UNIVERSITY OF EDUCATION, WINNEBA
DEPARTMENT OF SCIENCE EDUCATION

STAKEHOLDERS' PERCEPTIONS OF THE INTERNSHIP PROGRAMME OF THE DEPARTMENT OF SCIENCE EDUCATION OF THE UNVERSITY OF EDUCATION, WINNEBA, GHANA

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Ph.D

2013

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M. Phil (SCIENCE EDUCATION)

A Thesis in the Department of Science Education, Faculty of Science Education, Submitted to School of Research and Graduate Studies, University of Education,Winneba, in partial fulfillment of the requirements for award of Doctor of Philosophy Degree in Science Education.

August, 2013

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ACKNOWLEDGEMENTS

I am highly indebted to my Principal Supervisor, Professor Jophus Anamuah-Mensah, former Vice-Chancellor of the University of Education, Winneba for his encouragement and invaluable help he gave me from the planning stage to the end of the study. His e-mails and face to face meetings gave me much courage to sail through. My gratitude is also due to Professor Akwasi Asabere-Ameyaw, Vice-Chancellor of the University of Education, Winneba. Prof. Asabere-Ameyaw has been my mentor and lecturer since my undergraduate student days. He has been a catalyst to the finishing of this work.

My special thanks are due to Professor Stella Yemisi Erinosho, for her role and interest in this study. She painstakingly read through my draft proposal and instruments that were used to collect data. She on many occasions sat with Prof. Anamuah-Mensah to get me directed on this study.

I would like to extend my sincere thanks to Associate Professor Mawudem Koku Amedeker, Dean of the Faculty of Science Education, who voluntarily assisted me to get my proposal focused for the study. I am grateful to the following Faculty members who helped me in one way or the other. They were: Dr. Kojo Taale, Associate Professor J. Eminah, Dr. Ngman-Wara Ernest, Dr Young Tachie and Mrs Vida Eshun, all of the Department of Science Education, Winneba. All the other members of the Department of Science Education, Winneba, played very significant roles in helping towards the completion of this study. I appreciate their help. I thank Dr Yidana Yussuf, Acting Head of ICT Department (UEW), Winneba, for his help in inferential statistics and proof reading some chapters of this work. Mr Peter Akayuure, of the Department of

Mathematics, I owe you appreciations for answering my calls at short notices to help draw some diagrams using Excel.

I am indebted to Programme Reform and Alignment for Increasing Competencies of Teacher and Application in Learning (PRACTICAL) Science and Mathematics II project for sponsoring me to the University of Utretch, Netherlands, where I had the opportunity to meet experts in teacher education for much help. My meetings with Dr Meier, a teacher educator of Ivstitiae Illustra Nos Sol (IVLOS) Institute of Education for 3-months can never be forgotten.

I am much grateful to Associate Professor Eric C. Quaye of the Department of Botany, University of Cape Coast, the Ghanaian supervisor of the PRACTICAL Project, and Leo de Feiter, the Netherlands supervisor of the project for their various roles on my visit to the Netherlands. I shall not forget Prof. Harrie Eijkelhof, Dean of Faculty of Physics, Utretch and all the staff of Freudenthal Institute for Science and Mathematics Education, Amsterdam.

My wife, God's word is true, for you have remained my help all this time. You and our children have given me the moral challenge to finish hard. Thanks be to God.

DEDICATION

To my father and mother who brought me to this earth.

To my faithful wife, Gladys A. Awuni

To my children, Nana Aisha, Mambangba, Adelwini and Awingura

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ABSTRACT

The purpose of this study was to investigate stakeholders' perceptions of the student internship programme (SIP) of the University of Education, Winneba as practised by science education interns across a sample of Senior High Schools in Ghana. The study employed mixed methods that used questionnaires, interviews, focus group discussions, documents and observation to collect data. The total sample of stakeholders was 568. This was made up of five sub-groups of stakeholders comprising 103 science education interns, 67 mentors, 67 heads of Senior High Schools, 320 SHS students and 11 university supervisors. The sampling technique was purposive. Descriptive statistics was used to describe perceptions whilst an independent samples t-test was used to test one null hypothesis. The key findings were that stakeholders had positive perceptions of the SIP and its impact on interns' professional growth and development. The study also found significant difference between mentors and university supervisors perceptions of the intern classroom teaching practices. All participating stakeholders were of the opinion that the one slot evaluation of intern by the faculty was inadequate. There was polarity of opinions on the one-year duration of out segment section of SIP. Mentors and their heads of schools perceived that the duration of one year was adequate but interns and university supervisors said it was too long. However, based on the fact that majority of student teachers of UEW are SHS graduates, who are complete novice of the teaching profession, it is recommended that the SIP out segment period should remain as one academic year in duration and ought not to be shortened. Secondly, in-service training of teachers in Ghana is inadequate; therefore there is the need for a longer period of practicum for student teachers.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Overview

This chapter provides the background to the study. It also gives a statement of the problem, justification for the study, the purpose of the study, the objectives of the study, research questions and the significance of the study. The assumptions made about the study, limitations, delimitations and operational definitions are also presented in the chapter.

1.2 Background to the Study

In many places, schools and universities are forming collaborations that provide insight into how best to prepare the pre-service teacher. These collaborations offer opportunities for experienced teachers to share their expertise and experiences with upcoming teachers as well as retool their own skills (Darling-Hammond, 2005). Partnership between the university and the school provides a pathway that allows the pre-service teacher to mature and become socialised into the teaching profession more quickly than in traditional student teaching preparation. These partnerships are sometimes called mentorship programmes. Mentoring is a prominent approach used in teacher professional development programmes in most countries (see Denson, 2008; Rice, 2006). In Ghana, attention is now being paid to this mode of teacher preparation by the Colleges of Education and the University of Education, Winneba. The University of Education, Winneba, has established a partnership programme known as Students' Internship Programme (SIP) with schools at the basic and second cycle levels for the practical component of its graduate teacher preparation across the country.

Among different approaches of training teachers such as mentoring, coaching and supervision, mentoring seems to be very effective in enhancing teachers' professional development (Carter, 2006; Yost, 2002). In the context of UEW's internship programme, the mentor is an experienced teacher who serves as an observer, a guide, a coach, a motivator and a supervisor Centre for Teacher Development and Action Research (CETDAR, 2009). Providing some kind of support to pre-service teachers in the form of mentoring is essential to develop them as potential professionals (Saban, 2002). However, the emergence of mentoring as a professional development strategy for teachers has not received due attention in the West African sub-region. Moreover, not much research has been carried out in the field of mentoring in the context of teacher preparation in Ghana since the introduction of that mode of teacher preparation by UEW in 2000. No full scale study exists to examine the practice of SIP by interns in schools and the impact of mentoring on pre-service science teachers' development in Ghana has been conducted. This study was therefore, designed to investigate the use of mentoring as a professional preparation and development strategy of pre-service science teachers in the Department of Science Education of the University of Education, Winneba (UEW). The Department of Science Education had a population of 572 undergraduate and 57 graduate students at the beginning of the 2009/2010 academic year when the study was conducted. Of the 572 students, 157 were in the final year and went on internship. The study focused on these students.

The student internship programme of UEW is an intensive school-based student teaching-learning experience that provides a structured and supervised clinical experience. It is a programme for the whole university (including its satellite campuses in Kumasi and Mampong), and students of all the faculties of the university are involved in the programme. It involves not just teaching strategies, but also

experiencing good practices with students in a variety of ways, with the questioning and thoughtful guidance of mentors for a full academic year in Basic and Senior High Schools as well as Colleges of Education. The internship programme of UEW focuses on a university-school partnership and is modelled on the Collaborative School Model (CSM) (CETDAR, 2009). Some of the guiding principles of this model include: (i) having interns to interact with a cohort of peers; (ii) encouraging professional development opportunities for mentors; and (iii) encouraging interns to participate in a whole school experience. The Students' Internship Handbook (CETDAR, 2009), states that the rationale for such a partnership is to produce teachers who demonstrate excellence in the classroom and who serve as leaders in the field of education. The university recognises that to become a teacher requires strong preparation in subject matter knowledge, the development of pedagogical skills, right dispositions and the acquisition of the ability to make good judgement in practice. However, such knowledge and skills are incomplete without attending thoughtfully to the particular qualities of life in classrooms, schools and communities.

The components of the UEW student internship programme are: (i) participation in school activities, (ii) mentoring by trained mentor, (iii) building of a teaching portfolio, (iv) development of a written statement of teaching philosophy that reflects each intern's teaching values, (v) reflective practice (vi) an action research project; and (vii) post internship seminar (CETDAR, 2009). This model is similar to the Professional Development Schools (PDS) of America described by Villegas-Reimers (2003). Darling-Hammond (2005) describes PDS as "spaces where prospective teacher and mentor teacher learning becomes (i) experimental, (ii) grounded in teacher questions, (iii) collaborative, (iv)connected to and derived from teachers' work with their students, and (v) sustained, intensive, and connected to other aspects of school

change." The organisation and structure of PDS in America vary from one partnership setting to another partnership setting and that makes the PDS model a bit different from the UEW model, which is the same in all school settings. The UEW programme enables students in their third year, after 16-week on-campus teaching practice, to go out to pre-tertiary institutions to engage in professional practice for a period of one academic year. Since 2011/2012 academic year, the out segment of internship has been reduced to sixteen weeks (one semester). The on-campus teaching practice (pre-internship seminar) and the methodology classes that are part of the regular academic curriculum of the University of Education, Winneba are expected to equip them with professional teaching skills needed to revitalise the teaching of the academic subjects in the Junior and Senior High Schools and Colleges of Education in Ghana. The Department of Science Education of the University emphasises the acquisition of science content and process skills of its students whilst the SIP emphasises on the acquisition of pedagogical strategies for effective teaching and learning.

In the opinion of Amedeker (2005), the acquisition of process skills by student teachers enables them to use critical thinking in their methods of teaching to promote and encourage critical thinking in their students. It is expected that teacher-trainees educated in the department would teach pupils of basic schools (the first 11 years of schooling-2 years of pre-school, 6 years of primary and 3 years of junior high school) and students of senior high schools using activities that would keep them participating actively throughout each lesson. The underlying philosophy for teacher education at UEW is that teachers are reflective decision-makers who facilitate student learning through daily reflection and acting on what they reflect on. It is through field-based experiences that opportunities are provided for student teachers to enhance their ability to engage in reflective strategies and to assess and improve their teaching behaviours.

Although the SIP has been going on since 2002, only two authors (Amedeker, 2005; Duodu, 2008) have researched the initial performance of the first few batches of interns.

Research on the Student Internship Programme is of national importance since it is an alternative form of preparing teachers where many partners collaborate in the training process. There is the need to find out the perceptions of the participants (interns, mentors, university lecturers, heads of partnership schools and SHS students) about the programme; and whether interns' practise teaching is having any impact on students' learning.

1.3 Statement of the Problem

Some concerns have been raised about the quality of teacher preparation and science teaching and learning in the basic and senior high schools in Ghana. These concerns stemmed from the dismal results reflected in national and international science performance of basic and senior high school students in Ghana. For example, Ghana participated in the Trends in International Mathematics and Science Study (TIMSS) assessment in 2003 and 2007. In the 2003 TIMSS results, Ghana scored second to last of the countries that participated (just ahead of South Africa) in both mathematics and science (Anamuah-Mensah, Asabere-Ameyaw & Mereku, 2004). This raises serious questions about the quality of teaching and learning in the schools and the state of teacher preparation. Ghana's poor performance in TIMSS 2003 and TIMSS 2007 could be attributed to the differences in pedagogical orientation, which is quite different from the one undergirding the test (see Appiah, 2010). In the 2007 TIMSS, the performance of Ghanaian students was nothing better than that of the 2003 (TIMSS, 2007).

At the end of JHS, a substantial proportion of pupils failed to get admission into SHS because of mass failure in mathematics and the sciences in the BECE. This has been attributed to poor tuition which reflects poor quality of teachers in the basic schools in Ghana (Anamuah-Mensah & Asabere-Ameyaw, 2009).

Similar results are reported at the Senior High School/West African School certificate examinations (SSSCE/WASSCE). Senior High School students have blamed teachers and government for the poor run of results in the 2009 and 2010 final West African Senior Secondary School Certificate Examinations (WASSCE)(The Ghanaian Journal, 2010). Many candidates failed to meet the bench mark for university admission (The Ghanaian Journal, 2010).

The perception of most stakeholders of education is that teachers are not well trained in methods of instruction (Anamuah-Mensah & asabere-Ameyaw, 2009) and therefore instruction is ineffective and there is not much learning. Agbeko (2007) also observed that pre-service teacher training in Ghana, between the period 1992 and 2002, had been beset with many problems including absence of links between the needs of the schools and teacher education, resulting in inadequate initial teacher preparation.

