Journal of Education and e-Learning Research
Vol. 8, No. 1, 52-58, 2021
ISSN(E) 2410-9991 / ISSN(P) 2518-0169
DOI: 10.20448/journal.509.2021.81.52.58

Understanding the Students' Adversities in the Science Classroom

Marisol Solis-Foronda[1]
Arlyne C. Marasigan[2]


(✉ Corresponding Author)

[1]*Isabela State University, Philippines.*
Email: marisolsforonda@gmail.com Tel: +639178913839
[2]*Philippine Normal University, Philippines.*
Email: casperarlyne01@gmail.com Tel: +639176351978

Abstract

Science has long been regarded as an important subject in a school curriculum and science teachers play a vital role in the learning process of the students in the science classrooms as well as in other subjects. However, students still encounter problems related to their science teachers, which significantly influence their academic performance in science. Using a qualitative-phenomenological design, an in-depth and systematic analysis of the students' experiences gathered during the face-to-face interview provided a detailed explanation of the teacher-based adversities in the science classroom. The students who participated in this study revealed that they had encountered various teacher-based adversities, which disrupted and affected their learning and performance in the science classroom. Students experienced having a teacher of limited pedagogical content knowledge in science, and little commitment to teach science in the classroom. Consequently, the students were not encouraged to learn science; they lost interest to learn science as well as they have developed a negative attitude towards their teachers and the subject. In the same manner, the students experienced difficulty in understanding the topic and inability to connect previous information to a new one because of having a teacher of little commitment in the instruction of science. With this, the interested parties such as the teachers, administrators, students can develop appropriate actions to address these problems not only in the science classroom but in the school in general.

Keywords: Students' adversities, Science classroom, Phenomenological, Qualitative study, Teacher-based, Science teachers.

Citation | Marisol Solis-Foronda; Arlyne C. Marasigan (2021). Understanding the Students' Adversities in the Science Classroom. Journal of Education and e-Learning Research, 8(1): 52-58.
History:
Received: 23 October 2020
Revised: 25 November 2020
Accepted: 18 December 2020
Published: 4 January 2021

Acknowledgement: Both authors contributed to the conception and design of the study.
Funding: This study received no specific financial support.
Competing Interests: The authors declare that they have no conflict of interests.
Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study was reported; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained.
Ethical: This study follows all ethical practices during writing.

Contents

Contribution of this paper to the literature

The outcome of this study is essential in understanding the difficulties encountered by the students in the science classroom. With this, the interested parties such as the teachers, administrators, and students can develop appropriate actions to address these problems not only in the science classroom but in the school in general.

1. Introduction

The world today is shaped by the prevalence of scientific discoveries and revolutionary technologies, which are changing the manner of communicating, learning, and economizing as well as working and playing (International Council for Science, 2011; National Academy of Sciences, 2010). The changes brought by the digital world have drastically affected the educational system. Today, the students are vastly surrounded by computers, video games, smartphones, video cams and all other tools and gadgets of the digital age which become an integral part of their lives radically changing their ways of learning (Prensky, 2001). The paradigm shift in the educational system brings a serious dilemma to school leaders: graduates should be equipped with the necessary skills of the 21st century however these skills are not well defined in the learning standards or curriculum. The next tight spot is what subjects are relevant for these skills. The current framework provided by the Partnership for 21st-Century Skills (2006), a more detailed and widely adopted framework, identified Science as one of the core subjects significantly crucial in the 21st-century education.

Therefore, there is a necessity for the advancement of science and technology education (National Research Council, 2012a; NGSS Lead States, 2013). The UNESCO (2010) rationalized that science should focus in four dimensions: first, to reduce inequalities; second, for students to develop powerful ways of thinking; third, to increase the freedom to choose a broader range of careers; and lastly, to increase globalization. In the same manner, the science education framework should be based on three concepts: "(1) awareness of science in current, social, globally relevant and occupational contexts, (2) intellectual education in interdisciplinary science contexts and (3) facilitation of interest in the context of nature, everyday life and living environment" (Trna & Trnova, 2015).

