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The Magic of "Prerequisite Knowledge" in Meaningful Learner Engagement

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Abstract

Topics learned in different science subjects are related. Some concepts are built from one to another starting at a lower level to a more advanced level in education. Many teachers experience frustration when they take time to plan for a lesson only to go to class and struggle engaging learners in the lesson activities. In my reflective practice from my experiences, I have found that prerequisite knowledge is vital if learners are to be fruitfully engaged in lesson activities. For example, I realised that learners could not do activities on the preparation of molar solutions taught in chemistry Form Three because they lacked knowledge of chemical formulae, taught at Form Two. When I planned the lesson on Molar solutions and integrated a revision of chemical formulae, I noted that the students were engaged and participated actively in the lesson.

Keywords

Learner engagement, Prerequisite knowledge, Prior planning

Introduction

The ultimate goal of every teacher in a given lesson is to enable all learners to get involved in activities that should eventually lead to learning. It becomes worrying to teachers if they find out that some learners do not take part in the lesson activities for whichever reason. Most teachers usually resolve to spend a considerable amount of the lesson time in solving problems they think are making learners not participate in lesson activities. This means that the teacher is unlikely to achieve the lesson objectives as a result of a shortage of time.

The real nightmare comes when learners are unable to participate in the lesson activities because they lack an understanding of a concept that they ought to have learned earlier. In other words, such learners lack the prerequisite knowledge (PK). There is a need therefore for teachers to carefully consider prerequisite knowledge when planning for their lessons. Toh and Kapur (2017) assert that prerequisite knowledge influenced learners in their lesson involvement.

The Role of Prerequisite Knowledge

"*Molar solutions*" is a sub-topic under the topic "*The Mole*'' in Form Three of the Secondary school level. Learners are required to understand and carry out calculations involving Molar solutions. They are also required to prepare molar solutions. This can be achieved if learners have a knowledge of chemical formulae which is content taught at Form Two.

One day I went to class prepared to teach learners how to prepare Molar solutions using the demonstration method. I demonstrated how to prepare a I M solution of Sodium Hydroxide using solid Sodium Hydroxide. I also showed the learners all the calculations involved especially in determining the mass and moles of Sodium Hydroxide required to be dissolved to make 1 litre of solution. In my thinking, the lesson went well because most of the learners answered my questions

as we worked on a few examples on the chalkboard. I noted that a fairly good number of students also answered correctly some of the questions I gave them to work out in their exercise books.

In my opinion, I would say that the lesson made an impact and that the learners successfully grasped the concept. However, when I gave the learners a random test, I was proved wrong. Indeed, in the test, I included some of the examples we had done together during the lesson. To my surprise, in a class of 46 learners, only seven learners got all three questions correct. On the other hand, more than three-quarters of the class could not remember how they worked those questions we had done in class and got them correct then.

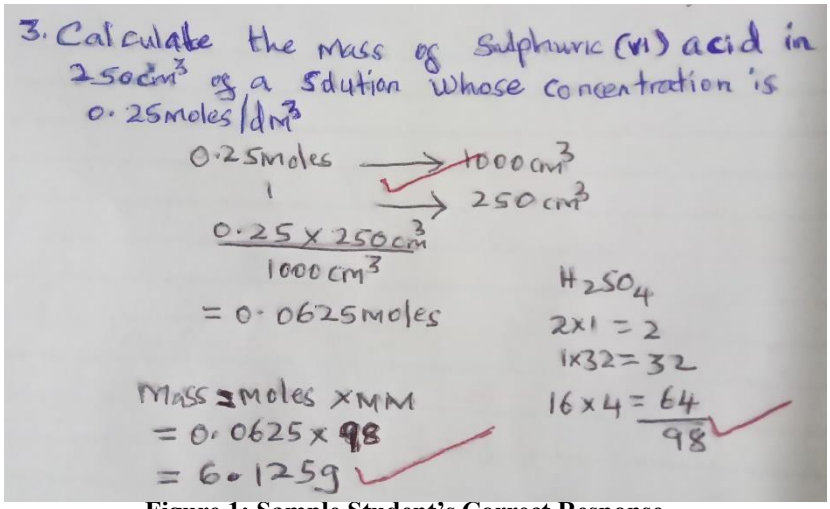
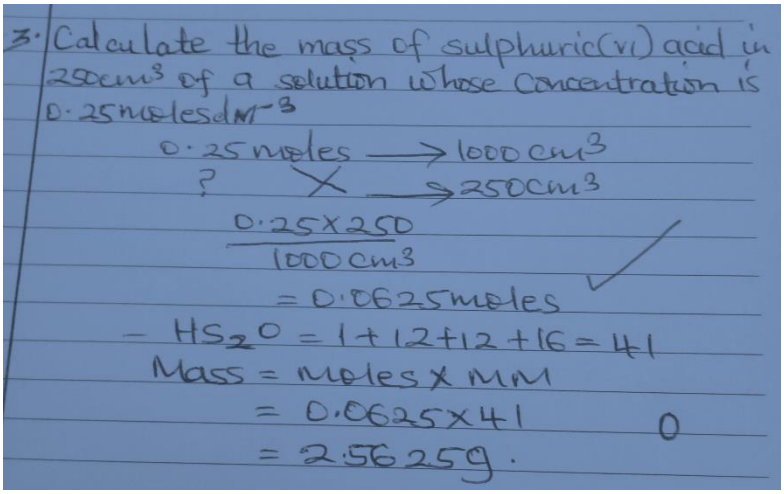