The Student Internship Programme (SIP) of the University of Education, Winneba (UEW), was introduced in September 2003 with the aim of improving the quality and effectiveness of teaching in Ghanaian schools (IEDE/UEW, 2004). The science programme of the Department of Science Education was, thus, restructured to incorporate new skills that student teachers would learn which will help to encourage the development of knowledge and skills in students during the internship and afterwards. Among the innovations introduced in the curricula of the Department of Science Education was the overhaul of the methodology component to include an intensive on-campus teaching practice (now called pre-internship seminar) that lasts an entire semester of 16

weeks. The science method course provides opportunities for student teachers to practice innovative ways of teaching science to students in the schools. Some studies have been carried out by Amedeker, (2005), Kwame-Asante (2005), Adinku (2008), Duodu (2008) and Dwamena (2010) into some aspect of the Student Internship Programme; but some major components of the programme have not been covered in these studies. For example, nothing is mentioned of the interns' action research, students' teaching portfolios, reflective practices or the changing philosophies of these interns about teaching and learning. But these are the main components of the SIP programme and should be issues of concern to the science teacher educator when researching into the programme.

The post internship seminar (usually called face-to-face), is the final component of the SIP programme and during which interns have deep interactions with department lecturers and supervisors. It is during this time that students are tasked to report on their reflective practices based on their portfolios. However, after more than 10 years of SIP implementation, no comprehensive study about has been carried out. It is imperative for these issues to be examined empirically in the context of the SIP programme. Gaining the support of the key stakeholders in exploring and revealing what is actually happening in science teaching and learning in our senior high schools is necessary for stakeholders to formulate a realistic picture of science teacher education in Ghana. Policy makers will like to know whether teachers produced by this model of teacher preparation will improve the teaching and learning of science in senior high schools in Ghana. This is the motivation for conducting this study. The need to identify stakeholders' perception of SIP becomes relevant.

1.4 Justification of the Study

The one-year SIP of UEW is the longest duration ever used by student teachers in Ghana for the purpose of teaching practice. All student teachers of the various faculties of the university take part in this programme. The expectation is that such long period will provide student teachers ample time to develop competencies in classroom teaching and ensure that they are equipped to contribute effectively to worthwhile learning. Since student internship is a new programme for teacher preparation, its continuous evaluation and feedback is imperative in improving the quality of the teacher preparation programme. The study is focussed on science interns because of the continuous outcry of parents on the mass failure of SHS students every year in the sciences (Anamuah-Mensah, Asabere-Ameyaw & Mereku, 2004). Despite the fact that the study involves only science interns of the Department of Science Education, Winneba, the influence of such teacher preparation programme on teachers in other subject areas can be pervasive in the long run. It is therefore important to study such a model. The findings can help to transform teacher preparation in Ghana and elsewhere on the African continent.

1.5 Purpose of the Study

The purpose of the study was to investigate the perceptions of various stakeholders on the state of Students' Internship Programme (SIP) of UEW as practised by science education interns across a sample of Senior High Schools in Ghana. It was to find out the effectiveness of the various components of the SIP and the extent to which the objectives were being achieved. The results would provide important feedback to help shape the activities of the internship programme.

1.6 Objectives of the Study

The objectives of the study were:

1. to find out the perceptions of the various stakeholders (science interns, mentors, university supervisors, heads of partnership schools, SHS students) about the students' internship programme;
2. identify the challenges science interns face during the implementation of the internship programme;
3. investigate whether the implementation of SIP in the schools is in consonance with its objectives.

These objectives were to help provide the needed information on the state of UEW's internship programme in order to help transform teacher preparation in Ghana, especially in science.

1.7 Research Questions

The following questions were addressed in the study:

1. What are the perceptions of science interns of:

   (a) the science mentor's support and effectiveness during the SIP?

   (b) the partnership school's support during the SIP?

   (c) the university supervisor's support and commitment during the SIP?

   (d) the internship duration and one time supervisor's assessment?

   (e) how well they were prepared for the SIP by the Department of Science Education?

   (f) the impact of SIP on their professional development?

   (g) the post internship seminar and the student teacher's portfolio?

2. What are the perceptions of science mentors on:

(a) the intern's pedagogical content knowledge base, teaching effectiveness and commitment during the SIP?

(b) the partnership school support during the SIP?

(c) the supervisor's support and commitment to the SIP?

(d) their own support and commitment during the SIP?

(e) the duration of internship and onetime assessment by the supervisor during SIP?

3. What are the perceptions of the university supervisors of the SIP?

(a) what are the university supervisors' perception of the intern's teaching effectiveness and commitment during the SIP?

(b) what are the university supervisors' perceptions of the duration of internship and onetime assessment of the intern by the supervisor during SIP?

4. Is there any significant difference in perceptions between the mentors and university supervisors of the SIP?

5. What are the perceptions of headmasters and headmistresses of the partnership schools of the intern's teaching effectiveness and commitment during the SIP?

6. What are the perceptions of Senior High School students of the intern's teaching effectiveness and commitment during the SIP?

7. Does the implementation of SIP in the schools align/agree with the objectives of the programme?

1.8 Hypothesis

The null hypothesis was stated to answer questions 4 at an alpha level of .05.

(i) There is no significant difference in the perceptions of university supervisors and science mentors about the students' internship programme.

1.9 Significance of the Study

In an effort to improve the teaching and learning of science in Ghanaian senior high schools and make the learning of science more attractive to students, this study is expected to be of great benefit to various stakeholders. First, this study will be of great benefit to the University of Education, Winneba, especially to the Department of Science Education whose students were involved in this study and the Institute of Educational Development and Extension (IEDE) which oversees the internship programme. The findings should enable the University of Education, Winneba, the Department of Science Education and the Ghana Education Service to appreciate the current status of SIP in schools -its merits and demerits- and to plan a better collaborative effort to improve the programme and revise current curriculum policies. Secondly, the results of the study could be used by CETDAR to help enhance the relationship and interactions between the three key stakeholders (interns, university science teacher educators and mentors) of the programme which in turn will go a long way to improve upon the preparation of highly skilled and effective science teachers for the nation. Thirdly, the Ministry of Education and the Ghana Education Service who are recipients of teachers trained at the University of Education, Winneba are also expected to benefit from the findings of this study - they will be informed of the calibre of teachers being trained through this partnership arrangement. Generally, this study should provide information on an aspect of teacher preparation (SIP) in Ghana that is regarded by teacher educators as essential for effective delivery in science.

1.10 Assumptions of the Study

The following assumptions underlie the study:

1. Entry level competencies of pre-service teachers for Level 400 science students in a full-time one year internship in schools are the same among participants in the study since they are trained by the same educators.
2. All pre-service teachers in this study have taken an instructional strategies course as part of the teacher preparation programme requirement that enables them to teach effectively.
3. Since all mentors of the science education interns were trained by UEW, they have the same level of competencies and mentoring skills.
4. The pre-service teachers, mentors and non-mentors accurately communicate their concerns through the various means of data collection instruments.

1.11 Limitations of the Study

The following are the limitations that underlie the study:

1. Conclusions may have been made based on data collected that fit the researcher's existing theory or preconceptions, and a selection of data that may have stood out to the researcher. However, the use of multiple approaches in collecting data may have helped to minimise this error.
2. The influence of the researcher on the setting or individuals studied, a problem known as reactivity, may have occurred.
3. The data obtained through the semi-structured and open-ended interviews are limited to the questions asked.
4. The generalisability of the data is limited to preservice teachers trained in the Department of Science Education, Winneba; and science mentors trained by CETDAR and who mentored science education interns covered in the study.

The information was collected from university science education supervisors, mentors of science education interns, science education interns, heads of SHS, SHS students of age range 17 to 19+ years and personnel of CETDAR. Hence, the conclusions of the study may have limited applications to other departments of the University of Education, Winneba, and other universities or colleges of education running similar but parallel programmes.

1.12 Delimitations of the Study

The following are the delimitations of the study:

1. The study focused on perceptions of stakeholders of the students' internship programme
2. The population of this study was confined to the 2009/2010 cohort of science interns registered for student teaching, the mentors assigned to them in the schools and SHS students taught by the interns.
3. This study covered only the internship programme of the Department of Science Education UEW.
4. Although some science education interns practice at Junior High Schools, the study sampled interns practising in SHS and did not extend to interns in Junior High Schools. Therefore, only science education mentors and science education interns in the senior high schools were sampled for this study.

1.13 Operational Definitions

Mentoring: Mentoring is a process in which a skilled and experienced person, the mentor, nurtures someone less skilled or inexperienced, the mentee. This may involve a mentor adopting a variety of roles of modelling, teaching, sponsoring, encouraging, counselling or befriending (Bonura, 2004), coaching, supporting, promoting (Lacey,1999) or even supervising and providing situational leadership to a mentee for the purpose of promoting the latter's professional and/or personal development (Peterson & Williams, 1998; Bonura, 2004). In the context of the

University of Education of Winneba's (UEW) internship programme, the mentor is to serve as an observer, a guide, a coach, a motivator and a supervisor (CETDAR, 2009). In the context of this study, mentoring is described as a combination of coaching, counselling and assessment where a classroom teacher in a school is delegated the responsibility for assisting pre-service teachers in their professional development.

Perceptions: Views or opinions held by an individual resulting from experience and external factors acting on the individual. Stakeholders' (interns, university supervisors, mentors, heads of SHS schools and SHS students) perceptions were measured by the use of questionnaires, interviews and focus group discussions.

Legitimate peripheral participation: Genuine involvement in the work of the group/organisation, even if one's abilities are undeveloped and contributions are small.

Self-efficacy: The perceived competence/confidence of an individual that he/she is capable of performing successfully a particular (difficult) task.

Teacher efficacy: The self-beliefs teachers possess enabling them to exercise a measure of control over their thoughts, feelings, and actions in the classroom.

Pedagogical content knowledge: Pedagogical content knowledge is a form of practical knowledge that is used by teachers to guide their actions in highly contextualised classroom settings. This form of practical knowledge entails, among other things: (a) knowledge of how to structure and represent academic content for direct teaching to students; (b) knowledge of the common conceptions, misconceptions, and difficulties that students encounter when learning particular content; and (c) knowledge of the specific teaching strategies that can be used to address students' learning needs in particular classroom circumstances.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Overview

This chapter covers the theoretical and conceptual framework of the study and the review of literature relevant to the study covering international perspective of teacher education, models of science teacher preparation, teacher education in Ghana, teacher education programme at the University of Education, Winneba, mentoring and models of mentorship, and theories that extend mentoring.

2.2 Theoretical Framework of the Study

Student teachers' internship involves social interactions in particular settings or environments. In order to understand the impact of social interactions and environments, social learning theory and social cognitive theory are explored in an effort to understand how they apply to human behaviour and knowledge acquisition under different contexts including that of mentoring.

Bandura's (1986) theory of social cognition provides a meaningful theoretical framework for analysing preservice teachers and their programmes. Social cognitive theory builds upon social learning theory (Bandura, 1977) which posits that people learn from one another through observation, imitation and modelling and posits that knowledge acquisition can be directly related to observing others within the context of social interactions, experiences and without the influences of media. Social learning theory explains human behaviour in terms of continuous reciprocal interaction between cognitive, behavioural and environmental influences. Social Cognitive Theory (SCT) describes learning in terms of the interrelationship between behaviour, environmental

factors, and personal factors. By this theory, it is suggested that if there is a close identification between the observer (intern) and the model (mentor) and if the observer has a good deal of self-efficacy and self-regulation, learning will most likely occur (Bandura, 1989). Skaalvik and Skaalvik (2010) observed that based on social cognitive theory, teacher self-efficacy may be conceptualised as individual teachers' beliefs in their own ability to plan, organise and carry out activities that are required to attain given educational goals. Self-regulation is what allows a person to control his or her response or behaviour when confronted with externally imposed stimuli. Feedback is an externally imposed control that works with a person's self-regulatory capability in order to make adjustments to behaviour. Learning is a function of the extent to which individuals are able to reflect upon and internalise their own successes and failures.

In school, for example, teachers have the challenge of improving the academic learning and confidence of the students in their charge. Using social cognitive theory as a framework, teachers can work to improve their students' emotional states and to correct their faulty self-beliefs and habits of thinking (personal factors), improve their academic skills and self-regulatory practices (behaviour), and alter the school and classroom structures that may work to undermine student success (environmental factors). According to Erawan (2011) an effective way to encourage the assimilation of teaching skills is to model skills. Erawan (2011) added that, mentoring practices (variables that involve modelling: enthusiasm, effective teaching, rapport with students, hands-on lessons, well-designed lesson, classroom management and syllabus language) have been identified with modelling effective primary science teaching.

