expectations are giving up on low-expectation learners; criticizing them; praising them less often following accomplishment; praising incorrectly; giving them not any response after their responses; place them in the back of the classroom; often giving fewer responsiveness to them; showing less warmness to them (Friedrich, Flunger, Nagengast, Jonkmann & Trautwein, 2015).

What has constantly fascinated me around these studies is particularly what the teachers did to communicate that they thought a certain set of learners had potential for academic growth. The studies aren't too clear around this, but it specifies that the teachers ought to paid more responsiveness to the learners, and treated them in a different way in times these learners experience difficulty. Therefore, the Pygmalion effect contains mutually positive expectations and negative expectations. In other words you get what you expected. If we as teachers embrace positive expectations to learners, learners will be given extra learning opportunities, given more detailed and

positive and helpful feedbacks, be commended more often following learners success and be encouraged more often (Friedrich et al., 2015). In consequence, teacher expectations and behaviours influence learners' expectations and motivation to learn in a positive way. And vice versa. If teachers embrace negative expectations to learners, they will be taken into unfavourable learning situations and therefor teacher expectations and behaviours influence learners' performance also in a negative manner.

2. LITERATURE OVERVIEW

The Pygmalion effect is an interpersonal motivational phenomenon that begins with high teachers expectations. These expectations conveyed by teachers to learners orally or nonverbally via teacher behaviour, the teacher's high expectations enhance the learners' self-expectations and self-efficacy, increasing motivation, and ending in improved academic performance. Many teachers are acquainted with knowledge around the Pygmalion effect, thus the awareness that one's expectations about a learner can ultimately lead that learner to act and achieve in ways that confirm those expectations (Friedrich, Flunger, Nagengast, Jonkmann & Trautwein, 2014). Few teachers know how to implement the Pygmalion effect or self-fulfilling prophecy (SFP) as a focused and determined instructional instrument to transfer positive expectations and to escape passing on negative expectations to learners.

In spite of teachers' determinations to avoid expectations regarding learners and their academic performance, you as a teacher sometimes form expectations about certain learners. By doing this, the self-fulfilling prophecy is set in motion. If a learner has been pegged as a "troublemaker" etc., the probabilities are better that your treatment as a teacher of this learner will help your negative expectations come real. On the other hand, the teacher could see the learner as "cooperative" , as a consequence growing the probabilities that the teachers behaviour will transfer these expectations and therefore contribute to the learners living up to the teachers positive prophecy. Teachers, more often than not, get from learners what they expect from them (Friedrich et al., 2015). As seen in the words of Wagar, he claims that "the ultimate function of a prophecy is not to tell the future, but to make it" (1963, p66). Each time a teacher form an expectation of a learner, the teacher is influencing the learners' future expectations of him/her, behaviour, motivation to learn and academic achievement. Thus, how does SFP works? The teacher expresses expectations and on these expectations, the teacher behaves in a specific manner. The teacher's behaviour communicates to the specific learner what expectations, behaviours and what academic attainment the teacher expects and if this behaviour of the teacher is constant, it will form the learner's behaviour, expectations of him/herself to achieve and their motivation to learn (Rosenthal & Jacobson, 1968). Over time, the learner's expectations, behaviour, their motivation to learn and academic performance will change to that what is expected of him or her.

It is the opinion of the authors that if non-verbal communication is important in the corporate world, why is it neglected and debatable in education circles? The Pygmalion Effect takes place in classrooms and boardrooms on a daily basis (Friedrich et al., 2015). Education in South Africa experiences multiple problems and needs all the help it can get. If the Pygmalion Effect can benefit South African education, no matter how insignificantly, then it is worth the effort to research it and make it part of the teaching and learning process. Therefore, SFP is alive and well in the modern classroom and it is important to investigate the influence of a teacher's expectations on the learners' learning experiences and the effect that SFP has on the actual learning that takes place in class. The research for this article focused on how Mathematics learners experience the teacher's expectations towards them and how it motivates these learners Mathematics performance and enhances their learning experience. Learners and teachers form perceptions of each other and this could influence the expectations they have of each other. The assumptions are that the teacher is the person who controls the learning process and learning outcomes (Jones et al., 2008). This influence can be helpful as well as destructive, depending on how the teacher labelled the learner or how the learner labelled the teacher. Biased expectancies