Many studies have been conducted supporting that the students' achievement in the classroom is greatly influenced by the quality of teachers' instruction (Wayne & Youngs, 2003). How the teacher conceives, performs, and facilitates his/her daily actions in the classroom creates a significant difference for students (Miller, Smith, & Ennis, 2006). This study explores teacher-related adversities experienced by the students who in the science classroom. A detailed discussion of each teacher-based adversity and how it affected or disrupted the students' learning of science in the classroom is presented accordingly.

Consequently, Science Education should not merely aim to produce scientists but should demand a scientifically literate population that is capable of wise decisions to address technical issues on a global scale (Wieman, 2007). Science has long been regarded as a difficult subject by many students because of this perception the students often developed a negative attitude towards it or worse they fail the subject. This negative attitude of students towards the science subject may be attributed to the many adversities they experienced while studying in the classroom. In this study, the adversities were described as the experiences of the students that produced undesirable results through disrupting their normal functioning (e.g., low performance in science, not understanding the concept in science) or healthy well-being (Riley & Masten, 2005).

2. Methodology

2.1. Research Design

A qualitative research design focusing on phenomenological approach was used to understand the teacher-based adversities experienced by the students in the science classroom. Through this design, the students' lived experiences in terms of their teacher-based adversities in the science classroom were conceptualized.

2.2. Selection Criteria and Participants

Theoretical sampling was strictly used in the selection of participants and in determining the sample size. The criteria for the inclusion of participants were students who had previously taken any science subject and students who were currently taking or enrolled in any science subject. The participants of this study were selected from students who had just graduated from senior high school and students who were currently taking and had taken science subjects recently in college. These criteria in the selection ensured that participants of this study had a rich exposure to and experience of science learning in the classroom. Table 1 presents the profile of the participants concerning sex, age, and school or grade level. The names of the schools where the participants attend and graduated from were kept anonymous.

2.3. Data Collection

The data collection began immediately after the guide questions for the interview had been validated by an expert. The validation of the guide questions happened upon receiving the clearance to proceed from the ethics committee which was issued on May 21, 2018. The face to face interview with the selected participants was the most suitable method to collect the data to explain their experiences about teacher-based adversities in the science classroom. The interview was conducted in the chosen place of the participants for about 30 minutes on the average.

The interviews happened from May 28, 2018 to June 20, 2019 during weekdays at the specified vacant time of the participants. The questions in the interview were not invasive which could violate the privacy of the participants. During the face to face interview, the preferences of the participants such as where he/she wants to sit, and how far the distance were strictly observed and respected. The participants were given ample time to think and answer all questions one after another and were not rushed to answer the questions.

Table-1. Profile of the participants.

Profile	# of Participants
Sex	
Male	16
Female	17
Age	
17	1
18	5
19	10
20	6
21	3
23	2
24	2
26	2
27	1
28	1
School Level	
College Level	20
Senior High School Graduate	13

2.4. Data Analysis

In this study, the coding involved two stages of analyses: 1) open coding; and 2) refocused coding. During the initial coding also known as open coding, the collected data were analyzed by the researcher line-by-line to bring together invaluable insight. The codes had come from the language of the participants to show that the participants had truly experienced every event mentioned in this study.

The second stage of coding involved reducing the codes into meaningful core categories through identifying recurring or predominantly substantial phenomenon. Consequently, the categories in the study were integrated into higher-level functional concepts to reach a higher-level of conceptualization. The researcher employed theoretical sampling and consistently enhanced the interview questions to gather relevant data. The use of literature was employed continuously by the researcher as a point of comparison as well as conceptual mapping. Finally, in order for the readers to understand the statements of the participants, sample transcripts included in the findings and discussion were translated into the English language by an expert in the field of language education.

2.5. Ethical Considerations

Though the study did not require manipulation of the subjects, it was still important to observe protocols due to some sensitive questions that might trigger the participants' emotion during the interview process. Explicitly, the participants had to recall negative experiences or challenges that they encountered while learning the subject science; hence, this moment of recall might cause discomfort to them. To address this ethical issue, the participants were informed that they can unquestionably stop the interview if they felt uncomfortable. The participants were advised that they may or may not want to continue the interview depending on their decisions without any obligation to explain the reason to the researcher. Finally, all participants of this study signed an informed consent prior to the interview agreeing to participate in the study.