Bandura (1988) says these are based on some sources that include mastery experiences, vicarious experiences, verbal and persuasion and emotional and

physiological states. According to Usher and Pajares (2008), the value of a mastery experience comes from providing an opportunity for individuals to see themselves complete an experience successfully. Individuals (interns in this case) can see the results of their actions. The student teacher practicum experiences that preservice teachers have to undergo in a teacher preparation programme can represent a mastery experience and can be the catalyst to their achievement and performance through vicarious experiences. Examples of vicarious experiences include observing others (Usher & Pajares, 2008) such as mentors, university faculty and/or peers. Participating in vicarious experiences such as observing an intern teaching allows the preservice teacher to compare themselves to other preservice teachers. These social models play an important role in boosting or undermining one's confidence to carry out a task.

Usher and Pajares (2008) described verbal and social persuasion as the encouragement and positive feedback one receives while performing a task. This feedback can increase the confidence in one's ability to perform. Preservice teachers crave feedback and reinforcement on their teaching skills. Ideally, they should receive multiple forms of feedback from course instructors, their mentors and university supervisors. The fourth source of efficacy is emotional and physiological states of the learner, and is described by Usher and Pajares (2008) as the varying degree of feelings related to personal competence based on the differing conditions.

Modelling influences can have diverse psychological effects. First, they foster acquisition of new competencies, cognitive skills and behaviour patterns in the observer. Second, they affect the level of motivation and restraints over behaviour that has been previously learned. Modelling influences also serve as social prompts that actuate and channel behaviour in social transactions. In addition, models often express emotional reactions that tend to elicit emotional arousal in observers.

2.3 Learning Theories

Learning occurs when experience causes a relatively permanent change in an individual's knowledge or behaviour. The change may be deliberate or unintentional, for better or for worse, correct or incorrect and conscious or unconscious (Hill, 2002). The changes resulting from learning are in the individual's behaviour or knowledge. Cognitive psychologists who focus on changes of knowledge believe learning is an internal mental activity that cannot be observed directly such as thinking, remembering and solving problems (Schwartz, Wasserman, & Robbins, 2002). Behaviourist theorists such as Watson emphasise the role of outside stimuli on learning, focusing on behaviour and observable responses (Woolfolk, 2007). Cognition refers to the mental processes involved in gaining knowledge and comprehension. These processes include thinking, knowing, remembering, judging and problem solving (Chery, 2010). These processes (thinking, remembering, judging and problem solving) are higher level functions of the brain, and encompass language, imagination, perception and planning.

2.3.1 Social Learning Theory

Social learning theory (Bandura, 1977) postulates that one mechanism by which individuals learn is observation of other individuals in their social environment. It emphasises the importance of observing and modelling the behaviours, attitudes and emotional reactions of others. The theory proposes that learning occurs through four stages of imitation: close contact, imitation of superiors, understanding concepts and role model behaviour.

Merriam and Carafarella (1999) help elucidate the relevance of the social learning theory in reference to mentoring by stating that "Social learning theories contribute to adult learning by highlighting the importance of social context and

explicating the process of modelling and mentoring". The inclusion of social learning theory to extend mentor theory is the result of social learning theory's emphasis on how social context and the environment reinforce behaviour. This theory considers that people learn from one another and from observation, imitation and modelling. Social learning theory is also relevant because it is seen as a bridge between behaviourist learning theories and cognitive learning theories (Ormond, 1999).

The processes involved in observational learning as Eisenschmidt (2006) explains are attention, retention (including cognitive organisation and motor rehearsal), motor reproduction, motivation (including external and self-reinforcement) and observer characteristics (such as sensory capacities, arousal level and perceptual set and past reinforcement). Strategies consistent with social learning theories include mentoring, apprenticeship, on the job training and internships. Each of these involves learning in a social situation whereby novice teachers' model more experienced teachers or co-workers. For example, the theory of mentoring proposes that through psychological support, a mentor is able to help a protégé develop his/her sense of competence, confidence and self-esteem (Allen & Day, 2002). The social learning theory extends this mentoring theory by contending that this development is achieved through observing and modelling the behaviours and attitudes of others (Ormond, 1999). Bandura's (1977) theory helps explain human behaviour in terms of continuous reciprocal interaction between cognitive, behavioural and environmental influences. As Bahn (2001) observed, Bandura's version of social learning theory is unique in that it presents a sophisticated form by adopting a truly cognitive-behaviourism approach that addresses the interaction between how we think and how we act. Its extension of the mentoring theory lies in the fact that it helps clarify how learned behaviour can be prompted by others.

Bahn (2001) posits that after observing and modelling performance, the observer may develop a pattern of behaviour consistent or different from the original model. Modelling is considered a powerful means of transmitting values, knowledge, attitudes and even patterns of thought and behaviour (Bandura, 1977). This sort of imitative learning is likely to occur when the role model (i.e. mentor) is relevant, credible, knowledgeable, and if the behaviour is rewarded by others (Eby, Lockwood, & Butts, 2006). The potential of an effective mentor's influence on the behaviour and perception of a protégé are readily apparent and coalesce with social learning theory to form an analytical lens from which to view the impact of the mentoring relationship on a student.

2.3.2 Social Cognitive Theory

Bandura's social cognitive theory consists of two important concepts of self-efficacy and self-regulated learning. Self-efficacy refers to ones perceived beliefs and judgments about ones capability to complete a given task or activity necessary to attain designated levels of performance. Social cognitive theory builds upon social learning theory and posits that knowledge acquisition can be directly related to observing others within the context of social interactions, experiences and outside media influences. This theory further evolved when it was suggested that if there is a close identification between the observer and the model and if the observer has a good deal of self-efficacy, learning will most likely occur (Bandura, 1989). According to Bandura (1989), identification allows the observer to feel a one-on-one connection with the individual being imitated and will be more likely to achieve those imitations if the observer feels that he or she has the ability to follow through with the imitated action. The characteristics of social cognitive theory are inherent within an effective mentoring

relationship, which looks to match the intern and the mentor based on similar interests and backgrounds.

Consistent with mentoring theory, social cognitive theory suggests that student teachers, need social support as an incentive, meaning and worth to what they do (Bandura, 1988). Those individuals that figure predominantly in student's lives serve as an indispensable source of knowledge that contribute to what and how students think. Guided instruction and modelling that effectively conveys abstract rules of reasoning promote cognitive development in learners. Socially guided learning also encourages self-directed learning by providing learners with the conceptual tools needed to gain new knowledge and to deal intelligently with the varied situations they encounter in their everyday lives.

School-based mentoring programmes have the potential to become part of the dynamic social reality that novices experience during their formative years. Social cognitive theory helps explain why many school-based mentoring programmes have been successful in promoting career awareness and advancement (Underhill, 2005). In theory, mentoring programmes initiated within an educational context, and imploring the strategies of an effective mentorship programme, have the potential to greatly influence the growth and perceptions of protégés described by the social cognitive theory.

2.3.3 Situated Cognition Theory

The theory of situated cognition (Brown, Collins, & Duguid, 1989; Schell, 2002) posits that learning is (i) essentially a social phenomenon that is rooted in its context, and (ii) transforms learners' identities. The theory of situated cognition claims that every human thought is adapted to the environment in which it is situated, because

what people perceive, how they conceive of their activity and what they physically do develop together (Schell, 2002). It is argued that situated cognition provides a broad, useful framework focusing on everyday cognition, authentic tasks and the use of in-context apprenticeship training.

In theory, situated learning has the potential advantage of (i) placing learners (interns) in realistic settings where socially acquired ways of knowing are often valued, (ii) increasing the likelihood of application within similar contexts, and (iii) enhancing strategic application of the learner's prior knowledge on a given subject (Schell, 2002). To the behaviourist, learning is determined by external environmental structures that lead to re-enforcement of behaviour rather than to mental processing or conscious thought on the part of the learner. Cognitivists on the other hand insist that there are mental processes "internal and conscious representation of the world'' that are essential for human learning (Bates & Poole, 2003). On the contrary, situated learning looks at the learning phenomenon in a broader and holistic perspective incorporating behaviours (actions) and cognition by recognising the interaction between people and the environment and the role of situation (Wilson & Myers, 2000). Learning and cognition are fundamentally situated. Given the chance to observe and practice in situ the behaviour of members of a culture, people pick up relevant jargons, imitate behaviours and gradually start to act in accordance with the cultural norms. Student teachers can therefore pick up what mentors do in the classroom by observing and imitating them.

2.3.4 Situated Cognition and Cognitive Apprenticeship

According to Brown et al. (1989), situated learning theory and the cognitive apprenticeship suggest that skills are acquired through authentic contexts and by communicating with peers and experts about those contexts. For example, learning

your first language or foreign language by immersion is widely held to be easier than learning languages from textbooks and vocabulary lists. Cognitive apprenticeship is a model of learning that provides practical steps for applying situated cognition theory. Vygotsky (1978) advocated apprentice-like coaching and said that learning tasks should be situated in zones of proximal development just beyond what a student can accomplish alone, but not to a level of impossibility. Vygotsky (1978) advocates employing peer and teacher scaffolding to reach appropriate levels of engagement. Vygotsky's concept of zones of proximal development suggests that we design authentic tasks that are more difficult than students may handle alone, but not so difficult that they cannot be solved with the support of peers or teachers who model appropriate strategies. John Dewey cited by Oliver (1999), was also an advocate of situated approaches to learning, arguing that understanding is defined within a social unit. He posits, learning cannot be defined by outsiders but rather, emerges via collaboration. This contrasts with cognitive psychologist who would argue that learning is objectively definable, and emerges more from personal information processing (Oliver, 1999).

In the traditional classroom, for the most part, learners are asked to reason about rules and laws pre-formulated by others, act on accepted symbols or systems and resolve well-defined problems. This tends to produce fixed meaning which does not transfer well to new situations (Oliver, 1999). This learning approach is in contrast to how apprentices learn. Cognitive apprenticeship is a recursive process. The most important emphases of the learning environment in cognitive apprenticeship are situated learning and the culture of expert practice. Learners are engaged in modelling learning activities that are similar to the practices of experts in the job. In classroom situations, cognitive apprenticeship usually commences with modelling guided by the mentor. The

mentor gradually decreases the support provided to the interns through scaffolding and coaching methods and increases interns' autonomy through exploration. Interns from time to time practise teaching under the observations of the mentor who gives them feedback. In the process of learning, interns must revisit what they have done and discuss their ideas with the mentors and their peers. Interns finally discuss, demonstrate, present and exchange their individual work and look back to analyse their own performance and artifacts through articulation and reflection methods. The practice encourages the novice teacher to think like the expert (mentor). The situated, contextualised learning enables student teachers to retain their knowledge until they encounter similar situations in future. The process may facilitate higher order reasoning among interns. Social interaction is a critical component of situated cognition and apprenticeship. As student teachers (interns) become more active and engaged within a culture, they learn to acquire and develop cognitive tools in authentic domain activities.

However, there are many challenges that the mentor and his/her mentee may face. It requires that the mentor has high facilitative teaching skills. The novice's autonomy level depends on the success of the coaching and scaffolding provided by the mentor. This requires patience and advanced facilitative teaching skills. If expert modelling overwhelms the intern, there may be difficulty in understanding the process and construction of a mental model of the process. The intern may become anxious, frustrated and afraid to explore on their own. Cognitive apprenticeship may also require more time on task. Also, since cognitive apprenticeship includes situated learning and the culture of expert practice, it may automatically require resources that are not readily available in schools (e.g. subject matter experts, time and money for expert modelling). In the cognitive apprenticeship model of teaching and learning, reflection is yet another cornerstone activity. The goal of reflection is that students have guided opportunities to

look back and analyse their individual and group performance and artifacts with an eye toward understanding and improvement. Like other components of cognitive apprenticeship, reflection can be encouraged in students in a variety of ways. For example, a mentor can pose experientially-based questions or ask students to construct their own questions throughout the learning experience - questions that consider content while emphasising process.

2.3.5 **Social-Cultural Theory**

Vygotsky (1979) considered social learning environment critical for learning. He opined that with the integration of a person's cognitive and personal factors within the social context, learning can most optimally occur. He further postulated that the social environment and cultural context in which a learner finds himself or herself is the source of both social behaviours and individual thoughts (Vygotsky, 1979). Stated in another way, human mental activity in a particular case of social experience and understanding of human mental activity rests on the understanding of the mechanisms of social experience (Woolfolk, 2007). Also, Vygosky's (1978) theory of zone of proximal development (ZPD) defines the distance between a student's current level of learning and the level he/she can reach with the help of tools, people and powerful artefacts. In the ZPD, the teacher and the learner work together on tasks that the learner could not perform independently because of the difficulty level. This process captures the idea of collaborative mentoring process, requiring the teacher, who has and know more skills, to share that knowledge in a culturally mediated interaction (Bruner, 1984) with a student or group of students working together.