could affect beliefs of learners, and teachers' perceptions of one another, and create self-fulfilling prophecies as a result. This forms the basis of the Pygmalion Effect, which is also described as SFP (Rosenthal & Jacobson, 1968). SFP can move back and forth depending on who controls the learning process and therefore determines the learning outcomes. Brophy (1982) supports this movement of SFP in class. Teachers and learners do influence each other, and this influence can have a constructive or destructive effect upon the learning process and the learning outcomes (Jones et al., 2008).

2.1 The Effects of Teachers' Expectations

Teachers' expectations around learners' learning can have consequences on what learners really learn. Expectations influence the curriculum, instruction and evaluation (Friedrich et al., 2015). These expectations can be most influential factors in determining students' motivation to learn (Bakash, 1984). If teachers have more positive expectations concerning learners' academic performance, teachers will be more likely to encourage levels of academic performance amongst their learners. Teacher expectations are a key constituent of learners' expectations, motivation to learn and academic performance. In the beginning of the school year, teachers form expectations for learners' expectations, behaviour and academic achievement and teachers then behave differently toward various their expectations of specific learners (Solovan, 2016). This behaviour of the teacher will influence learners' self-concepts, motivation to learn, how learners behave in the classroom, and their level of aspiration (Weinstein, 2002). These effects will match the teacher's expectations. Eventually, this will influence the learners' academic performance.

2.2. Teacher Behaviors Based on Expectations

Akhyak (2013) describes a teacher as a person who has great influence on the teaching-learning process, and says that the role of a teacher in the classroom can be difficult, and goes hand-in-hand with huge responsibilities. Teachers have to influence their learners and help the learner to recognise their own learning needs as well as the learning objectives (Açikgòs, 2005). According to Kumaravadivelu (as quoted by Açikgòs, 2005), it is the teacher who creates a purposeful, task-oriented and relaxed classroom atmosphere that motivates the learner the most. The teacher who has a sense of order, a sense of humour and a warm, supportive attitude is the teacher who creates an atmosphere where a learner feels safe and understood (Jones et al., 2008). This is extremely important for the Mathematics' classroom. If you take into account the amount of influence the teacher has on the learner's learning experience and the learning process, then it is important for teachers to be competent (Solomon, 2016).

Statements by Skinner & Belmont (1993) concerning teacher behaviour involves that teacher behaviour influences learners' perceptions of their interactions with teachers; teacher behaviour influences learner involvement and learners' involvement influences teacher behaviour (Akhyak, 2013; Fiedler, 2001). These three statements underpin a number of studies in the field of teacher behaviour and its influence on the learning process, and whether teachers as well as learners influence one another, either negatively or positively, depending on the perceptions that the teacher and learners have of one another (Friedrich et al., 2014). The way a teacher behaves in class will have an influence on the learning process, the learning expectations of learners, their performance and their motivation to learn. This also fits into the purpose of this article.

Nash (1976) explains further that learners' expectancies of teachers have a considerable influence on the behaviour of the teacher and learners. He also stated further that the teachers who are disliked by the learners and who do not fulfil the expectations of the learners often experience disruptive, destructive lessons where no teaching or learning takes place (Burns et al., 2000; Davies et al., 2015). The assumption can be made by the authors of this article that some Mathematics learners struggle at school not because of their academic abilities, but because of teaching behaviour towards them. It can also been seen that teachers behave differently towards learners for whom they have high expectancies than towards learners for whom they have low expectancies (Solomon, 2016). Teachers

tend to praise the high-expectancy learners and are less likely to criticise them (Brophy, 1983; Davies et al., 2015). When teachers criticise learners who are high achievers, they do it to communicate challenges and high standards to them. The teacher also offers more regular feedback to learners who are high achievers. On the other hand, more teachers tend to spend less time giving feedback to learners who are low achievers. Learners believe that teachers degrade or cut low-achieving learners off from attempts to complete the work. If a teacher unknowingly behaves differently towards the learners in the class, as described by Mittman (1985), then learners tend to behave according to the expectations that were created by the teacher, and this will lead to SFP, where the saying "as a man thinks in his heart so is he" will come true for many learners (Davies et al., 2015).

