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Primary school mathematics teachers' ideas, beliefs, and practices of constructivist instructional strategies

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Abstract

The study explored Ghanaian primary school mathematics teachers' ideas, beliefs and practices of constructivist instructional strategies (CIS). The design for the study was a sequential exploratory design, comprising two hundred and fifty-two (252) mathematics teachers (126 lower primary teachers and 126 upper primary teachers), who were purposively selected from school districts in the Upper East region. The qualitative data consisted of interview responses and lesson observations. The quantitative data consisting mainly of teachers' responses to a 3-point Likert scale questionnaire items, helped to investigate relationship in two quantitative variables. The results indicated that through CIS pupils were able to construct their own understanding, and were willing to follow learner-centred method of instruction. Additionally, teachers became aware of social interaction and authentic learning tasks, two aspects of CIS. It was also determined that as teachers' perceptions of CIS increased, their frequency of use of selected CIS correspondingly increased. The implications of this study are that mathematics teachers should be provided with resources that would enable them teach using CIS. To forestall this, in-service and professional development programmes should continually be organized for teachers to keep them abreast of CIS.

Keywords: constructivist instructional strategies, mathematics teachers' beliefs; mathematics teachers' practices

Introduction

The falling standards of pupils' mathematics achievement have triggered the growing attention of researchers, educators, parents and other stakeholders to find an appropriate solution to this downward trend over the last two decades (Blum, 2002). In our schools today, instructional delivery by most basic school teachers is non-interactive, and this encourages pupils to learn by rote memorization (Dramani, 2003; Gyasi, 2003). Rote learning approaches, in themselves, do not assist in prescribing solutions to the myriad of problems a pupil encounters in life, neither do they help in building an intelligent and active citizenry (Ghana Education Service). According to Jones and Brader-Araje (2002), social constructivism and educational

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constructivism (including theories of learning and pedagogy), have had and continue to have the greatest impact on instruction and curriculum design because they seem to be the most conducive to integration into current educational approaches. In Ghana, there are growing numbers of programmes which incorporate child-centred methods in lesson delivery methodologies to meet pupils' needs, and constructivism encompasses most of these child-centred methods (Associates for Change, 2011).

A general acceptance of the positive impact of constructivist approaches on pupils' mathematics dispositions abounds in the education literature (Burris & Garton, 2007). Even though most teachers have heard about the potential of the use of the constructivist instructional strategies to improve pupils' academic performance (Abbot & Fouts, 2003; Herman & Knobloch, 2004; Cunningham, 2004; Opoku-Asare, 2004; Kim, 2005), there is little research that has examined teachers' ideas, beliefs and practices of use of constructivist instructional strategies in Ghana. Teachers usually struggle between their desire to cover a lot of materials and the necessity of using more time-consuming methods that allow pupils to construct meaning from their lessons (Franklin, 2001). There seems to be a general haste to cover topics without given pupils the opportunity to acquire deeper understanding of the topics (Anamuah-Mensah, Mereku & Ghartey-Ampiah, 2008).

Literature Review

Research shows that teachers have varied ideas, beliefs, and practices of constructivist instructional strategies and their classroom practices, which are likely to be more effective when it is informed by an understanding of how pupils learn. It is therefore important that major implications of learning theory reflect in classroom practice (Palmer, 2005). Constructivism ideally represents most teachers' ideas, beliefs and practices of mathematics teaching in the classroom (Philip, 2000). Such environments provide multiple representations that avoid over simplification and represent the complexity of the real world; emphasise knowledge construction instead of knowledge reproduction; emphasise authentic tasks in a meaningful context rather than abstract instruction out of context; provide learning environments such as real-world settings or case-based learning instead of predetermined sequences of instruction; encourage thoughtful reflection on experience; enable context and content dependent knowledge construction; and, support collaborative construction of knowledge through social negotiation, but not competition among pupils for recognition (Jonassen, 1994).