3. Results and Discussion

3.1. The Science Teacher Has a Limited Pedagogical Content Knowledge

Table 2 shows the coding of the adversity, limited pedagogical content knowledge. In the 21st-century science classroom, science teachers play a very crucial role in the teaching-learning process. Pedagogical content knowledge was first introduced in 1986 by Shulman and was described as the manner on how a teacher represents and formulates the subject-matter knowledge to facilitate student learning.

Table-2. Concept of limited pedagogical content knowledge.

Category	Indicators	Transcript References
Limited pedagogical content knowledge in science	Teaching is unclear	Interview # 1, 2, 4, 6, 10, 13, 14, 17, 21, 24, 26, 27, 28, 30
	Instructions are imprecise	
	Lecture in not good	
	Teacher did not teach well	
	Procedures were not explained	
	Teacher is giving shallow information	
	Knowledge imparted is limited	
	Teacher is hard to understand	
	Teacher does not know the lesson	
	Too many quizzes	
	Teaching is not interactive	
	Teacher's education is irrelevant	
	Students do the reporting	

Many of the students involved in this study revealed that they had encountered teachers who were not clear in their instruction of science concepts. To illustrate, the teachers just read the books, but they were not able to explain clearly what they had been reading to them. The students further said that they did not understand what the teacher was trying to convey to them because the discussion was not properly outlined or executed. Respondent # 30 illustrates her frustration to her teacher saying:

> "As for the teachers, it was difficult to understand them especially during discussions. For example, their instructions are difficult to understand or the subjects' lessons are also discussed in an unclear manner."

Respondent #14 agreed that her teacher was one of her problems when she was studying science, saying: "I think it is the teacher. He does not discuss much and the topics are not imparted well. Also, we do not understand each other."

Similarly, Respondent #26 said: "Sorry, but the teachers for science subjects do not focus well in teaching, especially for the last semester. When he/she lectures in our Ecology, he/she does not do it well so sometimes we find it difficult to cope up in the subject."

The students mentioned that their teachers in science were not able to explain thoroughly during their discussion the necessary information that they needed. They pointed out that their teachers failed to teach the right lesson to them because they were just assigned to report the lessons in the class. The students voiced out that their teachers in science were discussing information not related to their topic.

Respondent #23 said: "More likely because of my teachers; because my teachers did not really teach the right lessons when I was in high school. We reported more rather than have discussions or lectures." In addition, Respondent # 4 said:

> "During my first year to fourth year, my teacher was not able to discuss properly because she was always telling us the stories of her life."

Aside from the teachers' insufficient instructional clarity of subject matter, one more problem identified by the students that concerns that pedagogical content knowledge is experiencing teacher who has low sensitivity to learners. Many students in this study revealed that some of their teachers in science were insensitive as regards to their ability to learn and understand the subject. They also mentioned that there were teachers who solely rely on the students' capacity to interpret information such as procedures in a given activity without guiding them to avoid misconceptions. Respondent #10 expressed his frustrations saying:

> "In high school, the teachers gave us experiments to do along with the procedures and it is up to us to perform them even if there were procedures we could not understand."

Respondent #13 admitted that he had no way of knowing whether his taught of a particular concept was correct or just a misconception because the teacher did not ask if they understood the topic. He expressed his concerns saying: "I think science is hard to understand if I am doing it on my own. I need the help of a teacher. But our teacher just let us students analyze the problems or the topics on our own without even following us up."

Respondent #28 said that her problem is "As for the teachers, I had teachers who just kept on giving and giving information. She does not even ask if students understood or not." Some of the students in this study were also aware that some teachers were not education graduates but had only earned education units to qualify for a teaching position. Because of this, the students were not able to put into practice what they have learned from their teacher. Respondent #6 pointed out saying:

> "We had teachers who graduated with BS Biology and BS Chemistry degrees; they were not really in line with teaching. They only acquired educational units so when they are already teaching in the field, they just keep on teaching and teaching though no learning experience takes place."