3. EMPIRICAL STUDY

3.1. Philosophical Point of Departure and Methodology

It is difficult to isolate the different components of the teaching process, because teachers and learners are intricate beings who are forever changing and evolving and who try to manipulate the situation to get the outcomes that are perceived by them to be the best option. It was possible to get a general idea of how Mathematics' teacher's expectations and their teaching behaviour influence Mathematics learners' learning performance, learning experiences. This was also the driven force in this study namely what is the influence of teachers' expectations on learners' motivation towards Mathematics. The research methodology was based on the constructivist-hermeneutical-interpretivist paradigm and it allowed the authors to interact with these learners and interview them in their specific environment. The constructivist-hermeneutical-interpretivist paradigm allowed the authors to gain the understanding that was needed to focus on the problem decisively and in a focused manner. It is necessary to realise that the Pygmalion Effect or SFP will differ from one school to the next, from one teacher to another and from one subject to another subject as well as from one group of learners to another.

3.2. Research Design

According to Merriam (1998) interpretive qualitative cases studies provide a rich description of data that is used to develop conceptual categories to support theoretical assumptions. The advantages of a qualitative case study are that we can work in a bounded system (Merriam 1998; Miles & Habarman, 1994). The bounded context of this research is how mathematics learners experience their teachers' expectations and teaching behaviour during the teaching and learning process and motivation towards Mathematics. There are several advantages to the bounded system of the interpretive qualitative case study for this specific research, namely:

The boundaries form the focus of our research.

Data was manageable because we could control the number of participants who took part in the research.

The interpretive qualitative case study allowed us to interpret, explore and examine through the eyes of the learner the nuances of the interaction between the learner and the teacher that takes place during the Mathematics teaching process.

The interpretive qualitative case study research approach gave us also the opportunity to create theories and draw conclusions from the analysed data.

Therefore, the qualitative design suited this study the best in our opinion due to the human factor. Humans, in this case the teachers and learners, adapt and change their teaching behaviour and perceptions to accommodate their circumstances and emotions from one moment to the next. It can be argued that these differences were so miniscule they were not likely to influence the data; they had been taken into consideration.

3.3. Participants, sampling strategies

Purposive and convenience- sampling strategies directed this research. Four different sites were considered for this study and for that reason a case study (school A, school B, school C and school D) was also included. As the purpose of this study was to cultivate an understanding of a situation inside four diverse schools, we did not make a comparative study between these four schools. In this constructivism-hermeneutical-interpretative qualitative case study, the attention was on the method rather than the outcomes; on circumstances rather than a specific variable, on discovery rather than proof. It was on the intensive descriptions of a single unit or restricted system, such as an individual. It allowed the authors to do this case study and answer questions on how, when, where and why mathematics teachers' expectations and teaching behaviour influenced their learners' mathematics' experiences and their motivation to learn. Therefore, as mentioned above, four high schools in Middelburg, Mpumalanga were used (all were former Model C schools) and eight Grade 11 Mathematics learners from each school participated through semi-structured individual interviews. Thirty-two learners in total were interviewed.

3.4. Data Collection Strategies

The data for this article was collected through semi-structured interviews. Eight learners from four different schools in Middelburg were asked to participate on a voluntary basis with written consent from the DoE, circuit managers, the four principals, learners' parents and the learners who were interviewed. The purpose of these semi-structured individual interviews was to establish how these Mathematic learners experience their Mathematics teacher's expectations towards them, how this motivated them to learn and how it influences their Mathematics performance. The questions for the interviews were constructed with the literature study as the background and these questions were directed at the learners' and through their answers we tried to determine the influence of teachers' expectations and teaching behaviour on Mathematics learners' motivation towards Mathematics. The questions in the semi-structured individual interviews were as follows:

What would you like to tell your Mathematics teacher you dislike the most in one minute about his/her way of teaching?