Although, pupils' prior knowledge, to a large extent, informs teachers to use constructivist instructional strategies, novice teachers often hold insufficient conceptions of prior knowledge and its role in instruction to effectively implement constructivist teaching practices, as compared to expert teachers (Mayer, 2004). In the case of pre-service teachers, for example, despite the method courses and teacher preparation programmes they have experienced, they still find it difficult to implement appropriate instructional practices to support constructivist learning in their classrooms (Haney & MacArthur, 2002). Windschitl (2002) acknowledges that the most profound challenges for teachers are not associated merely with acquiring new skills but with making personal sense of constructivism as a basis for instruction. By holding onto a constructivist view, teachers are able to develop mathematics to describe their observations of the world. They see mathematics as continually growing, changing overtime, as pupils explore solutions to new problems with teachers acting as facilitators (Golafshani, 2001). Constructivist teachers exhibit a number of discernible qualities distinctly different from teachers in teacher-

centred classrooms. They are able to create flexibly an opportunity for pupils to construct their own knowledge and use their energy in a meaningful way in the learning environment (Mary, 1999). They motivate pupils to learn and apply their new knowledge in everyday situation (Savery, 2006). They ask critical questions, and listen attentively to pupils' responses. They take advantage of pupils' natural curiosity and help them to understand concepts. In constructivist classrooms, pupils are able to think, reason, communicate, reflect upon, and critique the mathematics they encounter; their classroom relationships become a resource for developing their mathematical competencies and identities (Turnuklu & Yesildere, 2007).

In the constructivist classroom, pupil-pupil and pupil-teacher dialogue is very important in an interactive sense. The classrooms are structured in ways that foster group work, and ensure that knowledge moves from teacher to pupil, from pupil to pupil, and from pupil to teacher (Crawford, & White, 1999). This arrangement encourages social interactions where pupils are able to air their views about a topic. These interactions could be inquiry-based or argumentative in nature (Wood & Turner-Vorbeck, 2001). In a constructivist classroom, pupils are encouraged to use varied resources to help them make interpretations. These resources, mostly manipulative materials, play a vital role in basic school mathematics because at that stage most pupils face difficulties in thinking in abstract terms. In fact, implementing classroom teaching that is consistent with a constructivist view of learning is still a major issue (Palmer, 2005). Teaching requires teachers who understand pupils' existing ideas, beliefs and practices that are able to create learning experiences that allow pupils to either accommodate or restructure their knowledge frameworks for new learning (Mayer, 2004). Changing teachers' beliefs about knowledge, teaching and learning is important in helping them develop effective teaching. For basic school mathematics teachers, they must have a sound understanding of relevant content and how to teach it. They should learn and apply models and theories that advance pupils' thinking through sound instructional strategies. They must be educated both on "content knowledge" and "pedagogical knowledge" to effectively deliver instructions (Turnuklu, & Yesildere, 2007).

The purpose of the study was to explore Ghanaian primary school mathematics teachers' ideas, beliefs and practices of constructivist instructional strategies. It is designed to address the following fundamental questions: (1) What levels of selected constructivist instructional strategies do primary school mathematics teachers use in their instructions? (2) What knowledge and perception do primary school mathematics teachers possess or hold about constructivist instructional strategies? (3) Is there a relationship between primary school mathematics teachers' perception of constructivist instructional strategies and use of selected constructivist instructional strategies?

Method

Design

A mixed methods approach, a technique for integrating both quantitative and qualitative data, was used in this study (Creswell, 2013). This approach was used because neither method (qualitative or quantitative) is individually sufficient to thoroughly capture the details of the study. When used together, both methods complement each other to provide a more complete picture of the situation being studied (Tashakkori & Teddlie, 2008). In this study, a sequential exploratory design was used consisting of two stages (Ivankova, Creswell & Stick, 2006). The first stage involved the collection and analysis of the qualitative data, while the second stage

focused on the collection and analysis of the quantitative data to shed more light on the qualitative results. In this instance, both primary school mathematics teachers' perception of constructivist instructional strategies and their use of selected constructivist instructional strategies, were explored qualitatively. Then, the two variables were correlated to determine if any relationship existed between them.

