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Teacher Noticing: Exploring the Nexus between Effective Implementation and Academic Performance of Basic 12 Students in Geometry in Builsa South District

Enoch Kabinaa Suglo*

Department of Mathematics, Ken Hammer Senior High/Technical School, Goaso, Ghana

Research Article

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***For Correspondence:** Enoch Kabinaa Suglo, Department of Mathematics, Ken Hammer Senior High/Technical School, Goaso, Ghana

Email: enochsuglo85@gmail.com

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ABSTRACT

Teachers' noticing has become a crucial topic in recent studies because many believe that the teacher's noticing, interpretation and attention to students during lesson activities have a great impact on students' learning and academic performance. This study therefore aimed to explore the nexus between effective noticing implementation and the academic performance of basic 12 students in geometry. The study was purely quantitative descriptive research with a population and sample size of 360 and 186, respectively. A simple random sampling technique was used to select the sample members. Data for the study were collected using a questionnaire survey and a Geometry Achievement Test. Data analysis was done using SPSS's descriptive procedures and the simple linear regression model. The study found that: 1) there was a significant relationship between effective implementation of noticing in teaching and students' academic performance in geometry, p (.019). 2). the study recommended that teachers should effectively implement their noticing skills during geometry and mathematics lessons so as to enhance students' learning and academic performance.

Keywords: Noticing; Geometry nexus; SPSS; Students

INTRODUCTION

Various scholars have highlighted that noticing has become an important concept for teachers to explore to help them improve their day-to-day teaching in the classroom. For instance, Weyers, König, Scheiner, Santagata and Kaiser conducted a survey of recent research studies on mathematics teacher noticing published between July 2019 and 2022 [1]. The authors built their study upon an earlier review of literature on teacher noticing in various disciplines. Scholars believe that the topic of teacher noticing has gained prominence in conversations around professional development and competence for instructors [2]. Many aspects and processes of noticing have been extended to include recognizing significant and noteworthy classroom episodes, drawing connections between these incidents and more general teaching and learning concepts and reasoning about classroom interactions [3].

Although teacher-observing activities and their underlying meanings have been studied for decades, Sherin, Jacobs and Philipp noted that a new wave of empirical investigations has resulted from these approaches' more constructivist focus on student thinking and strategies. Berliner pointed out that through cognition and reflection connected to teaching practices and experiences, teachers' competence and consequently, their noticing evolve across several stages [4]. The idea of attention-enhancing teachers' awareness of pupils and their comprehension of the material is central to one important conception of teacher noticing [5,6]. Four key viewpoints that have significantly influenced research on teacher noticing over the past 20 years have been highlighted in recent survey papers. The four main perspectives on teacher noticing were as follows:

- The perspective from cognitive psychology, which defines noticing as what teachers' pay attention to and interpret.
- The perspective from sociocultural, which emphasizes the social and situated aspect of teacher noticing and is frequently linked to the term "professional vision".
- The perspective from discipline-specific psychology, which focuses on strategies for increasing teacher awareness.
- The perspective from expertise-related psychology, which emphasizes the distinctions between experts and novices.

According to Blömeke et al., teachers' noticing abilities are viewed as a requirement for delivering high-quality education, which in turn conditions student learning progress [7]. The teacher's visible conduct in the classroom and how well he or she initiates and supports students' learning show their instructional quality, as noted by Kunter et al [8]. To advance students' learning, teachers must carefully consider what to pay attention to, what to ignore and how to interpret what they notice. In order to ensure efficient teaching and learning, teachers must filter pertinent information and make impromptu decisions due to the complex and dynamic nature of classroom instruction. In the discourse surrounding teacher expertise and professional competence in recent decades, teacher noticing—defined as "the specialized ways in which teachers observe and make sense of classroom events and instructional details"—has taken center stage. Teaching noticing includes a variety of specialized viewpoints, such as discipline, which concentrates on purposefully drawing attention to and raising awareness of particular facets of a teacher's work [9]. Research from this perspective mostly adheres to Mason's discipline of noticing, which describes strategies for helping educators become more perceptive and present while avoiding a robotic or reactionary approach to practice. Teacher noticing has been conceptualized as a component of professional competence in recent theoretical and empirical work [10,11]. There is a better understanding of the nature, components, and development of the teacher-notice construct thanks to a wealth of theoretical discussion [12]. Qualitative research emphasizes the importance of particular knowledge components for teachers to be aware of, like understanding mathematical learning progressions [13]. One of the primary components of a teacher's professional competence is their knowledge of many domains that are relevant to teaching [14]. Sherin and van ES et al., described teacher's instructional quality to include the capacity to draw connections and use knowledge-based reasoning to influence learning.