Describe how the teacher teaches Mathematics.

How do you think your Mathematics teacher can change her/his teaching to make it easier for you to learn and understand this challenging subject better?

Explain how you feel when your teacher writes a negative comment on your Maths worksheet on which you feel you have spent so must time?

Why do you like some teachers more than others?

In your opinion, do you want to study harder for an exam if the teacher of that subject takes time to get to know you personally?

A teacher believes you can do better and encourages you to do better. How would you react towards this belief?

Explain how the teacher of whom you are afraid teaches.

What must your Mathematics teacher do to motivate you to study harder in Mathematics?

3.5. Data Analyses Methods

The following process was followed to analyse the data: a) the text was transliterated in ample detail and screened to enable the researcher to become familiar with the content of the text; b) the connotation of words used by the learners was critically evaluated to understand the significance of the words and phrases used by the learners in their own vocabularies; c) different themes were identified and coded the topics line by line for each interview transcription. The themes were put into a table to assist the coding process; d) the authors continued naming the categories by inserting extra transcribed interviews and comparing new data with the themes that were already known; e) during the coding

process of the themes the authors looked for core similarities between the topics and the data was analysed according to the constancy and variability of the initial findings; f) and this procedure was repeated until the point of data saturation, when no additional data was required.

3.6. Ethical Considerations and Trustworthiness

The authors collected data that was reliable and the authors have taken every possible precaution to eliminate other possible explanations for the results that were obtained during the research process. A pilot study was conducted before the authors started the actual data collection process. This allowed us to make sure that all the participants understood what was expected of them. Criteria for authentication were the direct involvement of the researchers in the specific study; a detailed overview of the questions asked was obtained to verify the data; a detailed description of the phenomenon in a real-life scenario; recognised qualitative research strategies were used and a detailed overview of the relevant literature was done to verify the data that was collected; paraphrasing and repeating of questions confirmed the correctness of questions; a detailed description of interviewees within their specific milieu was used in the study; reliability was obtained through the process of coding and re-coding of data and lastly, all documentation and decisions that were made during the data collection process were used to verify reliability. Eight learners from four different schools in Middelburg were asked to participate on a voluntary basis with written consent from the DoE, circuit managers, the four principals, learners' parents and the learners who were interviewed. Participation took place on a voluntary basis and participants were notified that they could withdraw their interviews without any notice.

4. RESULTS, INTEGRATION OF THEMES AND DISCUSSION

The Grade 11 Mathematics learners of the four schools substantiate the five identified themes and provide insight into the influence of teachers' expectations and teaching behaviour on learners' experiences and motivation to learn. These five themes that were identified through the analysis and verified in the literature were Theme 1: Mathematics teachers' expectations: the influence on Mathematics learners' motivation to performance; Theme 2: Teaching behaviour: The influence on Mathematics learners' motivation to performance, Theme 3: Creating meaningful learner-teacher relationships for academic performance in Mathematics, Theme 4: Enthused learning: teacher attributes and skills and Theme 5: heartbeat teaching. An integration of Themes and a discussion will follow.