Participants

Two hundred and fifty-two (252) teachers, comprising 126 lower primary school mathematics teachers and 126 upper primary school mathematics teachers, participated in the study. Seven (7) schools were purposively selected from the total number of schools in each of the six districts in the Upper East Region. Then, forty-two (42) teachers were randomly selected from the seven (7) schools. The names of the districts are pseudonyms, and they do not bear any resemblance to any district in the Upper East region. Table 1 shows the summary of the participants in this study.

Table 1: Summary of Participants in the Study

District	Number of schools	Sampled number of schools	Number of teachers
District A	50	7	42
District B	79	7	42
District C	71	7	42
District D	73	7	42
District E	57	7	42
District F	64	7	42
Total	394	42	252

Research Instruments

Data were gathered through questionnaire, interviews and observations. The questionnaire, comprising forty-four Likert scale items, described mathematics teachers' perception and their instructional strategies. These items were crafted around perception on constructivism, classroom management strategies, teaching and learning activities, and pupils' assessment procedures, on a 3-point Likert scale. The interviews focused on the teaching approaches used by the teachers, factors that hinder such approaches and their beliefs and practices of constructivism. In all, eight (8) teachers were interviewed, with each interview lasting 20 minutes. The interview data were then transcribed, coded and analyzed into identifiable themes. The interviews helped to clarify the inconsistencies in participants' responses to some questionnaire items. Eight (8) mathematics teachers were observed when delivering lesson on three main variables: the physical environment, the instructional practices and pupils' academic performance. Each observation lasted for 40 minutes.

Reliability and Validity

Reliability is the extent to which an experiment, test, or any measuring procedure yields the same result on repeated trials (Gay & Airasian, 2003). Reliability is usually calculated using a statistic called the Cronbach's alpha, a coefficient (a number between 0 and 1) that is used to

rate the internal consistency (homogeneity) or the correlation of the items in a test. Cronbach's alpha, is calculated using the formula $\alpha = \frac{nc}{[v+(n-1)c]}$, where n = number of test items; c = average inter-item covariance among items; and v = average variance. If a test has a strong internal consistency, most measurement experts agree that it should show only moderate correlation among items (.70 to 0.90). If correlations between items are too low, it is likely that they are measuring different traits and therefore, not all items should be included in a test that is supposed to measure only one trait. If item correlations are too high, it is likely that some of the items included are redundant, and should be removed from the test. In this study, Cronbach's alpha coefficient for test items was .8, indicating that the internal consistency and reliability of the survey instrument was very good. A value of 0.8 is generally considered reliable (Vergis & Hardy 2010).

Validity refers to the degree to which an assessment measures what it is supposed to measure (Kaplan & Saccuzzo, 2012). According to Creswell (2003), one form of validity is content validity which asks, "Do the items measure the content they were intended to measure?" (p. 157). To address this, the instrument was sent to professors with extensive knowledge in effective pedagogical practices, including constructivist instructional strategies. Their feedback and comments were considered in constructing a final version of the questionnaire and interview questions.

Results

Practice of Selected Constructivist Instructional Strategies (CIS)

The extent to which teachers practiced selected constructivist instructional strategies is indicated in table 2. A sub-scale mean above and below 3 were considered positive and negative respectively, while 3 was considered as neutral. The sub-scale mean scores ranged between (M = 2.35, SD = .77) and (M = 3.71, SD = .51), while the frequencies and percentages of the selected constructivist instructional strategies ranged between 4(1.6%) and 150(59.5%). The result indicated that teachers have positive perception towards constructivist management strategies (M = 3.71, SD = .51). Eighty (80) teachers representing 31.7% indicated that they frequently use constructivist management strategies in their classrooms, 115 teachers representing 45.6% indicated that they sometimes use constructivist management strategies in their classrooms, while 10 teachers representing 4% indicated that they rarely use constructivist management strategies in their classrooms. The overall mean score for constructivist teaching and learning activities (M = 3.32, SD = .41), confirmed that the teachers have knowledge about constructivist teaching and learning activities. Eleven (11) teachers representing (4.4%) frequently and 150 teachers representing 59.5% sometimes designed lessons to incorporate activities such as hands-on learning, multi-option assignments, real-world problems, active investigation, and role play. However, 44 teachers representing 17.4% rarely incorporated these activities in their lessons. This suggests that majority of teachers saw the need to actively and meaningfully involve their pupils during classroom instruction. The overall mean score for constructivist assessment strategies (M = 2.35, SD = .77) was rated the least among the three sub-scales. This indicated that pupils do not have control over the type of assessment being used during instruction. One hundred and fifty (150) representing 59.5% rarely let their pupils have a say in assessment, while 4 teachers representing 1.6% and 51 teachers representing 20.2% frequently and sometimes respectively provide opportunities for their pupils to get involved in their own assessment. The results indicated that most teachers sometimes practice