Statement of the problem

The practical nature of geometry lessons in senior high school core mathematics requires that every student become an active participant in the teaching and learning process so as to enhance understanding and learning outcomes. In this context, teachers are expected to always pay attention to every student's learning habits and respond to students' individual needs and actions in the geometry classroom. This puts a lot on the teacher's table to deal with during every instructional session. The critical question to ask is: Are teachers able to effectively implement their noticing skills and competencies in such a manner that their interpretation and attention to what they notice about students do not affect the students learning? This question is very critical due to the high level of potential that teachers may notice students' actions and situations in class, interpret these students wrongly and, as such, give unproductive attention to these students. For instance, it is common to hear teachers describe nodding-asleep students in the classroom as lazy, hyperactive students as stubborn, etc. In this context, the teachers who describe students as stubborn and lazy may decide not to engage such students in classroom activities based on how they interpret the particular students. The students therefore lose the opportunity to learn. The aforementioned instances show how teachers' noticing, interpretation and attention to students during lesson activities impact negatively or positively on students' learning and academic performance. In the classroom, teachers may largely focus on a few things, neglecting other things and drawing conclusions from what they observe. This implies that a teacher's noticing of his or her students' contributions and actions during lessons has an immense impact on how the teacher interacts with the students during class activities. This study therefore aimed to explore the nexus between teacher-noticed implementation and the academic performance of basic 12 students in geometry.

Objective of the study

The study aimed to;

- Ascertain whether there is a significant relationship between teachers' implementation of noticing in geometry lessons and students' academic performance in geometry.

Research hypothesis

The following hypothesis was formulated in line with the objective of the study

- There is no significant relationship between teachers' implementation of noticing in geometry lessons and students' academic performance in geometry

Significance of the study

The findings would be of immense importance to students, as they will help them enhance their geometry learning and performance. The findings would also be of immense importance to parents in the sense that investment in their wards will not be wasted as the wards will successfully complete and graduate to other levels of the educational structure. The findings will also benefit teachers, as they will help them effectively implement noticing in their classroom activities for improvement in students' academic performance. Last but not least, this study would equally benefit scholars and researchers who are interested in research relating to students' learning and academic performance in various mathematics concepts.

Noticing in teaching versus academic performance

Research on the relationship between noticing and instructional quality: The function of psychological and cognitive constructs was examined by Cross Francis, Eker, Liu, Lloyd, and Bharaj. Their work emphasized the importance of qualitative methods in noticing research and took into account the intricate relationships that exist between post-instructional noticing, beliefs, knowledge and instructional effectiveness. Specifically, the findings showed that there is no guarantee that high levels of noticing in the classroom are associated with great instructional quality. It's thought that teachers can design meaningful learning experiences without worrying about their students' mental processes after a lesson.

Melhuish et al., highlighted the subjectivity of teacher noticing when they discovered that the researchers' assessments of the classroom using the mathematical quality of instruction instrument were only weakly correlated with what instructors saw and reported about their own classes.

Through interviews and the use of the mathematical quality instruction questionnaire to rate video clips of the teachers teaching, Cross Francis et al. evaluated the post-instructional noticing of six teachers [15]. Three teachers were found to have either high or low alignment for both noticing level and teaching quality, according to the authors. The other three teachers showed misalignment for high instructional quality but low notice level, which the authors also noted. This contentious conclusion was deductively linked to the professional identities and views of teachers, which may or may not encourage pupils to pay attention to their mathematical thinking.