Figure 1: Sample Student's Correct Response

Figure 1 shows a sample correct student response to one of the questions I gave in class. On the other hand, Figure 2 shows errors in a sample student's response to the same question.

It is clear from the response in Figure 2 that the student understood the method of calculating the mass of sulphuric (IV) acid in 250cm^3 of the given concentration. However, the students failed the question because of the wrong formula of sulphuric (IV) acid. The performance of the learners on the test sounded a wake-up call for me. I decided to re- teach the lesson but this time provided an opportunity to link PK to the lesson content. The results were astounding.



A significant majority of the learners were able to solve the problems both during the lesson and on the test. Table 1 shows the results in terms of the number of students who got correct answers as well as those who got the wrong answer with and without attention to PK.

Table 1. A Summary of Students' performance in class and test

		Correct	Wrong	Total
Lesson Score	No provision of PK	19	27	46
	PK provided	41	5	46
Test Score	No provision of PK	7	39	46
	PK provided	45	1	46

From the data in Table 1, I noted that when no PK was provided, there were learners who got some questions correct during the lesson activities but got the same questions or similar questions wrong during the test. This could probably suggest that such students copied from others during the lesson. It seems accurate to suggest that they may not have understood the concept. When prerequisite knowledge was provided there was an increase in the number of students who got the questions correct both during the lesson and the test.

Based on the observations during the two lessons on the same content, when a teacher prepares to teach a topic in which the learners lack prerequisite knowledge, learners may be superficially engaged in lesson activities. The students may find compensatory tricks of behaving as if all is well and this may send the wrong signal to the teacher who in turn may assume that meaningful learning is taking place. Correct answers to questions to the tasks given during the lesson are not a guarantee that learning is taking place.

To achieve a positive learning environment, attitude and motivation towards learning can be harnessed through ensuring the usage of appropriate instructional strategies (Chakraborty, 2017). In my view, prerequisite knowledge can be one of the strategies of motivating learners and ensuring that they learn meaningfully. This requires appropriate prior planning on the part of the teacher. This will help him/her realize meaningful learner engagement in learning (Taylor, Olofson, & Novak, 2017).

Conclusion

The importance of prerequisite knowledge as featured in this article cannot be overemphasised. If teachers can take time to focus on prerequisite knowledge, then they can get more learners involved in meaningful engagement in the learning process. Depending on the nature of the topic and the prerequisite knowledge required, teachers can plan and address it before the lesson. They can also address that by allocating more time during the lesson for the review of prerequisite knowledge.

Consequently, if not addressed, the lesson may continue and learners find tricky methods of indicating that all is well. The teacher may never know that learning is not taking place. Teachers can plan for lessons one or two days earlier and give their learners areas they require to review as take-away assignments. This will ensure that by the time the lesson is taught, the learners already have the required information to help them grasp the new topic. I call upon teachers to explore this area of taking into consideration prerequisite knowledge when planning for lessons. This will contribute to positive engagement in the learning process.

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