constructivist classroom management strategies, they actively engage their pupils during instructions. Nevertheless, they do not involve and consult their pupils in classroom assessment.

Primary School Mathematics Teachers' Constructivist Approaches

To better understand the aspect of constructivism often used by teachers in their lessons, some teachers were further interviewed. In the results in which a specific teacher is quoted, a pseudonym is used rather than the teacher's actual name. The responses given are representative of the total number of teachers. The following conversations took place between the interviewer and teachers.

Interviewer:	How do you involve your pupils in your classroom discussions?
T6:	I give a lot of class exercises to test their understanding.
T1:	I allow the pupils to demonstrate procedures to consolidate their thinking.
T3:	I assists pupils to interact with the TLMs
T4:	I encourage pupils to have presentations during small and whole classroom interactions.
T7:	I involve my pupils in the class discussions.

The teachers' responses indicated that majority of primary school teachers use interactive constructivist approach to teaching. Teachers' lesson plans were examined and the observations made are indicated in Tables 2 and 3.

Table 2 Matrix of Mathematics teachers' Instructional Practices and Use of selected constructivist instructional strategies

Use of selected constructivist instructional strategies (CIS)						
Sub-scale	Frequently	Sometimes	Rarely	Total	Sub scale Mean (M)	Standard deviation (SD)
Constructivist Management Strategies (CMS	80(31.7)	115(45.6)	10(4.0)	205(81.3)	3.71	.51
Constructivist Teaching and Learning Activities (CTLA)	11(4.4)	150(59.5)	44(17.4)	205(81.3)	3.52	.41
Constructivist Assessment Strategies (CAS)	4(1.6)	51(20.2)	150(59.5)	205(81.3)	2.35	.77

Table 3 Matrix of Instructional practices used by teachers in the classroom

Lessons Observed								
	Practice Observed (1) Not-observed (0)							
Teachers' Classroom Instructional practices	T1	T2	T3	T4	T5	T6	T7	T8
Introduce the topic in relation to pupils' relevant previous knowledge	1	1	1	1	1	1	1	1
Provide concrete material for pupils	0	1	1	1	1	1	1	0
Provide opportunity for pupils to engage in authentic task	0	1	1	1	1	1	1	0
Pose challenging questions	0	0	0	1	1	1	1	0
Serve as a facilitator by allowing pupils to construct their own knowledge	0	0	0	0	0	0	0	0
Encourage healthy discourse in the classroom	1	1	1	1	1	1	1	1
Allow pupils to work in groups	0	0	1	0	0	1	1	0
Pupils determine the assessment tool	0	0	0	0	0	0	0	0
Assessment is ongoing	1	1	1	1	1	1	1	1
Evidence of marking	1	1	1	1	1	1	1	1

Footnotes: Under practice observed 1 means practice present and 0 means practice not present; T1= 1st teacher observed, T2= 2nd teacher observed, etc**.**

