



THE USE OF DIALOGUE AS A PSYCHOLOGICAL TOOL FOR TEACHING AND LEARNING PHYSICAL AND LIFE SCIENCES IN AND OUT OF THE CLASSROOM

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Abstract:

This study looks at dialogue as a vital tool for teaching and learning in a Physical and Life Science classroom. Dialogue could elicit responses that could raise issues bothering science learners as well as science teachers, while teaching and learning goes on in the classroom or even out of classroom situations. Physical and Life Science is perceived as tough disciplines. This perhaps explains why using dialogue could discover strengths and weakness of both learners and teachers in these disciplines. The data for this qualitative study was collected from a focus group interviews. The response from Both Physical and Life Sciences learners (students), who offer between Mathematics and Mathematics literacy, were interviewed. The feedback from the interviews were transcribed, coded and categorized into themes, as supported by Saldana (2009). The Issues discovered from this study range from, students' background, creating an authentic environment for teaching and learning through Teacher Pedagogical Content Knowledge (TPCK), learners attitude, language used for communication while teaching and learning. This study got different feedbacks which supported discussions considered by the researcher. These feedbacks are from the Physical and Life Sciences Learners. In this context, Physical Science is made up of Mathematics, Chemistry and Physics. Biology and Health Sciences makes up Life Sciences in this study. The results suggest Learners had different interpretations about their teaching and learning in the classroom. This research was carried out in a township school in South Africa. In this qualitative study, however, it explains how dialogue could be used as a psychological tool (lens) to discover strengths and weakness of both learners and teachers in and out of the classroom learning situation.

Keywords: dialogue, feedbacks, learners' background, parental roles. learners' attitude, teacher Pedagogical Content Knowledge, (PCK) and language discourse

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1. Introduction

Dialogue is a very essential tool that could be used in the classroom learning situation and even outside the classroom, as discovered in this study. Dialogue contributes to learners' development as suggested by (Kiemer, Groscher, Pehmer and Siedel, 2015). By development, this could mean Piaget levels of development which is from different stages. Each development helps cognitive learning and promotes understanding for learners.

According to Piaget, the theory of cognitive development which consists of four stages, improves mental development. This development could be initiated through dialogue, in and out of the classroom learning situation. Blatchford and Kutnick (2003) confirmed that dialogue in the classroom between teacher and learners is very rare. The ability of the teacher to initiate this psychological tool in the classroom demonstrates the Teachers Pedagogical Content Knowledge, (TPCK) ability. However, it is absent as suggested by Blatchford and Kutnick (2003).

Odora-Hoppers (2002) explained, that the syllabus used in our schools is limited to what she called the colonial (western science) imposing their ways, abilities, system on ours here in African schools. It means there is no room for probing, or disagreement, in order to agree with what is taught and learnt in the classroom learning situation. This may be achieved through dialogue. It also means there is little or no room for assimilation, accommodation and adaptation.

She went ahead to emphasize that these syllabus already assumes an African learner brain as *tabula rasa*. (*empty, and therefore must just accept*) Odora-Hoppers (2002) criticized this system that it is a wrong approach considering our context of teaching and learning realities here in Africa.

When a child or a learner comes into any learning situation, teaching and learning should not be a matter of direct didactic means, neither should it be an abashed situation. This also means a situation where learners could be forced to accept whatever is presented in any teaching and learning situation, and particularly in a Physical and Life Science classroom as indicated in this study is wrong. Perhaps there could be a way science teachers could interact with science learners in the classroom, such that friendly argument could yield a new result (accommodation) without necessary imposing ideas, concepts or without understanding from the side of the learners.

Therefore, the purpose of this study is to look at dialogue. How can dialogue be used as a psychological or teaching tool, to aide teaching and learning in the science classroom? To answer this question, this study maintained a focus group interview with grade 10 science learners. It gathered data from the learners through a focus group interview with grade 10 learners. This in itself illustrated dialoguing. The feedback from these interviews were transcribed and coded to form themes. The themes are **Learners' background, parental roles, Learners attitude, and Teacher Pedagogical Content Knowledge and Language discourse.**

One of the themes learners' back ground as well as their temperament and who they stay with at their homes. Who the learners stay with suggests to me what the science teacher could do for the science learners as regards parental roles. The science teacher would know the learners background. This could initiate the discourse used in such teaching and learning situation. The science learners also listed their likings and dislikes, they mentioned their best teacher in terms of how he/she teaches them, which suggest different teacher pedagogy. All of these were feedbacks from the interviews, which suggest what dialogue could do in teaching and learning situations, and in this context, science and physical science classroom learning situation.

According to Robertson (2007) connecting a learners background with what is taught in the classroom is very vital. However, this also involves the ability of the teacher to acknowledge this, and build a connection with the topic, what is taught and the learner's background. This could be realized through dialogue in the classroom.