Positive **teacher expectations** and constructive criticism can improve the learners' self-concept and belief in them during Mathematics education. "*It encourages me more if my maths teacher actually believes in me. It gives me more power and to try again and again (SCHOOL A: p 5:208)*"; "*I would like whatever way she encourages me to do better in maths. I will give her that respect of ok I am going to do better in maths because she believes in me (SCHOOL C: p 8:513-514)*". These two features can assist the Mathematics teacher to produce positive SFP and have the potential to contribute positively to learners' Mathematics performance. Low or negative teacher expectations infuse negative SFP into the teaching and learning process, resulting in negative expectations and the loss of motivation to perform academically. The learners experience academic and personal failure, leading to lack of or no motivation at all in these conditions. This implies that teachers do differentiate between learners and therefore have stereotyped expectations of learners. Many of the learners interviewed voiced their frustration with teaching behaviour that is related to negative expectations: *"I feel like crying. I would like the maths teacher to tell me where my fault lies instead of pointing out the negative stuff. If she helps me to improve in my maths, it will be better than pointing out the negative stuff" (SCHOOL A: p 2:98)"; "It will make me feel so unloved, disappointed, I will think that the teacher doesn't like me, because if at least they explain what has gone wrong (SCHOOL D: p 6:514)"; ".....as my wiskunde onderwyser my afbreek dan hou ek nie van die onderwyser nie en glo ek dat ek ook nie kan goed doen in my wiskunde nie (SCHOOL B: p 5:178-179)".* It can be concluded that most Mathematics teachers are

unaware of the fact that their teaching behaviour either motivates or demotivates the learners' ability to perform in Mathematics (Weinstein, 2002).

Teaching behaviour and teacher behaviour are two critical components of the teaching and learning process. Teaching behaviour can be categorised into constructive and unconstructive teaching behaviour, which both lead to SFP in their respective ways. "*Ek sal goed voel omdat my wiskunde onderwyser moeite gedoen het om met my persoonlik te praat soos net om my self moed op te bou sodat ek positief kan wees oor my wiskunde want as ek negatief is dan voel ek nie lus om wiskunde te doen nie (SCHOOL B: p 5:172-174)*"; "*She explains the maths very well and if you do not understand it is easy for me to go up to her and say that I do not understand this work and she won't hesitate to help. My maths teacher is very approaching (SCHOOL A: p 5:189–191)".* Baksh and Martin (1984) conducted an elaborate study in Canada and in their findings concluded that learners' and teachers' experience, teaching behaviour and teacher expectations differ from each other. These different perspectives imply that the teaching and learning processes are not compatible with each other. More specifically, teachers are often not attentive to this change in their teaching behaviour and label learners unintentionally. Learners, on the other hand, confirm that they know through the teacher's teaching behaviour that the teacher stereotypes them, resulting in their being treated differently. Mathematics teachers need to be made aware that if they think learners are competent to be successful, they need to support this belief through their expectations and their teaching behaviour. The analysis of the data indicated that if teachers' positive belief (SFP) encourages learners in Mathematics, they will put more effort into their subject: "*I tend to do my maths homework if my teacher takes time to get to know me personally and show that she believes in me (SCHOOL C: p 4:316)"; "Ek is nie mal oor wiskunde nie maar die onderwyser wat ons het in wiskunde is ongelooflik goed en sy maak wiskunde lekker en sy weet wat daar aangaan. Mens kan haar nie vasvra nie sy vra ons altyd vas en dit maak dat ek wil goed doen in wiskunde en dat ek wil hard werk (SCHOOL B: p 3:74)".* On the downside, if the teaching behaviour is unconstructive, it may restrict the forming of positive SFP, leading learners to be unmotivated during Mathematics education. The analysis of the semi-structured individual interviews confirmed that most of the participants were able to "read" the teachers' behaviour and teaching behaviour: "*Because sometimes maths teachers like focus on the people who understand the work and we are like ok you understand fine then they expect the rest of the class to understand (SCHOOL C: p 8:487)".*