Likewise, Respondent #21 expressed her observation on some of their teachers in science lack the skill to manage their classroom which resulted in a chaotic environment. She mentioned: "Just like in our Physics before, he/she did not have control in the classroom. When it came to that subject, there was no classroom management. My classmates would run around the classroom and he/she just let them."

However, the students in this study pointed out that having experienced teachers who have insufficient instructional clarity of subject matter in science classroom has brought negative views regarding the subject and the teacher. The students mentioned that they were *not encouraged to learn science because of the kind of teachers they had.* Also, they *lost interest to learn science* as well as they *developed a negative attitude towards their teachers.* The students believed that what they had felt and experienced from their teachers in science had disrupted their normal process of learning science in the classroom thereby resulting in their negative attitude towards the subject and their teachers. Some of the students' statements are presented below:

> Respondent #30 said: "With the teachers who are not as adept for example, if they are not skilled enough in a science subject, I am not encouraged to learn it, something of that sort."
>
> It is as if I lost interest in listening since I figured that there is a book anyway, I will just read it, something of that sort, so I did not really listen anymore."
>
> Respondent #27 said: "It is like I developed a negative opinion about the teacher and even the subject because it seemed so boring already; it is like you will just figure it out on your own and you are not given guidance."

Another adverse effect of having teachers who have insufficient instructional clarity of subject matter in science classroom as mentioned by the students is the *inadequacy of information that they have gained from the subject.* The students reiterated that they had learned limited information and there were questions in their minds left unanswered by the teachers. As a result of this, the students' learning of science was disturbed which led to students' repulsion to learn more about science and low scores during quizzes. Below are the responses of students from the interview:

> Respondent #1 pointed out: "It is like we are getting little information about the science subject unlike in other subjects, I mean, with other teachers who give us so much."
>
> Respondent #6 stated: "Of course, the information I was getting lacked and cannot even be applied since what is learned from the teacher is lacking already. Hence, sometimes quizzes are low."

Poor pedagogical content knowledge skill among classroom science teachers is considered one of the critical adversities that confront science education in the 21st-century. One of the pedagogical content knowledge adversities experienced and identified by the students during the interview is the insufficient instructional clarity of the science teacher. The instructional clarity is positively linked with the motivation and learning of students in both affective and cognitive aspects (Comadena, Hunt, & Simonds, 2007). Thus, when teachers' instruction or teaching is clear, students think better about the teacher and the subject and subsequently learn more about the subject (Chesebro & McCroskey, 2001). The clarity of instruction helps the students learn more or construct knowledge through enhancing their comprehension and sense of purpose (Mottet et al., 2008). Similarly, clear teaching is significantly associated to academic engagement by reducing the students' apprehension of the learning

process which is possible if teachers can organize the classroom into an efficient learning environment (Comadena et al., 2007).

Another important aspect of pedagogical content knowledge is the ability of teachers to recognize students' learning needs such as their responses to questions and misconceptions of students. Students' needs do not only refer to academic needs but broadly include cognitive, social, cultural, developmental, and emotional needs. Therefore, each student is a unique combination of these domains and the challenging part of this is that there is no checklist to describe each student. The difficulty of meeting every student' demands and needs falls on the classroom teacher (Jackson & Davis, 2000). Teachers should be aware of the issue and should be willing and able to act in order to meet the students' needs (Perry, Steele, & Hillard, 2003). However, there are teachers who deliberately or unknowingly ignore the clamor of the students (Zins, Bloodworth, Weissberg, & Walberg, 2004).

One of the reasons could be the lack of skills of the teachers to distinguish right actions to meet the individual needs of their students (Tomlinson, Brimijoin, & Narvaez, 2008). Thus, the failure of the teacher to meet the students' learning needs results in low academic achievement. In addition, students do not seem to be greatly interested in the learning process when their learning needs are not met in schools. The students withdraw from learning because they do not see their value in the course (Whiteside, 2006). To forge a better relationship between teacher and students, teachers should listen to their students' voices when making instructional decisions (Bianchini, 2011). Indeed, to teach science to students, teachers should have a sound pedagogical content knowledge (Chalufour, 2010; Sackes, 2012). Thus, to stimulate the desired outcome of science contents and processes in the minds of the students, they should speak fluently, outline and transition learning materials, as well as provide actual or concrete examples and definitions (Chesebro & McCroskey, 2001). Likewise, the teacher's ability to understand and address the learners' needs is critical in the instruction process.