Yang, Kaiser, König, and Blömeke conducted a study about video-based assessment of teacher noticing in the domains of perception, interpretation and decision-making competence with 203 teachers from China and 118 teachers from Germany [16]. The study's conclusions showed that when it came to identifying elements of general pedagogy, German instructors outperformed Chinese teachers by a substantial margin. On the other hand, Chinese educators did better than their German counterparts in identifying elements related to the teaching of mathematics. The authors also disclosed that the primary determinants of teachers' professional noticing are sociological and cultural elements, including differing philosophical orientations, teacher education traditions, and teaching and mathematical curriculum traditions.

The study "Teacher noticing: Advancing understanding of teaching, learning, policy and practice in mathematics education" was conducted by Lau and Man [17]. The authors examined a sizable number of research articles that add to the emerging field of teacher observation, with an emphasis on ways to improve our knowledge of practice, policy, teaching and learning in mathematics education. When taken as a whole, these publications emphasized the research that has been done in this field while also pointing out the necessity for additional study to provide a suitable agenda for upcoming investigations. In closing, the authors expressed their hope that scholars and professionals interested in mathematics education can work together to find solutions to the problems that still need to be solved and to take on the new ones.

In a design experiment, Stockero, Rupnow and Pascoe detailed how prospective teachers analyzed a classroom film that had been slightly modified to help them recognize significant mathematical thinking among the complexities of instruction. In fact, the results showed that there might not be a need to restrict the scope, duration, or mathematical concentration of the educational materials used to foster noticing abilities.

MATERIALS AND METHODS

Methods and design

Study design: The study employed a quantitative descriptive research design. The rationale for this choice of design is that the study aimed to measure its variables using numerical terms as well as gather information, which would have led to making accurate predictions about the research problem and the hypothesis of the study. The study, however, did not intend to manipulate any of the study variables.

Population and sample

Based on the students' program electives, the students were originally divided into thirteen classrooms. The classes included 3A1–3A2, 3B1–3B5, 3C1–3C3, 3D1–3D2 and 3F1. A minimum of 35 and a maximum of 55 students were in each classroom. At the time of data collection, there were 360 students available. This occurred after students who were eligible but unable to participate in the study were eliminated. These included students who were unwell, on leave or chronic absentees. For this reason, 360 students were the study's available population. A research population, according to Shukla,

is an assemblage of all the units that have the variable characteristic under inquiry in common and for which the study's conclusions can be broadly generalized.

Sampling technique

The study sample was selected using the table that Krejcie and Morgan proposed for selecting sample size from a particular population [18]. According to Krejcie and Morgan's table, the sample size of S=186 is optimal for a population of N=360. Using a simple random selection method, the sample members were selected based on the classrooms. Numbers from one to thirteen were assigned to the thirteen classes. Three classes out of thirteen were chosen using a random number generator which produced a total of 186 students as the sample for the study.

Data collection instrument

Two tools were utilized in the study to gather data. Two of these were an accomplishment test and a questionnaire that was created with Google Forms. Students were given the achievement test and Google Form survey questions. Statements about the use of teacher noticing were included in the questionnaire's design. Students were instructed to choose from the following options to react to the items in the Google survey form: Strongly Disagree (SD), Disagree (D), Agree (A) and Strongly Agree (SA).

Data collection procedure

Prior to beginning data collection, the study obtained consent from the participants' school academic board head. After permission was obtained, the students received an orientation outlining the aim and objective of the research. Researchers like Denzin and Lincoln have expressed the opinion that it is critical to adhere to professional guidelines and codes of conduct that regulate interactions with participants, so the study felt it was imperative to have obtained permission and consent from both the participants and the school administration. The students first of all wrote the achievement test, after which they were guided to respond to the questionnaire items.