As the researcher contends to examine the impact that the internship/mentorship programme has on the professional development and practice of pre-service science

teachers, it is vital that the researcher considers the above theories (social learning theory, social cognitive theory and social-cultural theory) as frameworks for the study. Due to their emphasis on social interaction, environmental influences and modelled behaviour, these theories can help to explain behaviour and behaviour change in a mentoring or internship situation.

2.4 Conceptual Framework of the Study

Figure 1 illustrates the conceptual framework of the study which is a collaborative model. There is collaboration between the university and the partnership school in the preparation of the intern during the SIP. In the diagram, the intern is influenced by the university support system through the supervisor (teacher educator) in the Department of Science Education, CETDAR and the link coordinator on one side, and by the partnership school through the mentor, headmaster, other school staff and the school environment on the other side. At the university, there is interaction between the lecturer (teacher educator), CETDAR and the link coordinator in the preparation of the intern. The triad interacts with each other in providing a support system to the intern. The intern is taught content and pedagogy/teaching methods by the university lecturers (supervisors) to develop their pedagogical content knowledge (PCK) during on-campus teaching practice. In pedagogy, they are taught classroom management and discipline, assessment techniques and improvisation of materials for instruction.

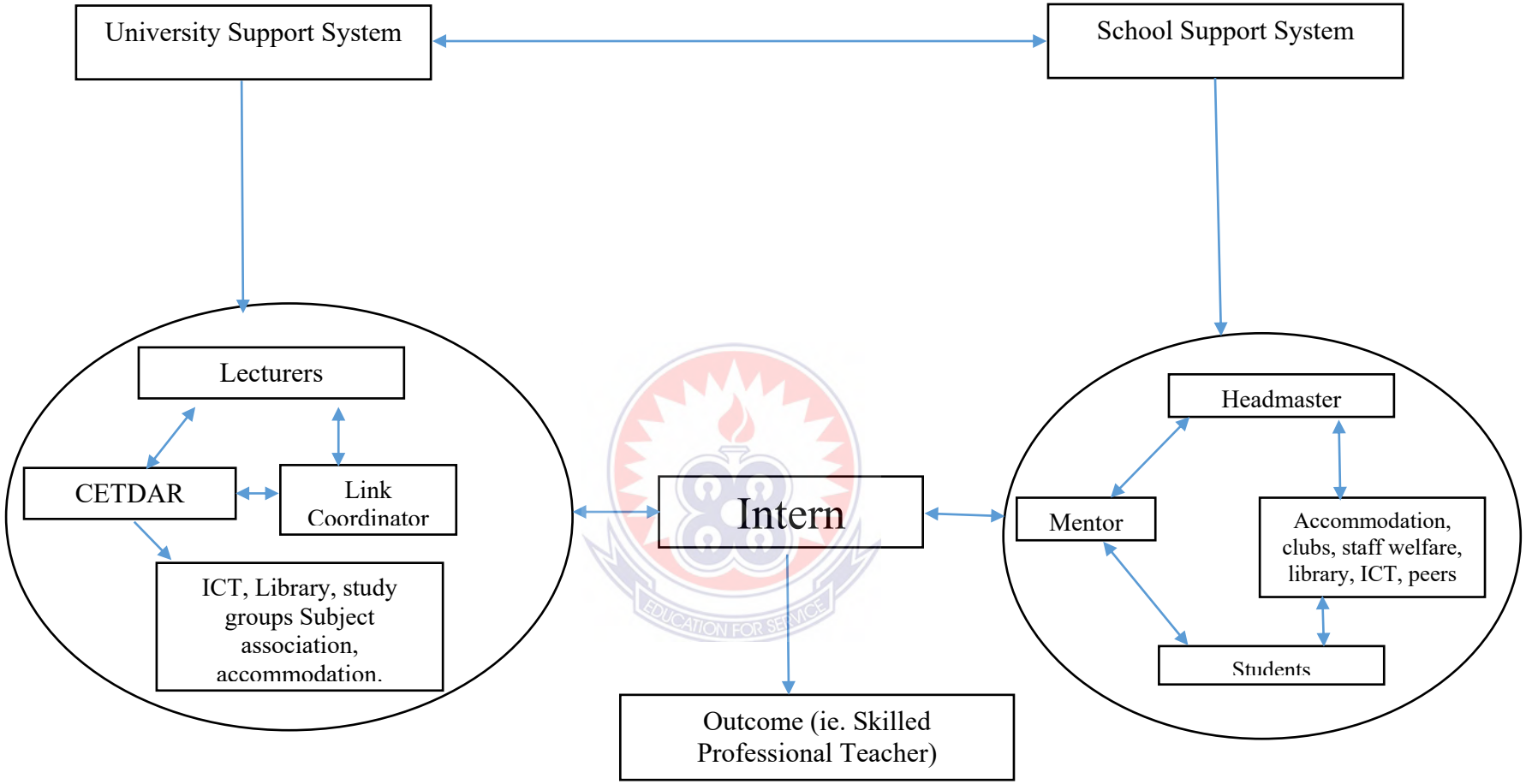


Figure 1: Conceptual Framework of the Study

The conceptual framework that underpins this study was adapted from Gadzirayi, Muropa, and Mutandwa's (2006) proposed supervision model called blended supervision which calls for authentic, collegial and collaborative partnership between the university/college, school based mentor and the student teacher. Authentic collegiality and collaboration is characterised by interdependent instructional skills and professional behaviours of providing assistance, consulting, demonstrating expertise for others, sharing of ideas and experimenting a sense of commitment and responsibility among partners. The starting point is for interns to model/copy how the mentor and /or university supervisor teaches. They (interns or student teachers) slowly begin to develop their own skills in teaching. Through collaborative teaching, interns become 'insiders', planning alongside experienced teachers (mentors) and discussing jointly taught lessons afterwards. Through collaborative teaching, interns have what the American anthropologists, Carr and Kemmis (1986), call legitimate peripheral participation. Legitimate peripheral participation is a situation whereby a novice has a legitimate right to be an '*insider*' to a complex process and is thus progressively guided to take over more and more responsibility for that performance. It is by reflecting on teaching, thinking about it and trying to express it in words that interns begin to transform the behaviour they have copied into concepts and theories which they 'own' for themselves. However, this reflective process is strengthened if it is systematically supported by an experienced teacher in the form of a mentor. As insiders, mentors are strategically well placed to take this role. Mentors have access to specific forms of practical professional knowledge; they know the school and its culture, the students and the curriculum of the school. They have also established ways of talking about their practice. They may have worked with other interns before and know their general needs and expectations.

In sum, the theoretical foundations of the student internship are the following: (1) Schools are seen as learning organisations where there are expert teachers (mentors) to help interns. The mentor is a supporter of the intern's professional development in the school setting, and helps him/her to adjust to the school as an organisation, to the teaching profession and provides assistance in work-related problems.

(2) Evolving into a teacher includes a socialisation process through which the intern becomes a member of the teaching staff, accepting the knowledge, skills, qualities, norms and manners valued in society and in the given school. It is a social process, where the opinions and attitudes of experienced mentors play a big role. Two socialisation processes take place simultaneously - socialisation within an organisation and professional socialisation. Professional socialisation is more successful if a person adapts to an organisation quickly, therefore the focus in the internship is for the adjustment of the intern to the school as an organisation (Eisenschmidt, 2006; Lauriala, 1997). Harrison, Lawson, and Wortley (2005) and Korthagen (1999) observed that it is during the practicum that basic competences are developed (e.g. a suitable teaching style is adopted) and a professional self-concept is formed. The ability to self-reflect is one of the important bases for professional growth. During the practicum it is the mentor who supports a novice teacher in the process of reflection and planning of one's development.

From the above theoretical foundations, the mentor has three important tasks in the school system in the students' internship programme: (1) to support the professional development of the student teacher; (2) to support the student teacher adjust to the school as an organisation; and (3) to assist the intern to participate in the school's development.

As mentors discuss with interns, they are in a position to guide and make them see and to help them enter the domain of teaching. With that growing insight comes an increased control of their teaching. They are helped to build their confidence by the university supervisor who sits together with the mentor to see the classroom practice of the intern and gives collaborative feedback. This also boosts the morale of the intern.

Stakeholders' perception of students' practicum has been recorded in a series of studies. In studies conducted by Brandenburg and Ryan (2001) and Ralph, Walker, and Wimmer (2008) student teachers perceived profound growth in their self-efficacy and pedagogical content knowledge. They thought they had developed technical and/ or professional skills. In some studies interns expressed both positive and negative feelings during their evaluation of clinical teaching (Rudman, 2007). The student teachers felt that mentors were not often reliable because they often forgot appointments made for evaluation. Some interns felt mentors were not good models and perceived high disagreement toward the effectiveness of school mentors (Tok & Yilmaz, 2011). They perceived not getting enough support from their mentors. Evaluators to practicum, associate teachers and interns perceived that the time allocated to university supervisors for evaluation of practicum was too short (Bunkers, Berkland, & Berkland, 2006; Klopper, 2007). Bunkers, Berkland, and Berkland (2006) stressed the importance of good time management by mentors/evaluators/facilitator, specifically for student teachers, as it enhances the mentoring experience and promotes theory-practical integration beyond the classroom borders, hence promoting the development of students' cognitive, affective and psychomotor skills. Mentors in previous studies perceived their roles to be that of providing support to mentees (student teachers). This support can involve giving feedback, creating a comfortable learning environment and providing explicit representation of the job or skill that the mentee is learning. Student

teachers perceive the role of the mentor as being mainly those of providing support and explicit instruction and training in the job or skill (Ambrosetti, 2011). Mentors do this by way of including mentees in the work environment, providing advice and treating them as colleagues and communicating effectively with them (Ambrosetti, 2011). In a study by Thobega and Miller (2008) student teachers perceived that university supervisor held more post- and less pre-observation conferences with them.

Other context-variables facilitate skills and knowledge acquisition by the intern in the university; they include the availability of good library with information and communication technology (ICT), subject associations, academic counsellors, halls/hostels for accommodation, study groups and well furnished laboratories. In collaboration with CETDAR, the supervisors prepare the intern for the field. The supervisors help CETDAR from time to time to review the students' internship handbook and the intern record book. The students' internship handbook is meant to be used by student teachers on internship. It contains guidelines for the various parties (the university supervisor, the mentor, the intern, heads of partnership institutions and the university link coordinators) in the programme. The intern record book contains assessment and or evaluation forms to be used by the mentor, the university supervisor and the heads of schools and colleges in evaluating the work of the intern. It also contains pre-observation and post-observation conference guides/forms to be completed by the intern during observation by the mentor or the university supervisor. The university supervisor together with the link coordinator help the CETDAR in organising induction programmes that get the intern psychologically prepared for the SIP. CETDAR on her part organise training workshops and seminars for lecturers and link coordinators on how to work with interns.

The link coordinator is a liaison officer between the university, the partnership school and the intern. He/she visits partnership schools within a general schedule of visits drawn by the CETDAR to monitor the work of mentors and provide support and guidance where needed. The link coordinator submits to CETDAR reports on his/her activities on visits to schools as well as yearly reports. The reports include any difficulties, questions, concerns and issues as well as the overall health of the partnership agreement. He/she also offers advice to CETDAR on the mentor and the training needs of the intern and student placement. The link coordinator also discusses with colleague lecturers the needs of the intern at school. Such discussions centre on the appropriateness of the environment in the school (e.g. sanitation, availability of teaching and learning materials and adequacy of furniture).

The intern on his part satisfies certain University/departmental requirements of attending lectures, sitting and passing all prescribed courses covering the first six semesters of the academic programme before he/she is permitted to go on internship. All intending interns should have passed the Pre-Internship Seminar (PSC 361), formerly called On-Campus Teaching Practice (OCTP). This is a special course that prepares the student teacher on methods of teaching. They should also have registered for the internship programme. Whilst on the field there is communication between the intern and the university supervisor on what is going on.

On the other side of the divide is the partnership school support system. The headmaster or headmistress together with the mentor and other staff on daily basis interact with each other and the intern and offer him/her the needed support. The head of the school appoints the mentor and assigns the same to the mentee. The mentor therefore gives progress report of the intern to the head of the school. The head also solicits help from other members of staff to give academic and social support to the

intern. The mentor on his/her part gets help from other staff in providing materials and other needs of the intern. Also in the school system, factors such as type of school, laboratories and equipment, students' home background, school climate, library and ICT availability facilitate intern learning during the practicum.