All eight (8) teachers assessed the current understanding of their pupils at the beginning of their lessons, and used the current understanding of the pupils as a focal point for their lessons. This connection between new learning and current understanding serves us the foundation of knowledge construction. Out of the eight teachers observed, six provided concrete materials for their pupils to engage in authentic task. This provided the opportunity for their pupils to experience real life situations in the classroom setting. For instance, T7 created a miniature supermarket in the classroom when dealing with the topic "measurement of time and money". Post observation interview with T1 and T8 revealed that they had no idea of any real life example to relate to the topic they taught. Although, four (4) of the teachers posed challenging questions during their lessons, they could not wait for their pupils to come up with their own views, but rushed to pose leading questions which do not aid better understanding of concepts. The teachers responded to pupils' questions in a polite and simple manner. They encouraged their pupils to answer questions through the use of words such as "well done", "thumbs up", "excellent", and "try again". However, only three teachers engaged their pupils in group activities. The teachers constantly assessed the understanding of their pupils through questions and independent assignments. On the other hand, the pupils did not take part in determining the assessment tools confirmed by the questionnaire results (see Table 2).

Teachers' Perception of CIS

The frequencies and percentages of teachers' responses ranged between 5(2%) to 158(62.7%), while the mean scores and standard deviation ranged between 3.67(SD = .95) and 4.13(SD = .87). Generally, the teachers have a positive perception towards constructivist instructional strategies (M = 3.90, SD = .62). One hundred (158) of the teachers representing 62.7% and 140 of the teachers representing 55.5% agreed that constructivist approach improves pupils' academic performance and enables them develop positive attitude towards mathematics respectively, while 5 teachers representing 2% and 9 representing 3.6% disagreed. One hundred

and twelve (112) representing 44.4% agreed to the statement, "I teach mathematics using the constructivist approach", while seventeen (17) teachers representing 6.7% disagreed to the same statement. One hundred and twenty-eight (128) teachers representing 50.8% agreed that they effectively implement the constructivist approach, while thirteen (13) representing 5.1% disagreed. This suggests that the teachers have adequate knowledge or skills of constructivist instructional strategies, and they effectively implement these strategies in their classrooms, a contradiction to a few of their responses (see table 3).

Primary School Mathematics Teachers' Knowledge of CIS

Out of the 205 teachers, 150 representing 59.5% conceived constructivism as a theory of learning where teachers assist pupils to construct understanding of concepts (see table 3). During the interview session, the following conversation took place between the interviewer and teachers. The responses are representative of the entire number of teachers.

Interviewer:	What is constructivism?
T1:	It is a theory of learning where teachers help pupils to construct their own understanding through activities.
T5:	It is the way and manner in which the teacher will help the pupils to construct meaning or understand the topic.
T7:	Is an approach to teaching where teachers help pupils to construct understanding of the topic

Fifty (50) teachers representing 19.8%, linked constructivism to leaner-centred instructions. A teacher responded as:

T11:	It is a child-centred method of teaching where teachers' act as facilitators.

Five (5) teachers representing 2% had no idea about what constructivism is. Sixteen (16) teachers had not been introduced to constructivist approach to teaching, five (5) teachers had no idea of constructivist instructional strategies (see Table 3).

Characteristics of Constructivism

The total number here is not the same as the total number of participants who answered this item. This was an open-ended question and the responses were computed as 100%. The results show that, 178 teachers representing 60.5% of teachers indicated social interactions as one of the characteristics of constructivism. Examples of responses are: "encouraging pupils to speak their mind" and "interactions among pupils" on the other hand, 116 teachers representing 39.5% of teachers indicated giving authentic learning task as one of the characteristics of constructivism. Examples of responses are: "using concrete materials during lessons" and "using real life examples" (see Table 3).