2. Learners Background as well as Parental Roles

INT: *"Tell me about yourselves, background, your family."*

Boy 1: *"I am staying with my sister alone, my parents, father and mother passed away. If it is mathematics then eh I ask my sister to help me, but other subjects they are too easy for me so I do it on my own".*

Boy 2: *"I stay around Orlando, I stay with my mother, she is a single parents, I stay with my little sister, am the first born, I am a life science and a science student."*

Boy 3: *"I am from Orlando high, as you know I am a science learner, but eish somehow the science work could be difficult that's all I can say."*

Boy 4: *"I live around Orlando here and I stay with my mother."*

Girl 1: *"I am from Johannesburg, am alone, am science learner, what I can say about me is eh, I like to experience things, to experience things that I don't know, I am just a honest person, and very patient."*

Girl 2: *"Haha this is me there is not much I can say, I am free, I am ready to laugh and smile all the times."*

Girl 3: *"I am a science learner, am staying with my sister, and my mum is in Limpopo, but my father has passed away few years ago."*

Girl 4: *"I am a science learner, I live in Dowson Vile its hard but the harder it becomes the more I keep."*

Girl 5: *"I am a science learner I live in Dowson Vile, am staying with my parents, I like to talk but I am shy hahahahahaha."*

However, this also involves the ability of the teacher to acknowledge this, and build a connection with the topic, what is taught and the learner's background. The learners' background, the teacher recognizes the learners who do not have parents, or who are not staying with their parents. This of course could help the teacher in terms of giving both classroom and outside classroom evaluations. How to give the learner's task that could help them at home. This could be realized through dialogue in the classroom. With dialoguing, the science teacher is able to know each learners background.

According to Vygotsky's sociocultural theory, learners learn through a social process. These processes are initiated through the learners lived life experiences. According to Vygotsky (1978) the social interaction takes place in two levels. They are inter-psychological, which has to do with the people, which in this case, interaction between the science learners and the science teacher.

The other form of interaction is the intra-psychological. This has to do with the science learners voluntary attention, to logical memory of the science learner which is inside the learner's ability. Dialogue initiates what I call the learners weaknesses, and the science teacher could scaffold from those discovered weakness.

Through dialogue, eliciting response from the learners, I was able to discover how these learners appreciate different pedagogical ways in which some of their science teachers use in teaching in the classroom for example the use of videos which enhances their understanding. Here are some of the feedbacks.

3. Teachers Pedagogical Content Knowledge

INT: *"Tell me about your Physical/Life Science teachers."*

Girl 3: *"...ah ah, our school is great because we have great people, we have beautiful people and we have great teachers who go extra mile for our education for us to understand things better like our life science teacher, she even get videos for us to understand when she, when you experiment it better, you understand why she explains it better and you understand better than reading, yea which is great."*

Boy 1: *"I will rate him 10 out of 10 but, physical sciences 9 out of 10, the problems is sometimes we have to, you know in maths we have topics, which means in a topic you have to touch it and go fast to another topic. Which means that is what makes us difficult to understand and he's a fastperson who is not multilingual, so for some English it's a problem, we cannot understand everything."*

The above feedback suggests a teacher's pedagogical knowledge which is very important in the classroom. Statements like, we have great teachers who go extra mile for

our education. Citing example of their life science teacher. The life science teacher that makes use of the videos to teach lessons in the classroom.

The learners compared these teachers and, in their opinion, the life Sciences teacher had a way of making learning more exciting and enhancing understanding of the concepts taught in the classroom. Here is a comment from one of the participating learners

Boy 1 and Girl 3: *"Our physical science teacher talks so slow we sleep off. He doesn't explain much."*

Shulman (1986) spoke extensively on Teacher Pedagogical Content Knowledge (TPCK). Shulman highlighted general pedagogical knowledge, pedagogical content knowledge, knowledge of learners and their characteristics. Dialogue could as well make the science teacher, to realize her weakness and strength. What the other teacher does that makes lessons more interesting and on the other hand, what the other teacher does not do. This could be realized through dialogue. Other issue arising from these conversations was the attitude of learners. Below are the remarks from the learners

4. Learners Attitude

INT: *"Do you like maths"?*

Boy 1: *"Yes, I like mathematics because some people say maths is hard, maths is hard, so I like proving people wrong that's why I prefer maths and I love maths because people think that everything is hard so I want to show them that not everything is hard."*

Boy 2: *"I cannot say it's not for hating maths because of what am feeling sometimes when you feel like after a long term, may be after second term you feel that maths is boring or not going to class, but when you are in class, sometimes you prefer like you enjoying what you are doing that's how I feel."*

Boy 3: *"Yes I can say, sometimes you may not like but, you just have to do it, may be cos, the career you want to do, so sometimes you just have to make a decision like take the way we feel but the way we will be surviving in the future."*

Girl 1: *"I like maths because eh sometimes, when at the end of the schooling, you looking for job, may be they ask if you are doing maths, so you say no am doing maths literacy, they say no they won't give you the job, cos you know they prefer a person who is doing maths."*

Girl 2: *"I don't like maths, the problem with me it's just so hard to explain but I can't figure it out, then I just have to ask other educated people like my uncle, where you working"*

uncle, are you doing that maths that I am doing that I am doing? He said no, so I don't see any need for me doing this formula, and these things I am doing, so I just have this bad thing about maths, the time I get interested I lose everything, when I write exam I fail, so I hate maths."