The responsibility of training the intern lies largely on the mentor. The mentor guides the intern to learn how to put what is taught them in theory into practice. The mentors model lessons for the intern(s) to observe and learn. The intern in turn practises how to teach for the mentor to observe and to provide regular feedback; and setting targets that help the intern to identify his/her strengths and weaknesses and to set priorities for development. The intern models the mentor's practices and learns through practise. The interns also discuss with their mentors and the university supervisors to identify professional needs, set new targets and become reflective about pedagogy. The mentors and heads of schools send reports on the intern's performance to CETDAR at the end of the programme. The interns on their part complete questionnaires developed by CETDAR about their mentors and heads during their post internship seminars. The university supervisor also assists the mentor in dealing with any problems the intern might be facing in practising to teach, including those related to portfolio development and reflective practice. The supervisor is also expected to plan and conduct parallel supervision with the mentor as much as possible. As much as possible, there is continuous communication between the mentor and the university supervisor on the progress and development of the intern during the same period.

Lecturers/supervisors visit the interns at their schools of practice. They also supervise their Action Research projects and the building of their portfolios whiles they are at the field. Lecturers also take post internship students through the Post Internship Seminar programme where students present their teaching philosophies, reflective

practices and portfolios as an aspect of the internship requirements. Students get the chance to complete their Action Research projects under the guidance of their supervisors during this time.

The interns return to the University for the Post-Internship Seminar; and are taken by the Faculty through the programme for completion of the degree programme. These processes of supporting the development of the intern occur simultaneously in three areas: (a) developing teaching competences; (b) socialisation in school and in profession and (c) developing professional identity (CETDAR, 2009). Growth and development of the student teacher in the above-mentioned dimensions and the corresponding processes take place in the school setting and are influenced by the processes within the school as an organisation. The university in collaboration with the school prepares the intern to become skilled and competent professional teacher.

2.5 International Perspective on Teacher Education

2.5.1 Structure of Pre-Service Teacher Education

In pre-service preparation programmes, primary school teachers are typically trained over a 3 to 4-year period at a residential teachers' college or in a university. Darling-Hammond and Cobb (1995) described the three most common pre-service models as:

- Certificate or degree programmes housed in normal colleges, normal schools and colleges of education established solely for the purpose of training teachers. These programmes usually specialise in training primary school teachers and emphasise pedagogical more than subject area preparation. These programmes tend to be of two- to four-year duration and lead to a certificate or diploma in teaching, such as the case of Botswana.

- Degree programmes housed at general, multipurpose universities. These programmes usually emphasise subject matter preparation more than pedagogical preparation. These are generally three- or four-year programmes leading to a bachelor's degree, with the teaching preparation portion lasting one to two years (such as the case of Namibia).
- Master's degree and/or fifth year programmes. These programmes open to candidates who have completed a bachelor's degree and lead to a master's degree or postgraduate diploma in education (such as the M.Ed. programme in Botswana and PGDE, M.Phil and M.Ed. programmes in Ghana). The duration of these programmes ranges from one to two years beyond the bachelor's degree (Craig, Kraft, & du Plessis, 1998; Lynd, 2005).

Though most pre-service teacher training fall into one of these three types of programmes, variations abound. In fact, pre-service programmes vary dramatically around the world in terms of institutional context, content areas, time allocation and forms of practical experiences for the students (Lynd, 2005). For example, initial preparation can vary from zero to five years and increasingly, pre-service teachers spend more and more time at practicum sites (UNESCO, 2004). The durations for supervised teaching practice vary from one country to another across the world. In Japan it takes two weeks for Japan secondary schools, 4 weeks in Japan and New Zealand primary schools, to as much as a full year for Belgium, France, Germany, Luxembourg, Chinese Taipei (Villegas-Reimers, 2003) and now in Ghana (CETDAR, 2009).

- Bangladesh: Eight-month course at a Primary Training Institute leads to a certificate.

- Burma: After completion of middle school, a one-year training programme at a teacher training institute or college leads to certification as a Primary Assistant Teacher.
- Burundi: Teachers are trained through a seven-year series of secondary-level courses. Completion of full course leads to secondary school certificate and the Ordinary Teachers Diploma.
- India: Teacher Training Certificate awarded after completion of a one to two year course at a Teacher Training Institute.
- Ivory Coast: Training is at upper secondary level and leads to the qualification of Institutor.
- Panama: The Certificado de Maestro Normal is awarded at the end of the last three-year cycle of secondary education in a teacher institution.
- Peru: A three-year upper secondary course leads to the title of Maestro Normal (McGinn & Borden, 1995).

These variations notwithstanding, there is currently a worldwide trend in pre-service teacher training toward imposing the same level of preparation on all teachers (i.e. a bachelor's degree) regardless of the level they will teach (Lynd, 2005).

2.5.2 Content of Pre-Service Teacher Preparation Programmes

In terms of the content of teacher preparation programmes, different countries emphasise different components in the curriculum through the amount of time devoted to each one. In most countries, the curriculum for pre-service teacher training programmes consists of three parts:

- Academic Studies/subject matter, which can result in a degree or diploma with specialisation in one or more school related subjects.

- Professional preparation, usually comprised of the study of educational theory, foundation of education courses, professional studies such as pedagogy and method courses, child development and training linked with teaching skills necessary to be efficient and effective as a teacher and
- School practice/practicum: this may vary from short practical periods in school to longer periods of internship. These periods may be supervised by trained lecturers and or school personnel (Ben-Peretz, 1995; Cobb, 2000).

These three components represent typical content of pre-service curriculum, however, as with the structures described in the previous section, there is much variation over the degree to which each element appears in a pre-service programme. In some cases, programmes emphasised the teaching of subject matter (content) in the initial preparation and pedagogy in the practicum and induction programme (i.e. the first year in the classroom) for new teachers (Villegas-Reimers, 2003).

Another trend observed around the world is the increase in the amount of time that pre-service teachers spend at practicum sites. Pre-service programmes that provide opportunities for supervised practice teaching throughout the duration of the course have been observed to be the most effective (Jackson & Leroy, 1998). The trend on an international level is to increase the amount of time spent in the classroom in a formal professional practicum. This would be, in most cases, during the initial preparation. In some countries where the practicum period is short, teachers are required to have extensive in-service opportunity to practice under strict supervision. Such is the case in Japan, where beginning teachers must complete 90 days in-service training where practical skills are improved; and continue with professional development on an ongoing basis, and also undergo intensive training after 5, 10 and 20 years of service

(Hawley & Hawley, 1997). In Germany induction period for the beginning teacher is one year (Hawley & Hawley, 1997).

2.5.3 Trends in Pre-Service Teacher Education

In a study completed by the Asian-Pacific Economic Co-operation Organisation (APEC), which examined teacher preparation programmes of 12 countries (Australia, Brunei Darussalam, Canada, People's Republic of China, Hong Kong, Japan, Korea, Malaysia, New Zealand, Singapore, Chinese Taipei and USA), the following trends were reported:

- An increase in the duration of teacher preparation programmes. However, it is also noted by Villegas-Reimers (2003) that in many countries, elementary teachers trained in teacher preparation institutions are usually expected to hold a certificate below that of a bachelor's degree, while secondary teachers are usually required to have successfully completed a college or university level course.
- Primary school teachers are prepared as generalist (with the exception of Alberta in Canada and Chinese Taipei, where teachers are expected to have at least one specialisation).
- An increase in the amount of time spent in a practicum, although there is a variation in this aspect of preparation. In Chinese Taipei, the practicum lasts one year. This arrangement (one year for practicum) is a prominent feature in the preparation of teachers at the 38 Colleges of Education in Ghana where student teachers go on internship practice for a whole year.
- An increase in the relationship established between the teacher-preparation institutions and the school.

Pattern of In-service Education of Teachers

Greenland (1983) has described in-service teacher training as training that is designed to: provide certification for unqualified teachers, upgrade teachers' knowledge or skills, prepare teachers for new roles such as teacher educators or Principals and to introduce new curricula or provide teachers with refresher courses. However, this method has not helped very much with most in-service programmes in developing countries where funding of such programmes is difficult and training personnel are not motivated. A similar classification is found in most Latin American countries where different names are given to in-service education depending on the profile of the beneficiary. When in-service constitutes a part of some form of an initial teacher-preparation process, it is identified as professionalisation. If it is offering an ongoing development of the teacher who is already a professional, it is identified as *capacitacion* (training), *perfeccionamiento* (improvement), *actualisation* (updating) or *formacion continua* (continuous education) (Villegas-Reimers, 2003).

As with pre-service models, the structure of in-service training can vary dramatically. Formats include:

- School-based workshops, teacher observation and feedback and mentoring;
- Cluster-based workshops and meetings;
- Modularised instruction through which teachers study individually or in groups, sometimes with support at a central location (school, training centre) from a more experienced teacher or tutor;
- The use of structured instructional materials in teaching, supported by periodic visits, observations, meetings and workshops;
- Media-based training: interactive radio instruction (IRI), radio-based training via drama or lecture-based formats, two-way radio support, DVD or video-

supported training, televised model lessons or lectures, Computer Assisted Instruction and internet-based learning and support; and

- Institutional course formats, usually used for upgrading of teacher qualifications during school holidays.

As with pre-service models, these different in-service formats can provide many types of content, from academic training in specific subjects such as science, mathematics and language to pedagogical methods such as group work and classroom management to professional development topics such as action research and reflective practice. But as Villegas-Reimers (2003) observed, the outcomes of such programmes are never translated into productive use by the beneficiaries; and teachers always forget what they learned after a brief period of time because most of such programmes were ad hoc in nature. The functions of in-service models vary tremendously around the world. In some places, they are mainly used as orientation to a new curriculum, in others, to improve teachers' knowledge and instructional skills. In Nigeria, in–service is understood principally as a formal mechanism for upgrading one's professional qualifications in order to merit higher status and salaries (Esu, 1991).

Induction Programmes as In-Service Education

Another category of in-service education is the support that new teachers receive in the form of induction programmes. Induction programmes are planned as systematic programmes of sustained assistance to beginning teachers (Jarvinen & Kohonen, 1995). New Zealand, Finland and Japan are said to offer examples of excellent induction programmes for their beginning and newly graduated teachers (Hawley & Hawley, 1997; APEC, 1999). During induction, beginning teachers are assigned mentors; they also have the opportunity to be engaged in discussion groups; observe other more experienced teachers and present a written record of their induction programme

(Eisenschmidt, 2006). Most formal induction programmes have failed to achieve their specific and general objectives due to lack of funding (APEC). Also, some mentored teachers often left the system before the end of the school year (Eisenschmidt, 2006).

2.5.4 Current International Trends in Partnership Practices with Relevance to Initial Teacher Education (ITE) Programmes

The main emphasis in this section is on good and innovative practice in partnership in initial teacher education (ITE) between schools and teacher education institutions (TEIs). Various models of school-university partnerships in ITE have progressively been developed in an attempt to address concerns about the quality of student teachers' professional learning experiences in pre-service teacher education programmes. These concerns have been voiced in research reports of cohorts of student teachers in Australia and the United Kingdom (Brisard, Menter, & Smith, 2005).

Hoban (1999) for instance, thought that traditional teacher education courses had a propensity to present a fragmented view of learning because teacher education curricula tended to split the study of learning into independent subjects. Student teachers complained about the fragmented nature of their professional learning experiences, organised around the delivery of what they saw as de-contextualised theoretical knowledge on the one hand and bouts of teaching practice encountered in isolation from the university or college context on the other. Eraut (1994) has argued that professional learning occurs through a process of acquisition of both procedural and propositional knowledge. Procedural knowledge is knowing how to do something while propositional knowledge is knowing the facts of how something is done. Eraut (1994) further states that a common critique faced by teacher education programmes worldwide has been that the university-driven teacher education curriculum governed

by requirements, structures and pressures both internal and external to the institution, meant that propositional knowledge was encountered independently of its situation of use. This has therefore called for a change in the structure of pre-service preparation of teachers.

In separate studies, Edwards (1997) and Furlong, Barton, Miles, Whiting, and Whitty (2000) concluded that it is generally accepted that the movement away from the separate nature of university programmes and in-school experiences through the advocacy of jointly planned initial teacher education programmes delivered in partnership has been a welcome change to the approaches taken up to the 1980s in the UK and elsewhere. Yet, Cherendnichenko and Kruger (2001) in Australia warned that the rhetoric of partnership does not necessarily imply new practices in teacher education, but simply different structures. Similarly, Stephenson (1999) in Europe acknowledged that there are limits to how far partnership conceived only in terms of an initial teacher training partnership can deliver continual improvement in the quality of student teaching.