Table 3: Teachers' perception and knowledge of CIS, characteristics of CIS, and aspects of CIS that promote learning

Teachers' Perception of CIS (Percentages of responses are in parentheses)

Item	Agree	Neutral	Disagree	Total	Sub-scale mean(SMS)	Standard deviation (SD)
1.Constructivist approach improves pupils' academic performance	158(62.7)	42(16.6)	5(2)	205(81.3)	4.13	.87
2. I teach mathematics using the constructivist approach	112(44.4)	76(30.2)	17(6.7)	205(81.3)	3.65	.95
3. I effectively implement this approach in my classroom	128(50.8)	64(25.4)	13(5.1)	205(81.3)	3.79	.95
4. It enables pupils develop positive attitude towards mathematics	140(55.5)	56(22.2)	9(3.6)	205(81.3)	4.05	.94
SMS/SD					3.90	.62

Teachers' knowledge of CIS

Category of teachers' beliefs and practices	Frequency	Percentage (%)
Pupils construct understanding	150	59.5
Pupil-centred	50	19.8
No Idea	5	2.0
Total	205	81.2

Characteristics of CIS

Characteristics of CIS	Frequency	Percentage (%)
Social Interactions	178	60.5
Authentic Examples	116	39.5
Total	294	100

Aspects of CIS that promote pupils' learning

Aspects of CIS that promote pupils' learning	Frequency	Percentage (%)
Social Interactions	121	38.7
Authentic tasks	192	61.3
Total	313	100

Aspects of CIS that Promote Pupils' Learning

In order to know the aspect of CIS primary school mathematics teachers' believe promote pupils' learning. Teachers' responses indicated two aspects as presented in Table 3. Note: Some teachers gave more than one response. The total number here is not the same as the total number of participants who answered this item. This was an open-ended question and the responses were computed as 100%.

Table 8 shows that, 121(38.7%) of teachers indicated that social interactions promotes pupils' learning, while 192(61.3%) of teachers indicated that giving authentic tasks promotes pupils' learning. It can be said from the results that majority of teachers think that authentic tasks

promotes learning. Closely linked to this is the impact of constructivist-based instruction on pupils' academic performance.

Primary School Mathematics Teachers' Reasons for Using the Constructivist Approach

The teachers gave the following reasons why they use constructivist approach to teaching: It enhances assessment, understanding, and interactions among pupils.

Interviewer:	What was your reason for using the constructivist approach to teaching?
T6:	Mathematics is such that you don't have to talk too much. It is practical work, so once you use the constructivist approach you are involving the pupils. You are doing it with them and using it to assess pupils is faster than any other method.
T5:	I do because it helps the pupils to interact among themselves and also because it involves practical activities.
T4:	I think it improves the understanding of the pupils.
T1:	Because it enables the pupils to understand the concept of the topic you are teaching.

The teachers' responses indicated that mathematics teachers have different reasons for using the constructivist approach to teaching.

Relationship between Primary School Mathematics Teachers' Perception of CIS and their use of Selected CIS

The relationship between primary school mathematics teachers' perception of CIS and their use of selected CIS (Constructivist management strategies, constructivist teaching and learning activities, and constructivist assessment strategies).

Table 4: Relationship between Primary School Mathematics Teachers' Perception of CIS and their use of Selected CIS

Correlations		Perception	CMS	CTLA	CAS
Perception	Pearson Correlation	1	.319**	.435**	.060
	Sig. (2-tailed)		.000	.000	.390
	N	205	205	205	205
CMS	Pearson Correlation	.319**	1	.459**	.242**
	Sig. (2-tailed)	.000		.000	.000
	N	205	205	205	205
CTLA	Pearson Correlation	.435**	.459**	1	.357**
	Sig. (2-tailed)	.000	.000		.000
	N	205	205	205	205
CAS	Pearson Correlation	.060	.242**	.357**	1
	Sig. (2-tailed)	.390	.000	.000	
	N	205	205	205	205

**. Correlation is significant at the 0.01 level (2-tailed).
CMS = Constructivist management strategies, CTLA = Constructivist teaching and learning activities, CAS = Constructivist assessment strategies

Correlation was run between teachers' perception of constructivist instructional strategies and their use of selected constructivist instructional strategies. A medium positive correlation existed between teachers' perception and CMS at .319 and CTLA at .435, which was also statistically significant at $p < .01$. Also, a small positive correlation existed between teachers' perception and CAS at .060. Generally, the results indicated that as teachers' perception of constructivist instructional strategies increases, their frequency of use of selected constructivist instructional strategies also increases.