3.2. The Science Teacher has a Little Commitment to Teach.

Commitment is generally defined as the level of involvement, agreement, and enthusiasm when carrying out a task (Ibrahim, Ghavifekr, Ling, Siraj, & Azeez, 2014; Yukl, 2010). Committed teachers are hardworking, less tardy, less to get absent and less inclined to leave the workplace as well as helpful towards students (Omar & Aziz, 2002). Table 3 presents the coding for the adversity of little commitment to teach.

Table-3. Concept of Little Commitment to Science Instruction.

Category	Indicators	Transcript References
Little commitment to teach.	Teacher is busy	Interview # 3, 4, 5, 8, 11, 12, 13, 17, 18, 23, 28
	Teacher is not explaining	
	Teacher is not dedicated	
	Teacher is always absent	
	Activities are not facilitated by the teacher	
	Less connection to students	
	No follow up for teachers	
	Teacher is not discussing	

The category of having a teacher of little commitment to science instruction had been associated by the students to science teachers who are frequently not attending the class. The students in this research study mentioned that their teachers were not able to attend the class due to their busy schedule. Hence, they ended reporting the topics themselves without the supervision of the teacher.

Respondent #5 said: "One issue is the teacher. Because, ma'am, our first meetings in Biology were ok but for a month, for example, we only met for class thrice." Respondent #11 said that their science teachers were holding other designations apart from teaching the subject which led to the nonattendance of their teacher in class. She expressed her sentiments saying: "My subject teachers had designations in the school, so some, although not all of them, especially in the Integrated Science for first year, were not able to attend our classes regularly. Hence, we only reported during classes and we discussed the concepts just among ourselves." Respondent #18 revealed a similar concern saying:

> "Our teacher in science was busy as well. She was our school principal then so we were not given much attention."

Aside from the absenteeism of the teacher during class schedule, the students had also experienced having teacher who has low enthusiasm for teaching science. Some of the students in this study described their science teacher as someone who has not done significant things to show to them that they should love science.

Respondent #12 expressed her feelings saying: "I like science but the teacher did not project the idea of loving science so what happened was that I was no longer motivated to search more on science."

Some of the students revealed that their teachers were not able to show concern or caring behavior enough to be motivated to like the subject. They added that they were not motivated to learn the subject because their teacher has not shown to them how to do it. The students pointed out that if the teacher is interesting and motivating, they acquire higher confidence and are able to apply their knowledge in science as compared to a boring teacher. They believed that a science teacher should be energetic and passionate when teaching lessons in science so that they would capture their desire to listen and learn.

Respondent #17 expressed her views regarding her teacher:

> "I think, the teacher is a big factor in raising my confidence and in improving my knowledge and acquisition for science. So, if the teacher is interesting and motivating, the more I am also encouraged to listen and learn more compared to when he/she is boring."

But then again, the students in this research study had confirmed that having a teacher of low commitment to teaching science in the classroom had significantly disrupted their learning of science. They have a preconceived notion that science concepts or topics are connected to one another; hence, the absence of the teacher during class discussion resulted in the *difficulty for students to understand the topic.* The failure of the teacher to elaborate the information to the students had caused *the inability of the students to connect previous information to new one.* The

students also revealed that their knowledge of science concepts is low as well as their interest to learn had decreased too. Excerpts from the students' responses are shown below:

> Respondent #8 said: "Science is connected to many topics. For example, Biology is related to Physical Science so I am at loss in that aspect."
>
> Respondent #13 cited: "For an instance there are these concepts that we should have mastered already but were not taught well to us. I am supposed to know that already because it was included in a subject I had already taken before but it is like I am back down in the primary level because I need to learn those before I can acquire new knowledge."