If the future of teacher education is to be based on meaningful partnerships between schools and universities to provide genuine and sustained site-based teacher education to meet the needs of student teachers, teachers and their schools, then a systemic change is required (Cameron, 1998). What is advocated is a new paradigm for teacher education which both engages more closely and systematically with school education and which is characterised more strongly by the centrality of professional experience (Ramsey, 2000; Cherendnichenko & Kruger, 2001). Partnership provides an essential framework for such a model of pre-service teacher education, which is both beneficial to student teachers and teachers as they inquire collaboratively about student learning (Stephenson, 1999; Cherendnichenko & Kruger, 2001). Chapman, Toomey,

Gaff, McGilp et al. (2003) referred to this new approach to building partnership as practice-based.

There is indication that innovative or leading partnership practices in ITE are indeed clearly linked to a process of developing teacher education into a dynamic, integrative and holistic system. This process is particularly evident in the USA and Australia, and also to some extent in England and Northern Ireland. Buchberger, Campos, Kallos, and Stephenson (2000) points out that in Europe, only a few countries have recently begun to develop teacher education into a dynamic system and to focus on systemic approaches integrating all forms of teacher education, school development and improvement and educational research and development. These leading practices involve a widening of the concept of partnership along the lines described above. The term 'widening' here encompasses notions such as 'expansion' and 'diversification' as well as 'consolidation' and 'continuum', given that all of the innovative partnership models reviewed here move beyond initial teacher education by placing the emphasis instead on one or more of the following:

- The coherent integration of all forms of teacher education from initial teacher education through to induction and continual professional development (e.g. Northern Ireland);
- Linking (initial) teacher education more systematically with school reform (e.g. the USA, Australia, England); and
- Achieving greater connection between (initial) teacher education and educational research and development (e.g. Australia, USA) (Brisard et al., 2005).

In his review of teacher education, Ramsey (2000) reported that there was presently a divide between universities, schools and the profession. The

withdrawal of teacher educators from teaching in the schools is detrimental to quality teacher preparation to meet the future demands of schools. This statement appears to be supported by the findings of two recent reports on the Quality and Standards of Initial Teacher Training in England (OfSTED, 2003) which support the argument that simply increasing the school-based component of teacher education is not necessarily better in terms of the quality of student-teacher learning experience given that school centred teacher educators continued to perform less-well than HEI-based partnerships. Likewise, there is evidence from research on alternative routes into teaching in the USA that programmes which minimise traditional supervision in favour of on-the-job supervision leave recruits underprepared in a number of areas and less confident and committed to teaching (Darling-Hammond & Snyder, 2000). This appears to underline the potential benefits of cumulative professional education with intensive (preferably joint) school-based supervision.

Following the adoption by universities of initial teacher education in Scotland, university-based teacher education is currently facing some of these dilemmas which make the mainstream implementation of new paradigms for teacher education of the kind advocated above likely to remain problematic. However, the trend is clear that in future, initial teacher education will be the task of universities and schools.

2.6 Models of Science Teacher Preparation

In this section, selected models of science teacher preparation are presented. These include-the Teacher Education and Achievement in Mathematics and Science (TEAMS), school-university partnership, collaborative model of science teacher

preparation and distance education. Only these four are discussed here because of the links between these models and that of the UEW model.

Teacher Education and Achievement in Mathematics and Science (TEAMS)

The TEAMS model was a cooperative effort by the Ames laboratory, Iowa State University (ISU) of the USA teacher educators and outstanding public school teachers from Ames community. The TEAMS model enables pre-service elementary teachers to learn science content and teaching methods in authentic environments. The model also allows both pre-service teachers as well as professionals involved to discuss and reflect upon experiences. The participants in this model are the pre-service science teachers, scientists, science educators and expert classroom teachers. The model focuses on the interaction of content/process preparation, pedagogy and the nature of human development and learning.

The model makes provision for pre-service teachers to have exposure to real classroom conditions. These include: (i) modelling effective hands-on teaching; (ii) providing opportunities for novice teachers to practise independently; (iii) evaluating the novice teachers work in the classroom and giving feedback to them; (iv) facilitating the development of the pre-service teacher's instructional knowledge and skills; and (v) increasing the pre-service teachers' confidence in their ability to effectively teach science (Thompson & Hargrave, 2001). The practising classroom teachers were those who exhibited most influence on the teaching philosophies and strategies of the pre-service teachers in the TEAMS. An essential component of the classroom experience was the guided reflection component that provided the necessary scaffolding for pre-service teachers. The primary means of assessment takes place during guided reflection sessions that is supposed to occur after the pre-service teacher has observed the practicing teacher. For example, after a lesson on gravity, the classroom teacher could

ask pre-service teachers the kind of questions that the students could have asked during the lesson.

The provisions in the TEAMS model are similar to that of UEW teacher education model. However, while practicing teachers (mentors) of TEAMS were experts and had been recipients of the Presidential Award for Excellence in Science or Mathematics teaching, some of the school mentors in the UEW model might not have received mentor training prior to their mentoring of interns in their schools. To better understand the TEAMS and how their experiences impacted the pre-service teachers' development, case studies of individual squads were conducted. Pre-service teachers participated in individual and group interviews and journaling activities. They were also observed by the project evaluator as they worked in the science laboratories and classrooms. The current study which examines stakeholders' perception of the internship programme of the Department of Science Education, Winneba, on interns' professional development and practice' runs in line with the TEAMS programme and could therefore use the same data collection techniques for evaluative purposes.

Organisational Partnership Models

These models involve linking schools and universities in science teacher preparation. There are several partnership models based on the structure they take. The known ones include professional development schools, university-school partnerships, institutional collaborations, schools' net works, teachers' networks and distance education (Cobb, 2000; Miller, 2001; Sachs, 2000;Wise, 2000; Huberman, 2001). The professional development school model is discussed here.

Professional Development Schools (PDS)

Professional development schools (PDSs) are partnerships between teachers, administrators and university faculty members created in order to improve teaching and

learning on the part of their respective students, and also in order to unite educational theory and practice. The PDS model involves and requires institutional support (Wise, 2000). This model differs from the more traditional relationship between schools and teacher preparation institutions in many important ways.

Koehnecke (2001) states that, the PDS model provides opportunities for teachers' professional development from the beginning to the end of their careers. The model varies from one setting to another. However, all PDS share the common goal of providing professional development experiences for pre-service and in-service teachers in school settings; and help to raise the standard of education in schools. Through this partnership, both the university and school are transformed. Both are of equal value to the partnership and the process of professional development. Under the traditional model, the university faculty members are sometimes thought of as being more important, or having a higher status, than the school teachers. In the PDS model, both are of equal importance and play equal roles (Villegas-Reimers, 2003).

Under the PDS, pre-service teachers are introduced to the profession in the setting where they will implement their knowledge and skills. They are assigned experienced teachers as their mentors. The mentors keep themselves informed of the latest research and theories in teaching because of their connections with the universities. In addition, their own professional development is supported as they learn to become mentor teachers and faculty members in university based programmes (Villegas-Reimers, 2003). As Larkin (2000) has observed, university/college faculty benefit from this kind of collaborative model, as they develop partnerships with practitioners in the field which allow them to become more informed about the daily practices and situations encountered in the classrooms. They feel supported in their

work with student-teachers, and also have the opportunity to link theory and practice more naturally.

The Collaborative Model in the Professional Development of Science Teachers

The collaborative model for science teacher education and development is based on the changing roles of various educational entities such as public schools, businesses, communities, university and Education Service Centres in delivering quality science professional development programmes. According to Barufaldi and Reinharts (2001), the cornerstone of the model is 'together we can make a difference.' It involves bringing together policies and ideas by various stakeholders in the education process. Teachers do not work in isolation, but they do collective thinking and sharing: they are not alone in their pursuit of teaching and learning. Members of the collaboration are important links in the chain for providing quality professional development. Teachers enrolled under this model share their experiences with colleagues and this may lead to fundamental changes in their classroom practices. The Texas Regional collaboration for Excellence in Science Teaching Model has been cited in literature to encompass all the basic structures of good collaboration in science teacher preparation (Barufaldi & Reinharts, 2001). Sachs (2003) pointed out that in order to develop collaborative partnership, the high level of trust and mutual respect that this entails must not be underestimated. Without trust and respect partnerships are on a very shaky ground.

Distance Education

Distance education (DE) is a model of teacher preparation in which a significant proportion of the teaching is conducted by someone removed in space and/or time from the learner. Not all the teachings occur at a distance because there is some element of face-to-face instruction. Different countries have implemented distance education

programmes to support teachers' professional development. They employ a variety of means such as radio, television, telephone, written and recorded materials, electronic communications and face-to-face instruction (Anamuah-Mensah & Erinosho, 2007). The strategies often exploit the benefits of cutting-edge multimedia delivery techniques, depending on the level of development of the country and availability of budgetary support.

In Ghana, the University of Education, Winneba (UEW) and the University of Cape Coast (UCC) run programmes in Diploma and Post-Diploma in Education for the upgrading of basic school teachers. Distance education in Ghana avoids the opportunity-cost of taking teachers out of their normal employment for training and is also cost-effective as many more individuals are reached at the same time. The curricula for various programmes are the same as for regular in-house programmes within the two universities; hence, the degrees, diplomas and certificates are the same as for full-time students.

In Nigeria, the Centre for Distance Learning of Obafemi Awolowo University, Ife, provides qualitative tertiary education via the Open and Distance Learning mode to two categories of Nigerians. The first group are the youth who possess the requisite qualifications for entry to Nigerian Universities but are denied admission owing to inadequate facilities on campus. The second group are working class people who are desirous of pursuing sub-degree and degree (undergraduate and postgraduate) programmes while still retaining their jobs. Many other universities in Africa offer DE programmes.

However, the general complaint is that DE does not address practice, and that student-teachers must still complete a practicum before they can graduate as effective classroom teachers. This point reflects the situation in Ghana where there is no teaching

practice component for student-teachers enrolled in DE programmes because they have had the initial supervised teaching-practice experience and are assumed to have acquired the right pedagogical skills over the years as professional teachers.

2.7 Mentoring and Foundations of Mentoring

The origin of the word mentoring dates back to the days of Greek mythology when Odyssey asked his female friend, the goddess of wisdom, Athena, to take the role of Mentor to watch over and guide his son Telemachus while he was away at sea (Castro, 2008). This was the first record of any literature using the word mentor thus beginning the ontology of the term that is used to describe beneficial people who help to guide, teach and coach their protégés (Denson, 2008).

Mentoring has been defined in various ways but is generally considered to be a relationship where a person with greater experience supports a person with less experience (Hall, 2006; Kram, 1983). Galbraith and Cohen (1995), after extensive review of the mentoring literature, suggested that common themes run through the definitions. They found that mentoring is a process within a contextual setting; it involves a relationship of a more knowledgeable individual with a less experienced individual; provides professional networking, counselling, guiding, instructing, modelling and sponsoring; is a developmental mechanism (personal, professional and psychological); is a socialisation and reciprocal relationship; and provides an identity transformation for both the mentor and the mentee.

Mentoring is a relationship between an experienced employee and a novice where the experienced employee acts as a role model and provides support and direction to the protégé. Conceptually, mentors may take on the role of a teacher, advisor, exemplar and a sponsor for their respective protégé (Haynes, 2004; Denson,

2008). Denson (2008) believed that the primary function of a mentor was to serve as a transitional figure for their respective protégé. The actual act of mentoring has been known under other names including guild, artisanship and apprenticeship. In the classical model of mentoring, there is typically a one-on-one interaction of unrelated individuals of different ages who network on a regular basis.

Merriam (1983) cited in Denson (2008) posited that mentoring appears to mean one thing to developmental psychologist, another to business people and also to those in academic settings. In the context of school-based student teacher internship or teaching practice, mentoring may be defined as an experienced teacher assisting a novice teacher to learn how to teach in a classroom setting and full engagement in real school life-activities. In this regard, mentoring may be described as a complex, social and psychological phenomena. The conceptualisation of mentoring in the teacher preparation milieu assumes different dimensions namely; relational, developmental and contextual. This is due to the different foci of school life (Roberts, 2000). The relational dimension of mentoring is described as the deep relationship that exists between a mentor and mentee where the mentor passes on *gifts of wisdom* to the mentee as a trusted friend and helper and vice versa (Hall, 2006). The developmental dimension of mentoring, on the other hand may be described as an aspect that focuses on the functions and behaviour of a mentor promoting professional and personal development. In this context, the mentor helps the mentee to reflect on his/her ideas and practices; shares ideas and experiences together, advises and guides the mentee. In an extended form, mentoring is beyond classroom teaching, touching on issues of school and community relations (McIntyre & Hagger, 1993). The contextual dimension of mentoring focuses on the learning influences from the school culture and as an organisation. A typical example may be seen during the induction of new teachers and

enculturation processes of new teachers. The conceptualisation of mentoring in this context is about assisting the new teacher to fit into the culture and norms of the institution, learning about issues of curriculum, instruction, assessment, school routines and many more (Feiman-Nemser, 2003).