Discussions

Most primary school mathematics teachers have experienced constructivist instructional strategies and have used this approach in their classrooms. These teachers have also been exposed to a variety of teaching methods during their teacher education programmes. These results concur with global results that show that teachers are more likely to receive training in the constructivist approach during their college preparation programmes, and are also much more inclined to use constructivist-based pedagogy in their classroom (Andrew, 2007). The mean scores and standard deviations for constructivist management strategies are greater than those in constructivist teaching and learning activities, whilst those in constructivist teaching and learning strategies are greater than those in assessment strategies. These strategies and activities include using social negotiation to solve pupils' problems, facilitating pupil-centred activities, using hands-on learning activities, and enhancing critical thinking and problem solving skills. The teachers' comments about constructivist assessment strategies indicate they often did not involve their pupils during assessment strategies (Koul, Fisher & Ernest (2005). The teachers' inability to frequently implement the constructivist instructional strategies could be due to their inadequate pedagogical knowledge of constructivist instructional strategies (Schoenfeld, 2002). It could also be due to the teachers' inability to have expert and experienced teachers who would expose them to constructivist instructional strategies (Kauchak & Eggen, 1998). The lesson observations and the interview sessions conducted have created an awareness that primary school teachers involved their pupils during instruction, and they also actively engaged their pupils through social interaction and authentic learning tasks. During the lesson observations, teachers created a connection between pupils' previous knowledge and the current concept being taught. The extent to which teachers facilitate this process significantly affects how well pupils learn (Mayer, 2004). Generally, pupils have different learning styles and respond to specific learning tasks differently. Therefore, teachers should always encourage them to select their own topics for projects that bring them joy (Wolfe, 2001). This study has shown that teachers never gave pupils appropriate feedback during assessment, because they did not explain to pupils why they selected some answer choices. In fact, good feedback can potentially improve pupils' learning (Barshdale-lead &Thomas, 2000).

Teachers' ideas, beliefs and practices, undoubtedly inform their decisions in the classroom. The mean score and standard deviation for teachers' perception of constructivism, suggests that the teachers have positive perception of constructivist instructional strategies. The teachers believed that constructivist instructional strategies promote understanding, interaction and socialisation among pupils. The results are consistent with claims by Herman and Knobloch (2004), who contend that the constructivist approach generate increased affective and cognitive outcomes, as well as increased pupils' positive dispositions (Burris & Garton, 2007). However, the findings expose some contradictions in teachers' perception of constructivist instructional strategies. Although, many teachers agreed that they effectively implement constructivist

instructional strategies, only a few teachers said that they would be able to effectively implement the constructivist instructional strategies. This contradiction may be due to the teachers' inability to carefully read and analyze some items on the questionnaire. The findings further show that majority of the teachers perceived constructivist instructional strategies as capable of assisting pupils to construct their own understanding (Slavin, 2000; Mascolol & Fischer; 2005, & Savery, 2006) . Effective teaching is largely shaped by the kinds of dispositions and thoughts that teachers hold for their teaching (Richardson, 1996). When the primary school mathematics teachers expressed their views about constructivism, they mentioned social interactions and authentic learning tasks as very crucial. Although they claimed that they assist pupils to construct their own understanding, it was apparent during the observation that they tried to make use of pupils' relevant previous knowledge. The teachers' inability to mention these two components may be due to ignorance or an oversight.

The Pearson correlation coefficient shows a medium positive correlation between teachers' perception and constructivist management strategies and constructivist teaching and learning activities. Furthermore, a small positive correlation existed between teachers' perception and constructivist assessment strategies. As teachers' perception of constructivist instructional strategies increases, their frequency of use of selected constructivist instructional strategies increases. This suggest that, if teachers are effectively exposed to constructivist instructional strategies, it would boost their desire to implement them in the classroom. The relationship between teachers' perception of constructivist instructional strategies and their use of selected constructivist instructional strategies was not an appreciable large positive correlation, although the teachers had positive perception of constructivist instructional strategies.

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