Data analysis instruments

The study employed a simple linear regression model to analyze data collected from the respondents. The simple linear regression model helped to determine the correlation between the implementation of noticing and students'' academic performance.

RESULTS AND DISCUSSION

The data for the study were analyzed using descriptive procedures which produced item by item results of the questionnaire statements. The outcome of the analysis is represented the statistical Table 1.

Table 1. Descriptive statistics of students' views regarding implementation of noticing in teaching by teachers in the classroom.

	Mean	Std. deviation
Item 1	3.58	0.515
Item 2	2.58	0.996
Item 3	3.17	0.718
Item 4	3.58	0.669
Item 5	3.42	0.515
Item 6	3.83	0.389
Item 7	3.75	0.452
Item 8	2.67	1.155

Item 9	1.92	0.996
Item 10	3.58	0.515

Testing hypothesis

H_0: There is no significant relationship between teachers' implementation of noticing in geometry lessons and students' academic performance in geometry.

The idea was that the successful use of teacher noticing in the classroom had a substantial impact on students' academic performance. Therefore, the goal of this hypothesis was to determine whether or not students' academic performance improved as a result of the use of noticing in the classroom. Refer to Table 2 for the simple linear regression analysis results.

Table 2. The regression analysis results regarding the relationship between effective implementation of noticing in teaching and students achievement test scores.

Std. error	r^2	df	F	Sig.
4.283	0.112	185	2.215	0.019[b]

As can be seen in Table 2, the study found a marginal correlation p=0.019 between students' achievement test scores in geometry and the effective implementation of noticing in teaching by teachers'. The successful use of teacher noticing by the teacher predicted the geometry performance of the students, r^2=0.112, F(185)=2.215, p=0.019. The percentage of variance explained by the model is indicated by the r^2 in Table 2. Therefore, the effective use of noticing in teaching (an independent variable) explained 11.2% of the variance in students' achievement test scores (a dependent variable), according to the r-squared value of 0.112. This indicates that the effective implementation of teachers' noticing has a marginal impact on students' academic achievement in geometry. The range of estimates for the association between students' academic success and teachers' ability to effectively apply noticing is demonstrated by the standard error of 4.28. There is a link between the findings of this current study and another study on the topic "Teacher noticing in mathematics education: A review of recent developments in instructional quality" by Weyers, Konig, Scheiner, Santagata and Kaiser. Despite the varying effect sizes, the authors' findings were consistent with earlier studies in that they showed a positive link between teacher knowledge and noticing [19]. The authors went on to say that in order to comprehend the relationship between teacher knowledge and noticing better, it is essential to identify the variables that moderate this link. Examples of these variables include the level of skill of the teachers. The findings of the study also corroborate those of Blomeke et al., who indicated that teachers' noticing abilities are a requirement for delivering high-quality education, which in turn contributes to students' ability to learn.

CONCLUSION

The study's evidence showed that effective implementation of noticing in teaching geometry would positively impact students' academic performance in geometry. This conclusion is based on the existence of a significant relationship between the effective implementation of noticing in teaching and students' academic performance in geometry. This finding therefore provides robust evidence that the effective application of teacher observation in teaching and learning positively influences students' learning outcomes. Teachers are able to identify situations in the teaching and learning classroom, attend to these situations with appropriate interpretation and provide needed support to enhance students' learning.

RECOMMENDATION

The study recommends teachers effectively implement their noticing skills during geometry and mathematics lessons so as to enhance students' learning skills and academic performance. Teachers' noticing should be accompanied by objective interpretation and attention to students during lesson activities so as to ensure ultimate support for students with learning challenges and behavior problems. This implies that a teacher's noticing of students' contributions and actions during lessons should have a positive link with how teachers interact with students during class activities.

ETHICAL CLEARANCE

The study was given ethical clearance by the FumSec School Ethical Review Academic Headmaster/Board Chair.

COMPETING INTEREST

I, the author of this paper declare that there is known competing financial interest or personal relationships that could have appeared to influence the outcome of this study.

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