Girl 3: "I like maths but its difficult, I like it because I get to learn more, I,I like it because I love challenges you get to learn more things, new things, and experience more things, so that's why I like it."

Girl 4: "I also hate maths, I don't like it, I don't like it all but I don't like it at all but I don't have a choice, because this career I want to do, it involves maths, that's why I don't have a choice, I also hate it."

Girl 5: "I love maths because some of the calculations we do in maths are also, we do in physical science, and my career needs maths."

Through the use of dialogue, I was able to discover, learners attitude towards the subject taught and this was very significant to performance, likes and dislikes towards the subject could help subject teachers, influence learners' attitude towards positivity. Positivity here could mean how to make learners enjoy subjects, in this context, Physical and Life Sciences. Lewthwaite (2000) established motivation of learners towards learning as one of the intrinsic factors influenced by the teacher. Which in this case, science teachers should create a positive attitude which could also influence learners' attitude towards learning.

Another interesting point raised from this study, were issues surrounding language discourse used while teaching and learning Physical and Life Sciences in the classroom.

5. Language Discourse

INT: "What's the medium like language your Physical/Life Sciences teachers use during teaching you guys in the classroom?"

Chorus answer: "English."

Girl 3: "Maths teacher use English when he teach, And then physical science teacher uses English but sometimes uses Sesotho to teach and the life science teacher also uses English and vernacular to explain."

INT: "Are you sure? Then why should your teacher choose to use native language because you said, you already told me that your teachers explains in vernacular after speaking

English. Which one do you understand much better when your teacher use it in the classroom?"

Girl 5: "...em, sometimes I understand better if she uses vernacular, but then in Physics, my teacher doesn't speak English, she speaks Sotho, but some of us are not Sotho, so obviously two or three sothos will be understanding, so its better for him to speak the language that everyone will be understanding. As for Maths teacher am not sure of any language he speaks but he speaks nothing more than English, Life science teacher speaks Zulu, and all other languages except Tsonga. And she said it when we entered the school, first day, she said I am sorry for those who speak Tsonga, because I don't know Tsonga."

INT: "Then she must use English all the times?"

Girl 4: "Yes, because she makes others not no to follow. She is discriminating, she said it that she doesn't know Tsonga, so she asked all of us, what can we do? So we said because there are other children who are in the class who can't understand English, I am not saying am perfect in English, I don't understand it but there are people who don't understand it in such a way that it does hurts, so she will explain in other language, because the Tsonga of this class they are so clever. And majority of the Tsongas in this class are very clever so English is the best, there should be no discrimination."

Boy 1: "...it's just that Tsonga is underestimated that it is not a proper language."

Boy 4: "...to add on that, there was a day that she persuaded us that we can present in zulu and other languages but she insisted she can't hear other languages, so why not allow us to all present in English?"

The researcher discovered issues about language, which were actually a challenge for both science teacher and her learners. Our dialoging session took us to this extent, where we realized language could be imperative for teaching and learning in the classroom. Matthew (2008) attested to the fact that language plays a very important role while teaching and learning in a Physical/Life Sciences classroom.

6. Discussions and Conclusions

This qualitative research made me understand what dialogue could do. In my interaction with the learners, the themes that emerged from **learners' background together with parental roles, to learners' attitude, Teacher Pedagogical Content Knowledge (TPCK) and Language discourse.**

Learners' background is very important as learners bring their experience into the classroom learning situation. Their background is backed with parental roles. This study discovered different learners with different challenges. Some of the challenges also

suggested some learners are without their biological parents or significant guardian. Some of these challenges could be fixed with Teachers Pedagogical Content Knowledge. The language discourse used in the classroom is very important as it was discovered from the study. The learners have issues with language of instruction. The instructional method used in their various classrooms by their teachers plays a significant role in creating an authentic teaching and learning situations. According to Sun & Bradley (2012), learners need parental support which has to do with background. Through dialogue, I realized science teachers could give parental support. I was able to know learners who stay alone, who were living with their parents who happened to be single. And some were living with their siblings. Science teachers could know about their science learners and know how to help such a learner. These help could range from when to give task, how to intervene where need arises. As supported by (Abell & Roth, 1992; Goodrum, Rennie, & Hackling, 2001; Harlen, 1997; Lewthwaite, 2000).

Learners' attitude could be stimulated by the science teacher. Through dialogue with the science learners, I was able to know learners views, perception about Mathematics, and their entire science teachers. Issues arising through (dialogue) interaction with the science learners made me realize (TPCK) is essential motivation for learners towards learning. Science teachers could even narrow down dialogue in the classroom, in order to teach and learn science topics in the classroom.

Language discourse, ranges from which medium of communication could be initiated in the classroom. When science teachers interact with science learners, the science teacher could always know the right medium of communication for the entire classroom activities. From my interaction, issues like symbolic violence arose as regards the language used in the classroom.

Edward & Marullo (1999), established, that science teachers in this context need to create a democratic, free class interaction between peers, teachers and allow freedom of ideas. This could allow ideas exchanged, and utilized in new case phenomena in the Physical/ Life sciences classroom.

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