Under the developmental dimension of mentoring, three models have been identified by Maynard and Furlong (1993). These are the apprenticeship model, the competency model, and the reflective model. With the apprenticeship model, the mentor acts as a role model and interpreter helping the mentee to learn the complexity of the teaching process. This is usually during the early stages of the student-teacher interaction in the school. With this model, student teachers need first-hand experiences with real students, teaching situations and classroom strategies. In the early stages of their training, the purpose of that practical experience is to allow them to form concepts, schemas or scripts of the process of teaching. But in order for trainees to begin to see, they need an interpreter. They need to work alongside a mentor who can explain the significance of what is happening in the classroom. Trainees also need to sense and fit into established routines. They therefore also need to be able to model themselves on someone.

With the competency model, the mentor acts as a coach or an instructor helping the mentee in more systematic training, building competencies agreed on during supervision. Learning to teach under this model involves practical training on a list of pre-determined competences. The mentor takes on the role of a systematic trainer, observing the trainee, perhaps with a pre-observation schedule and providing feedback. They are in effect coaching the student teacher on a list of agreed behaviours that are, in part, specified by others (Brisard, Menter, & Smith, 2005). What is right about the competency approach is that after an initial period of collaborative training, trainees

will benefit from an explicit programme of training following a routine of observation and feedback. They have to learn by actually doing the job of teaching and take routine responsibility of the class. The mentor provides activities that promote practice for perfection without promoting stagnation.

The reflective model is the stage where the mentor becomes a co-enquirer and co-learner providing critical reflection on the mentee's teaching and learning. Once student teachers have achieved basic competence during student teaching, the role of the mentor needs to develop further. While other aspects of the role may continue, mentors in this stage of development need to establish themselves as co-enquirers with the aim of promoting critical reflection on teaching and learning by the mentee. Maynard and Furlong (1993) recorded that during this stage, trainees need to be encouraged to switch from a focus on their own teaching performance to a focus on the children's learning and how they can make it more effective. To focus on children's learning demands that student teachers move beyond routines and rituals; they need to develop a deeper understanding of the learning process; thinking through different ways of teaching and developing their own justifications and practical principles from their work.

These stages can all be seen during a long period of stay of a mentee in a school. Student teachers continue to need preparation in other dimensions of professionalism. They need broad understanding of different styles of practice; an understanding of the practical principles underlying practice; and appreciation of the moral, political and theoretical issues underlying educational practice. All these other dimensions of professional knowledge are still best provided by those in higher education. Effective mentoring is a way of complementing and extending forms of training traditionally made available through higher education. It is not intended to be a substitute for them.

In this study, an examination is made of mentoring and its functions in an academic setting and the ability of a mentoring relationship to facilitate and help the teaching profession (organisation) recruit and retain teachers. In this role, the mentor usually acts as a sponsor who will provide his/her prospective protégé with exposure, coaching and visibility into the potential career opportunities (Allen & Day, 2002). Within the scope of the mentoring relationship, this mentoring function is categorised as career functions. Denson (2008) identified four distinct phases of mentoring relationship to include: *initiations* – a period of six months to a year during which time the relationship gets started and begins to have importance for both intern and mentor; *cultivation* – a period of two to five years during which time the range of career and psychological functions provided expand to a maximum; *separation* – a period of six months to two years after a significant change in the structural role relationship and/or in the emotional experience of the relationship; *redefinition* – an indefinite period after the separation phase during which time the relationship is ended or takes on significantly different characteristics, making it a more peer-like friendship (Denson, 2008).

Building on the previous definitions, but allowing for flexibility in the nature of the mentoring relationship, Denson (2008) proposed the following definition: A *mentoring relationship* is one that may vary along a continuum from informal/short-term to formal/long-term in which faculty with useful experience, knowledge, skills and/or wisdom offers advice, information, guidance, coaching, support or opportunity to another faculty member or student for that individual's professional development.

Mentors have been generally categorised based on their mentoring functions. According to Allen and Day (2002), career functions and psychological functions are the two main mentoring categories that have been supported by the literature. With the

career-role functions, the mentor helps the mentee learn the ropes for career advancement through sponsoring promotions and lateral moves (sponsorship); coaching the intern (coaching); protecting the intern from adverse forces (protection); providing challenging assignments (challenging assignments) and increasing the mentee's exposure and visibility (exposure). The psychological functions of the mentor include: helping the mentee develop a sense of professional self (acceptance and confirmation); providing problem solving and sounding board (counselling); giving respect and support (friendship) and providing identification and role modelling (role modelling). Career functions are those aspects of the relationship that primarily enhance career advancement and depend on the mentor's power and position in the organisation. Psychological functions are those aspects of the relationship that primarily enhance sense of competence, clarity of identity and effectiveness in the managerial role. This depends on the quality of the interpersonal relationship and the emotional bond that underlies the relationship between the mentor and mentee.

It is widely accepted that although mentoring programmes can be defined by their functions, mentoring falls within two distinct categories: informal mentoring and formal mentoring. Informal mentoring is defined as a naturally occurring relationship based on attributes, possibly similar interest and/or attraction. In this relationship, the experienced member in the organisation provides career and psychological support for the lesser-experienced member or protégé. In a formal mentoring relationship, the programme is developed and designed by the organisation to facilitate structured mentoring relationships where experienced organisational members provide career and psychological development to lesser-experienced organisational members (Haynes, 2004). Researchers (Eby & Lockwood, 2004; Denson, 2008) have suggested that informal mentoring has been more effective than formal mentoring. Due to the success

of informal mentoring, many corporate, government, and private organisations have attempted to replicate this success through increased efforts to develop informal mentoring programmes. Formal mentoring programmes do have various obstacles to overcome, namely trying to formalise a relationship that otherwise occurs naturally between mentor and protégé. Haynes (2004) provides a succinct and cohesive definition of the programmes stating "Formal mentoring is a programme designed and developed by the organisation to facilitate structured mentoring relationships where experienced organisational members provide career and psychological development to lesser-experienced organisational members"

A formal mentoring model was chosen for study mainly due to the structured nature of the relationship, which bodes well for both quantitative and qualitative research study. Adding credence to the selection, it was reported that there has been a surge of formal mentoring programmes throughout universities in the last decade in an effort to improve student retention (Salinitri, 2005). Formal mentoring relationships have been known to serve a much narrower focus and to serve an even different purpose than informal mentoring relationships. It is argued that formal mentoring relationships serve a rather short-term and more limited purpose for the respective protégés (Eby & Lockwood, 2004).

There are many benefits to a well designed formal mentoring programme, some of which are unique to formal mentoring. In a qualitative study provided by Eby and Lockwood (2004), learning was described as the most common benefit of the mentor and protégé relationship. This is not uncommon to informal mentoring relationships but it illustrates some of the benefits for providing such a programme. In examining characteristics that are unique to formal mentoring relationships, it was reported that career planning was a benefit of formal mentoring that is not readily seen in informal

mentoring relationships. Networking opportunities was also described by participants as a unique benefit of the formal mentoring relationship not to mention work role clarification, enhanced job performance and sense of pride (Eby & Lockwood, 2004). These benefits accruing from formal mentoring rebuts the perception held by some researchers (Eby & Lockwood, 2004; Denson, 2008) that informal mentoring has been more effective than formal mentoring. Though informal mentoring relations have more time to build psychosocial and career development functions, it may take a long time (sometimes years) for the benefits to be materialised. The benefits of a formally contracted mentoring could be realised within a short time. Mentees receive more promotions, higher incomes, more mobility within the profession and job satisfaction and a positive impact on organisational socialisation. In a formally organised mentoring programme such as that of the UEW SIP, the partners work with a common goal to see to the realisation of the objectives within the officially stipulated time.

There are many problems that are common characteristics of formal mentoring programmes. One of the most commonly noted issues of formal mentoring programmes is mentor-protégé mismatch. The source of this mismatch involves age, interest, and/or personality. Difficulties in scheduling and geographic differences were duly noted as problems that were consistent with formal mentoring programmes (see Eby & Lockwood, 2004). Other limitations of the formal mentoring relationship derive from a mentoring process and outcomes, which are frequently unexamined, uncritically applied, and power laden. In mentoring underrepresented populations, these problems are compounded by issues of cross-gender and cross-racial mentors mentoring protégés of a different gender and/or race (Mott, 2002).

To combat the problematic nature of the formal mentoring programme, scholars have suggested that formal mentoring programmes imitate those of informal mentoring

programmes (Ellinger, 2002). This would include having mentor and protégé provide input into the pairing process thus attempting to acquiesce the need for better matching (Mott, 2002). Other frequently mentioned themes for improving the mentor-protégé relationship include clearer communication of programme objectives, a clearly stated purpose or mission for the programme; guidelines for meeting frequency and guidelines for relationship length (Mott, 2002). It is recommended that mentors in formal mentoring programmes receive training in order to deal with potentially challenging situations between the mentor and protégé. To deal with relationship problems, it is suggested that mentors participate in interpersonal training as a way to help mentors effectively mentor their younger or less experienced colleagues (Maughan, 2006).

This current study utilises internship and mentoring theory in an effort to gain insight into how mentorship programmes impact pre-service teacher interns' practice, perceptions and professional development. The mentoring theory used suggests theoretical underpinnings in a number of areas including attitude, socialisation, professional development and perceptions. For the purpose of this study, the focus is on a review of predominant attitude and perception theories. In extending the student teacher internship/mentoring theory, social learning theory, social cognitive theory and social-cultural theory have exhibited promise in their contribution to our understanding of how social contexts and social interactions impact knowledge acquisition, attitude change and perceptions, warranting utilisation for this particular study (Bandura, 1989; Merriam & Caffarella, 1999). The learning theory (or epistemology) or constructivism as it relates to the impact of mentoring on students' perceptions towards science teaching was also critically examined in an effort to determine its relevance for this study. The study examined all these theories in depth to determine their appropriateness

in extending the SIP/mentoring theory for the scope of this study. These theories and their implications to the study have been examined earlier.

2.8 Teacher Education in Ghana

Ghana's secondary school education system emerged strongly after the Accelerated educational Development Plan (ADP) of 1951 in which the colonial government initiated steps to recognise and give state funding to schools most of which had been established through missionary effort. The ADP created a situation for church managed schools to be absorbed into the state system by making the government responsible for providing educational facilities and staffing. Until this time, schools were mostly taught by expatriate teachers (McWilliam & Kwamena-Poh, 1975). President Nkrumah started with the 40-day emergency teacher training colleges that prepared the pupil-teacher for primary school education (Mensah, 2007). Graduates from these institutions had to go back to college for a two-year teachers' Certificate B (Cert. B) and later another two years for the Certificate A (Cert. A). Most of these teachers became head-teachers while others occupied various positions in the Ghana Education Service. To meet the challenges of the middle school system, the first government under President Nkrumah introduced the Certificate A (4-year post middle) and shortly after the Certificate A, a two-year post-secondary teachers' certificate.

After Ghana gained independence in 1957, there was an expanding access to secondary education which resulted in great need for secondary school teachers. Continued expansion in secondary education had initially outpaced plans to attract and train Ghanaians to enter secondary teaching. This created teacher shortage and posed real danger in terms of achieving the quality expected. Teaching was therefore dominated by expatriate staff at the secondary school level. There was a shortage of

Ghanaian staff at the secondary school level; for out of 2,100 secondary school teachers, university graduates numbered 960, of whom 660 were expatriates. Of the remaining 300, ninety were headmasters and only 210 were actively teaching in 105 schools. Thus, the task of maintaining high standards expected had become impossible (McWilliam & Kwamena-Poh, 1975).

In 1975, a new structure of education was proposed which effectively split secondary education into two parts. These were the junior secondary school (JSS) and the senior secondary school (SSS). The implementation of the proposal in 1987 led to the introduction of more practical subjects into the secondary school curriculum. The reformers, however, failed to match this effort with a plan to train teachers to handle the new subjects and engage in more participatory pedagogical approaches to reflect the ideology of the change. The reforms were to change where and how secondary school teachers were trained. Teachers were to be trained for junior secondary schools (JSS) and senior secondary schools (SSS). The subject matter at these two levels varied to some degree. Teachers for the junior secondary school (JSS) level were trained at post-secondary (initial) teacher training colleges where subject content knowledge learning was equivalent to the senior secondary (SSS) level or slightly beyond that. The first batch of the 3-year post-secondary teacher trainees were admitted in 1975 and passed out in 1978. There was greater emphasis given to pedagogical subject content learning for this category of teachers. Teachers for the SSS continued to receive their training form the University of Cape Coast (UCC) where teacher training programmes placed a premium on advanced academic subject study in addition to general education and pedagogy courses (Akyeampong, 2003).