Teaching behaviour that is biased with favouritism was the biggest concern for the learners. This implies that learners will experience low motivation and negative SFP during Mathematics education. It seems that it affected some learners more than others, but all the participants agreed that they hated favouritism. The findings in the analysis of the data confirmed that teacher favouritism can have an effect on the theoretical relationship between SFP and teacher expectations and teaching behaviour: "*I do not even think they know. I think they just think that this child is smart and there is favouritism (SCHOOL A: p 1:38)"; "I would tell the teacher to stop picking favourites. Because that gives an unfair advantage to the other students in the maths class. How does the teacher talk to the rest of the class? Sometimes she gives us attitude. She doesn't speak to us the way she speaks to the other learners (SCHOOL D: p 5: 136-137; 419-420)".* Therefore favouritism can be a contributing factor why some teachers have poor academic results in Mathematics and why some teachers experience severe discipline problems with some learners in their classrooms. Learners prefer a Mathematics teacher who is forthcoming, professional and compassionate. Learners would like teachers to reach out to them, initiating and maintaining this unique relationship, because teachers are the authoritative person in the teaching and the learning process: "*I would like them to smile….. It will be nice to see a sincere smile. But then the teachers' facial expression. It says a lot about them (SCHOOL C: p 1:124–126)"; "Because we can talk to them about personal issues or issues with maths without feeling scared and they do not judge they try to help (SCHOOL A:p 2:101-102)"; "She is kind, she is well explained, you can even understand and communicate with her, while she explaining the maths (SCHOOL C: p 8:660)".*

Trust and respect form the foundation of **creating meaningful learner-teacher relationships for performance in Mathematics**. From a healthy, positive, professional learner-teacher relationship flows enthused learning. This type of teaching is infused with teacher favouritism, passive teaching and overly strict teaching behaviour, resulting in negative teacher-learner relationships.

Challenging, constructive, productive, structured and positive teaching behaviour are synonyms for the phrase **enthused learning: teacher attributes and skills**. Learners want to be challenged with subject content during the teaching process. They prefer it when teachers repeat and break the content down into smaller pieces. "*Keep teaching me maths with enthusiasm she should like what she doing when she teaches me that motivates me a lot. Keep giving me work, and work and work and explain a bit instead of letting go (SCHOOL D: p 1:103)"; "Because some maths teachers are fair to children and some explain the work and then some treat us unfairly because like I said of other kids being naughty in class they do not like the whole maths class (SCHOOL A: p 6:226)" ; "Also when they repeat things because then that helps me to remember that you have to do this over and over again (SCHOOL C: p 3:270)".* The assumption can be made that enthused learning and teaching takes place when teaching behaviour meets the requirements of the learners' understanding of teaching and learning. After the process of rereading and reworking the literature and analysis the authors were able to form an educated concept, namely **heartbeat teaching**, which encapsulates Mathematics teacher expectations and teaching behaviour concerning their learners' motivation to perform better in Mathematics. "*I would be very happy, because if they believe in me, I believe in myself too. So then I would be able to do my work and then work harder. It is motivation (SCHOOL C: p 3:276-277)".* Heartbeat teaching personified effective teaching and learning and supports the research themes, i.e. teacher expectations, teaching behaviour, learner and teacher relationships, enthused learning and heartbeat teaching. The teachers are responsible for keeping the learning heart of every learner healthy through effective, creative and healthy teaching behaviour and positive expectations that lead to SFP: "*Ek doen goed in wiskunde want ek voel my onderwyser is opgewonde oor wiskunde en dan sal ek ook wees (SCHOOL B: p 6:207*)"; "*My wisk onderwyser doen dit nie, sy sal juis by die kinders gaan staan wat nie weet hoe om 'n som te doen nie sodat sy hulle kan help (SCHOOL B: p 3:104)"; "She is kind, she is well explained, you can even understand and communicate with her, while she explaining the work (SCHOOL D: p 8:660–661)"*.

Consequently, Good and Brophy (1974), Cabrera et al. (2012), Davies et al. (2013), Solomon (2016) and Fredich et al. (2014, 2015) support the findings in the analyses and we concluded that if negative SFP occurs in Mathematics education, learners will respond negatively towards Mathematics and motivation to perform better will nearly be impossible. The conclusion from the analysis process confirms that Rosenthal and Jacobson's (1968) Pygmalion Effect and Brophy and Good's (1984) SFP are alive and well in the multi-cultural classrooms of South Africa, and that there is a link between SFP and learners' learning experiences in Mathematics and their performance. It can be argued also that learners experience teacher behaviour and teacher expectations differently in Mathematics education, yet the influence of teachers' expectations and teaching behaviour on learners and how it augments the learning experience and motivates the learning process is real and cannot be ignored. The following features were prominent in the data:

The negative influence of unconstructive, passive teaching and teacher favouritism in Mathematics education

The positive influence of constructive, professional, and pleasant teaching on the performance of learners in Mathematics

Learners see their Mathematics teacher as a person who needs to help them and to motivate them to better performance.