An evidence of disrupted learning as a consequence of teacher absenteeism is shown in the students' academic performance. The students' achievement (Obeng-Denteh, Yeboah, Sam, & Monkah, 2011) as well as classroom participation (Hacket, 2009) are negatively affected when their teacher is out of the classroom. The more the teacher is absent from the class, the lower the students' performance or achievement as commonly manifested in their scores. Similarly, when the learning routine is disturbed or interrupted due to frequent absences of the teacher, the students' desire to learn vanishes (Carter, 2010). When a teacher is absent from the classroom, the instructional transfer of course objectives to learners is compromised due to the change in classroom management skills (Performance Audit Report, 2011). As a result of this, there is a gap in the instructional process because the teaching has become fragmented (Miller, 2012). This finding strongly supports the claim of the students of this study that they had difficulty connecting previous topics to the recent one.

Another essential component of teacher commitment is teacher enthusiasm (Ibrahim et al., 2014; Yukl, 2010). In this study, teacher enthusiasm is conceptualized as the instructional behavior of teacher that is lively and engaging in teaching a specific classroom subject (Kunter, Frenzel, Nagy, Baumert, & Pekrun, 2011). More specifically, the teacher instructional behavior should be motivating, stimulating, energetic, and use sense of humor in teaching (Walberg & Paik, 2000). Previous studies have argued that enthusiastic teachers promote or uphold learning and student achievement (Keller, Neumann, & Fischer, 2013; Kunter et al., 2013). Similarly, teacher enthusiasm is positively connected to the students' level of interest as well as their intrinsic motivation (Keller, Goetz, Becker, Morger, & Hensley, 2014; Kim & Schallert, 2014). Student involvement and enjoyment are positively influenced by teacher enthusiasm (Kunter et al., 2013).

Unmistakably, the role of teacher commitment to student learning has been long established over the past decades. Successful learning (Janisch & Johnson, 2003) and academic achievements (Solomon, 2007) had been reported as the positive contributions of teacher commitment to students learning. Teacher commitment is linked to sincerity and students are more likely to listen, follow, and respect their teachers if they show sincerity to them (Sun, 2015). The teachers are truly influential in the teaching-learning process wherein their behaviors and actions affect students' learning outcomes. Hence, the teacher instructional behavior should be motivating, stimulating, energetic, and use sense of humor in teaching (Walberg & Paik, 2000). Teachers should bear in mind what Oliver Wendell Holmes Sr. said that, "It's faith in something and enthusiasm for something that makes a life worth living."

4. Conclusion

The educational landscape has changed however the students still encountered various academic adversities related to teachers of science which indeed disrupted their learning in the classroom. As a consequence of having teachers who have limited pedagogical content knowledge and little commitment to teach, the students in this study were not encouraged to learn science; they lost interest to learn science as well as they have developed a negative attitude towards their teachers and the subject.

In the same manner, the students experienced difficulty in understanding the topic and inability to connect previous information to new one because of having a teacher of low commitment/engagement to teach science in the classroom. Though the participants of this study are limited and are not enough to generalize the pedagogical content knowledge and commitment of the science teachers, however the experiences of the students can be used as a framework to improve the teaching of science. Thus, institutions of learning should continuously strive to enhance the teachers' competencies and commitments. A policy that specifically promotes the teachers' development in teaching science should be given priority in every learning institution.

5. Recommendations

From the findings of this study, the following are recommended:

The problem concerning teachers having poor pedagogical content knowledge skill is genuinely disturbing. Thus, it is recommended that teachers should continuously enhance their pedagogical content knowledge skills by attending training and seminars focusing on this aspect. The school may also conduct in-service training and seminars to enhance their teachers' pedagogical content knowledge and constant monitoring and evaluation of teachers should be implemented.

The importance of teachers' behavior has been established by many studies conducted. The teachers' commitment has a significant influence on the students' motivation to learn science in the classroom. Therefore, teachers must be able to show their commitment to teaching their students using their unwavering engagement during their class schedule. The teacher's absence in the classroom must be counterbalanced with other learning activities carefully planned by the teacher so as not to sacrifice the necessary learning outcomes for that session.