It is a reality that Mathematics education in South Africa is in a predicament. One cause of this dilemma can be that Mathematics teachers do not understand the important role they are playing in a learner's life.

South Africa needs more qualified Mathematics teachers, but they must be well-trained, passionate teachers who know how to teach Mathematics and how to create positive expectations. In other words, teachers who understand that heartbeat teaching can motivate the learners to learn so that effective teaching and learning can take place.

Figure 1 visually summarises how heartbeat teaching ties in with the influence of Mathematics teachers' expectations and behaviour on learners' motivation for better performance in Mathematics.

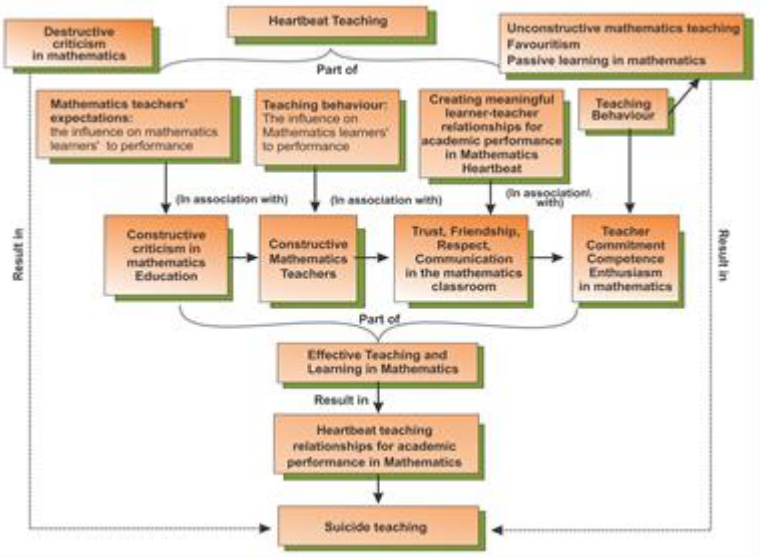

Figure 1: The influence of Mathematics teachers' expectations and behaviour on learners' motivation for better performance in Mathematics

5. CONCLUSION

The focus in this article was twofold: (1) the author's discussed and reflected on the results of the data that was collected through the semi-structured individual interviews, and (2) discussed the relationship between the aim of this article, the data in the literature and the results of the data that was obtained through the semi-structured interviews. This reflection and discussion led to a new phrase, "heartbeat teaching". Teachers are keepers of the learners' learning heart by pumping positive expectations into the heart through effective, creative, healthy and positive teaching behaviour that leads to SFP and effective Mathematics education. Heartbeat teaching encompasses the sense of belonging that every learner in Mathematics craves. Mathematics teachers who understand this concept that their expectations and teaching behaviour have the potential to form positive teacher and learner relationships that lead to enthused Mathematics education and positive SFP can live up to the heartbeat teaching idea (Weinstein, 2002). However a human being is not a simple, predictable creature that fits into a fixed mould. This multifaceted tapestry that is interwoven through complex Mathematics education is not so simple if teachers do not see every learner as their own heartbeat and do not give the life-giving blood in Mathematics education. Mathematics education is then turned into suicide teaching, with death, destruction and a dislike in Mathematics in its wake. This action can be turned around if teachers see every learner as their own heartbeat and give of themselves the life-giving blood through the teaching and learning process in Mathematics education. In this way, Mathematics education in the South African educational context can be turned into heartbeat

teaching. SFP is a small, invisible but powerful instrument in the Mathematics classroom that has the potential to change a life. It is not what you see in a learner, but how you treat the learner that will determine effective Mathematics education.

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