References

Bianchini, J. A. (2011). How to foster student–student learning of science? The student, the teacher and the subject matter. *Cultural Studies of Science Education, 6*(4), 871-882.Available at: https://doi.org/10.1007/s11422-011-9359-x.

Carter, J. (2010). *A correlational study of principals' leadership style and teacher absenteeism.* Doctoral Dissertation. Retrieved from: http://acumen.lib.ua.edu/content/u0015/0000001/0000418/u0015_0000001_0000_418.pdf.

Chalufour, I. (2010). *Learning to teach science: Strategies that support teacher practice. Early Childhood Research and Practice.* Paper presented at the Collected Papers from the SEED Conference.

Chesebro, J. L., & McCroskey, J. C. (2001). The relationship of teacher clarity and immediacy with student state receiver apprehension, affect, and cognitive learning. *Communication Education, 50*(1), 59-68.Available at: https://doi.org/10.1080/03634520109379232.

Comadena, M. E., Hunt, S. K., & Simonds, C. J. (2007). The effects of teacher clarity, nonverbal immediacy, and caring on student motivation, affective and cognitive learning. *Communication Research Reports, 24*(3), 241-248.Available at: https://doi.org/10.1080/08824090701446617.

Hacket, R. (2009). Absenteeism high in prestige schools in PoS. Trinidad and Tobago. Guardian Online. Retrieved from: http://www.guardian.co.tt/.

Ibrahim, M. S., Ghavifekr, S., Ling, S., Siraj, S., & Azeez, M. I. K. (2014). Can transformational leadership influence on teachers' commitment towards organization, teaching profession, and students learning? A quantitative analysis. *Asia Pacific Education Review, 15*(2), 177-190.Available at: https://doi.org/10.1007/s12564-013-9308-3.

International Council for Science. (2011). *Report of the ICSU Ad-hoc review panel on science education.* Paris: International Council for Science.

Jackson, A., & Davis, G. (2000). *Turning points 2000: Educating adolescents in the 21st century.* New York: Teachers College Press.

Janisch, C., & Johnson, M. (2003). Effective literacy practices and challenging curriculum for at-risk learners: Great expectations. *Journal of Education for Students Placed at Risk, 8*(3), 295-308.Available at: https://doi.org/10.1207/s15327671espr0803_1.

Keller, M., Neumann, K., & Fischer, H. (2013). Teacher enthusiasm and student achievement. In J. Hattie & E.M. Andermann (Eds.), International guide to student achievement (pp. 247-250). New York: Routledge.

Keller, M., Goetz, T., Becker, E., Morger, V., & Hensley, L. (2014). Feeling and showing a new conceptualization of dispositional teacher enthusiasm and its relation to students' interest. *Learning and Instruction, 33*, 29-38.Available at: 10.1016/j.learninstruc.2014.03.001.

Kim, T., & Schallert, D. (2014). Mediating effects of teacher enthusiasm and peer enthusiasm on students' interest in the college classroom. *Contemporary Educational Psychology, 39*, 134-144.Available at: 10.1016/j.cedpsych.2014.03.002.

Kunter, M., Frenzel, A., Nagy, G., Baumert, J., & Pekrun, R. (2011). Teacher enthusiasm: Dimensionality and context specificity. *Contemporary Educational Psychology, 36*(4), 289-301.Available at: https://doi.org/10.1016/j.cedpsych.2011.07.001.

Kunter, M., Klusmann, U., Baumert, J., Richter, D., Voss, T., & Hachfeld, A. (2013). Professional competence of teachers: Effects on instructional quality and student development. *Journal of Educational Psychology, 105*(3), 805-820.Available at: 10.1037/a0032583.

Miller, S. K., Smith, D. C., & Ennis, L. S. (2006). The effects of race, place, class, and gender on instructional strategies in Kentucky's seventh grade science classes: Individual and school level analyses. *Journal of Rural Social Sciences, 21*(2), 65-88.

Miller, R. (2012). Teacher absence as a leading indicator of student achievement: New national data offer opportunity to examine cost of teacher absence relative to learning loss: Center for American Progress. Retrieved from: http://www.americanprogress.org/wp-content/uploads/2012/11/TeacherAbsence-6.pdf.

Mottet, T. P., Garza, R., Beebe, S. A., Houser, M. L., Jurrells, S., & Furler, L. (2008). Instructional communication predictors of ninth-grade students' affective learning in math and science. *Communication Education, 57*(3), 333-355.Available at: https://doi.org/10.1080/03634520801989950.

National Academy of Sciences. (2010). *Rising above the gathering storm, Revisited: Rapidly approaching category 5.* Washington, D.C: National Academies Press.

National Research Council. (2012a). *Education for life and work: Developing transferable knowledge and skills in the 21st century.* Washington D.C: National Academies.

NGSS Lead States. (2013). *Next generation science standards: for states, by states. : . .* Washington D.C: National Academies.

Obeng-Denteh, W., Yeboah, E. A., Sam, C., & Monkah, J. E. (2011). The impact of student and teacher absenteeism on student performance at the junior high school: the case of the Kumasi-metro school district. *Cont J Educ Res, 4*(1), 7-17.

Omar, S., & Aziz, I. (2002). Form positive values and employee commitment in the organization: Economic Council (pp. 32-33): Dewan Ekonomi.

Performance Audit Report. (2011). Teacher absenteeism in Solomon Islands primary schools. National Parliament Paper, No.19.

Perry, T., Steele, C., & Hillard, I., A. (2003). *Young, gifted, and black: Promoting high achievement among African American students.* Boston: Beacon Press.

Prensky, M. (2001). Digital natives, digital immigrants, on the horizon (Vol. 9, pp. 5): MCB University Press.

Riley, J. R., & Masten, A. S. (2005). Resilience in context. In Resilience in children, families, and communities (pp. 13-25). Boston, MA: Springer.

Sackes, M. (2012). How often do early childhood teachers teach science concepts? Determinants of the frequency of science teaching in kindergarten. *European Early Childhood Education Research Journal, 22*(2), 169-184.Available at: https://doi.org/10.1080/1350293x.2012.704305.

Solomon, C. (2007). *The relationships among middle level leadership, teacher commitment, teacher collaborative efficacy, and student achievement.* PhD Dissertation. University of Missouri, Columbia, MI.

Sun, J. (2015). Conceptualizing the critical path linked by teacher commitment. *Journal of Educational Administration, 53*(5), 542-624.Available at: https://doi.org/10.1108/jea-05-2013-0063.

Tomlinson, C., Brimijoin, K., & Narvaez, L. (2008). *The differentiated school: Making revolutionary changes in teaching and learning.* Alexandria, CA: ASCD.

Trna, J., & Trnova, E. (2015). The current paradigms of science education and their expected impact on curriculum. *Procedia-Social and Behavioral Sciences, 197*(25), 271-277.Available at: https://doi.org/10.1016/j.sbspro.2015.07.135.

UNESCO. (2010). *Current challenges in basic science education.* Paris 07 SP, France: UNESCO Education Sector 7, Place de Fontenoy 75352.

Walberg, H., & Paik, S. (2000). *Effective educational practices.* Brussels: International Academy of Education.

Wayne, A. J., & Youngs, P. (2003). Teacher characteristics and student achievement gains: A review. *Review of Educational Research, 73*(1), 89-122.Available at: https://doi.org/10.3102/00346543073001089.

Whiteside, V. (2006). *Meeting the challenge of no child left behind: How an inner-city middle school succeeded.* Unpublished Doctoral Dissertation, Fordham University, New York, NY.

Wieman, C. (2007). Science education in the 21st century using the tools of science to teach science- Using the tools of science to teach science (pp. 61-64): In Forum for the future of higher education.

Yukl, G. (2010). *Leadership in organization* (7th ed.). Upper Saddle River, NJ: Prentice Hall.

Zins, J., Bloodworth, M., Weissberg, R., & Walberg, H. (2004). *The scientific base linking social and emotional learning to school success. Building academic success on social and emotional learning: What does the research say?* New York: Teachers College Press.