Structure-wise, education in Ghana was changed from 17 years of pre-tertiary education [comprising of six years of primary, four years middle school, five years

secondary school (O-level) and two years of sixth form (A-Level)] to 12 years of pre-tertiary education (consisting of 6 years of primary school, 3 years of junior secondary school and 3 years of senior secondary school). The 1987 education reform had the following effect on training of secondary school teachers in Ghana. First, it meant that School (JSS) teachers received post-secondary teachers' certificate after training in teacher training colleges. Second, Senior Secondary School (SSS) teachers were to be trained at the University of Cape Coast (UCC) and the University of Education, Winneba (UEW) (Quagrain, 1999).

There were basically two routes to a teacher qualification status in Ghana. The first was the post-secondary certificate A for teachers who had completed three years of post secondary teacher training. Certificate A teachers, after teaching for at least 3 years were eligible for enrollment into a diploma teacher programme. Thereafter, they could move on to the post-diploma B.Ed teacher training programme. Before 2005, a certificate A teacher required a further 4 or 5 years training to obtain a B.Ed., making the total length of training to graduate level 7 or 8 years which was rather a long route to achieving a secondary school teacher qualification.

During this same period, students who completed SSS with good qualifying grades could gain direct admission to university to study for a bachelor's degree in education and qualify as trained secondary school teachers. This was the second route to becoming a qualified teacher (Akyeampong, 2005). From 2005/2006 academic year, the three year-diploma programme in teacher education started and the first batch of that programme graduated in 2008. A Secondary school science teacher who went through the certificate A route had more professional capital as a result of prior initial teacher training followed by at least 3 years teaching experience. Post Graduate Diploma in Education (PGDE) teacher trainees also have some teaching experience but

no initial teacher training experience. As such, over the years, Ghana has built up a teaching corps comprising of different categories of teachers: the Pupil teacher; the 4-year Certificate A teacher; the Certificate B teacher; the 2-year Post-Secondary Certificate A teacher; the 3 year Post-Secondary Certificate A teacher; the 2-year Specialist; the 3-year Diploma teacher and the Graduate teacher. It is observed that, a system of teacher education which produces so many categories of teachers is unsatisfactory hence the need for the current reform that lay emphasis on two levels of teacher education-the diploma and the degree (Agbeko, 2007).

As regards the models of teacher education in Ghana, two main classifications are worth considering. These are the Location and Organisational models. The location model, typical of most African countries is the college-based and the school-based. The more common of the two is the college-based. Initial training of teachers in Ghana has been the college-based approach. The University of Cape Coast (UCC) was established in 1962, and tasked with the responsibility of training graduate teachers for the secondary schools, training colleges and the polytechnics. In 1992, a new University College (now the University of Education, Winneba) was established out of the amalgamation of the then existing diploma awarding colleges of education. These two institutions offer institutional-based programmes.

In the case of the organisational model, which determines how the education of teachers is perceived over the professional life of the teacher, the concurrent and consecutive patterns have been used in Ghana. The concurrent pattern is the more dominant procedure of training for both graduate and non-graduate teachers. The University of Cape Coast and the University of Education, Winneba admit most of their students to pursue the concurrent pattern of training (Quagrain, 1999). In the concurrent pattern, a student combines the academic studies and professional studies.

Students obtain either a BEd or BA or BSc with education after the four-year programme. It was the University of Cape Coast which offered limited spaces for the consecutive pattern, but with the establishment of the Faculty of Education, the trend is still in favour of the concurrent pattern. In the training of teachers, there are three components namely:

i. academic studies (subject content);
ii. educational studies/theory - psychology, sociology, philosophy, testing and assessment; and
iii. professional studies (methods of teaching, teaching practice/school experience).

These three components are not proportionally combined to give the trainees balanced academic and professional expertise. On the average, the proportion of the three components in the four-year education is as follows: In the four years of the pre-service education, the teacher trainees spend only 18 weeks out of 128 weeks for teaching practice in the four-year academic calendar of 16 weeks per semester. There is apparently more academic orientation to the detriment of the actual professional training. In the case of UEW, this trend has changed with the coming into being of the SIP. As the key characteristic to this dominant route (concurrent) to teaching is the integrative nature of the course programme, it is expected that interdependence and interaction between all the diverse perspectives which contribute to teacher education will be enhanced. Though there is partnership between the universities/colleges of education and the schools, it has challenges. These challenges were inadequate funding, unequal powers that existed between mentors and university supervisors on the supervision of interns. This tends to diminish the effectiveness of the collective effort.

Secondary science teacher preparation is regarded as a tertiary education in Ghana and it is the responsibility of Central Government to provide adequate funds for

the training of teachers. Currently in Ghana, the University of Education, Winneba (UEW) and the University of Cape Coast (UCC) are responsible for preparing and awarding degrees in science education with specialisations in Integrated Science, Chemistry, Biology or Physics. In the case of Winneba, the initial phase of science teachers' preparation involves a three-year period of preparation in content and methodology courses at the department level; followed by one-year mentoring programme in partnership with senior high schools under the guidance of trained science mentors. The content and methodology courses are taught concurrently. In the case of UCC, the science teacher degree programme consists of course work both in education and science together with supervised teaching practice in the secondary schools. They do not practice the internship programme, which calls for mentoring during practicum. The B.Ed (residential) programmes in the two universities attract two types of students:

- The first type is the student who has come straight from Senior Secondary School (SSS), and has no previous teaching experience, and therefore quite unaccustomed to classroom experiences.
- The second type is the student who has come through a certificate A/Diploma route and has therefore some initial teaching experience. This may have an influence on an intern's performance at SIP.

At the graduate level, pupil teachers (graduates without teaching qualifications but with honours degrees in science) are gradually introduced to the teaching profession and courses in education together with intensive teaching practice in the schools for a period of one to two years depending on the institution (whether UCC or UEW), leading to the award of a Post-Graduate Diploma in Education (PGDE). The component of the PGDE programme consists of subject studies (content knowledge), professional studies and

practical teaching. The subject studies component aims to help trainees acquire knowledge in the subject matter to be able to teach well. The professional studies cover issues such as school and institution, teacher responsibilities towards pupils; whilst the practical teaching component develops teacher competencies in classroom teaching, ensuring that they are equipped to contribute to worthwhile learning. The programme runs over two semesters and is organised during the long vacation periods that fall between June and August; meaning it takes two years to complete. Each semester course work is completed in approximately 8 weeks.

Another path for science teacher preparation in Ghana is through part-time or sandwich programmes organised by the two universities for providing on-the-job training to teachers with initial teacher qualifications so that they can upgrade their qualifications to M.Ed or Post-Diploma and also for adults who are seeking a change of career into teaching. These programmes are suitable for adults who could not afford attending the full time programme as a result of job, financial commitments and other reasons. These programmes usually last for a longer period of four-years for diploma in education, and five-years for degrees. Classes are held in the evenings, weekends and during school vacations. It is important to indicate that graduates from these programmes and the full-time courses have significantly reduced the shortages of science teachers in Ghanaian schools. The University of Education, Winneba, has introduced Masters of Science Education programme in the Department of Science Education for sandwich graduates.

Distance education is the fourth path through which secondary science teachers are prepared. Teachers who have diploma in science education are admitted for a post-diploma degree in science education by distance mode. The University of Education, Winneba and the University of Cape Coast have established regional centres in some

parts of the country where mature teachers on distance education programmes meet on regular basis for tuition and collection of teaching-learning materials in the form of texts. Candidates are awarded their degree in science education upon successfully completing the programme in three years.

2.8.1 The Teacher Education Programme of the University of Education, Winneba

The student internship programme of UEW came into operation when it was realised that the traditional model of teacher preparation where over 90% of the training period was used for theoretical teaching on campus and only 10% on practice was inadequate to give teachers the essential teaching skills, techniques and dispositions they require to face the modern day teaching and learning environment. Further, the SIP was adopted because it was realised that supervision, which in the traditional model, was solely done by the university supervisor, was not a true reflection of the reality. This is because there was little or no input by the school where the practice took place. Besides, it was sometimes largely biased and skewed towards lecturer-student relation. The model failed to prepare student teachers adequately for real-world situations. Thus, the new model that was introduced by UEW during the 2002/2003 academic year adopted the Collaborative School Model (CSM). This model promotes the involvement of experienced teachers in partnership schools as mentors to mentor the student-teachers. It also encourages professional development of both the mentor and the student-teacher. It establishes a collegial, reciprocal and collaborative relationship with the schools and colleges (CETDAR, 2009).

The teachers in schools are experienced in their profession, they also know the school culture and are assumed to be able to call on a significant set of resources to support their subject teaching compared to the trainee teachers. During the internship

period, the students develop Assessment Portfolios which contain thirteen items, including an action research study, a reflective study, records of assessed lessons by mentor and university supervisors and a written statement of teaching philosophy. In the context of modern day teacher preparation, the CSM model can only be effective if a framework of mentoring is adopted. Literature on CSM in two contexts is discussed below:

The CSM model favours a dialectical approach to theory and practice since it encourages reflective practice (Smith, Brisard, & Menter., 2006; Essuman, 2009) as an essential element in the teaching profession. In other words, the model provides an opportunity for the student teacher to draw upon different forms of professional knowledge, skill and attitude from staff in the Higher Education Institution (HEI) and from staff in schools/colleges where he or she is practising. It is believed that knowledge acquired from the two ends is equally essential for the development of the student teacher (Furlong cited in Smith et al., 2006). This model operates on the assumption that contributions from both the HEI and the schools/colleges would be integrated to bear on the curriculum. These contributions may then be seen as theory-based knowledge as well as situated knowledge of teaching, schooling and practical perspectives from schools. This model has been practised by some schools in the United Kingdom and Australia. An example cited in literature is the Oxford Internship Scheme for Postgraduate Certificate in Education (PGCE) for teaching in secondary schools. This approach was implemented as a pilot project by Oxford University, but was not considered as norm. It has, however, been described by activists as a model that is achievable in other contexts (Brisard, Menter, & Smith, 2005). What this seems to suggest is that the model is commendable and could be adopted in other teaching and learning situations for positive outcomes. What might be important is that the objectives

should be similar and the programme should be designed to achieve similar outcomes. In a similar vein, the collaborative model was practised in an Australian context, where it emerged that there were significant demands on both the higher education institutions offering that mode of teacher education and school staff operating it. From the two examples cited, which were both piloted by HEIs and schools, it again emerged that the model could be resource intensive, and demand staff time. This implies that any implementation of the model should consider extensive planning and monitoring. However, the Australian model had courses that were reconceptualised into 'problem-based-learning-within-the-school-site' model. What this means is that the roles of stakeholders were redefined so that staff of HEI became co-learners who facilitated and participated in the learning process with students of the schools.

Also, mentors in the schools became associates and educational researchers gathering data to help them solve problems posed in the problem-based learning environment. The teachers therefore, became informants about the practice and culture of the school. The conceptualisation of the teacher as a reflective decision-maker who facilitates student learning is one tenet that prompted the UEW adoption of this model. The argument was that through school-based experiences and apprenticeship, student teachers get opportunities to model their experienced mentor teachers' practices that are in consonance with modern trends. It is believed by some researchers that one way of promoting field-based experience is through the development of school-university partnership (Bullough, Birrell, Young, & Clark, 1999). Essuman (2009) also suggests that partnerships acknowledge the crucial contribution that schools and teachers make in the professional development of the student teacher.

The pre-service internship programme of UEW is an attempt to refocus the many existing policies on teacher training programmes and practices in Ghana so as to build

concepts, motivation and commitment needed for effective teaching and learning (Amedeker, 2005; CETDAR, 2009). The University of Education, Winneba initiated its new programme of teaching practice with an implementation plan consisting of an on-campus preparatory programme for (science) students, the training of mentors, university supervisors' training and the orientation of link coordinators.

2.8.2 Standards for the Evaluation of UEW Interns during their Practice Teaching

Standards for teachers have been developed in various places throughout the world for the purpose of assessment and to meet demands for accountability with respect to teachers' mastery of a core body of knowledge and skills (Smith, 2005). In Ghana, the Ghana Education Service (GES) has developed standards for members of the teaching profession as benchmarks for evaluating their teachers for promotion (GNAT, 2000; Sekyere, 2010). Similarly, UEW as an autonomous institution that prepare professional teachers has developed a set of teaching standards that are used in assessing their student teachers on internship practice for the purpose of grading and certification. These benchmarks are labelled *Performance Indicators for UEW Professional Teaching Standards* (CETDAR/IEDE, 2009). These benchmarks are grounded on five core principles that should guide the student teacher development and assessment. These principles focus on: students and their learning; content and pedagogical knowledge; managing and monitoring student learning; reflective practice and learning communities (CETDAR, 2009). These principles are expanded to form the performance standards or indicators and summarised in an evaluation form to be used by supervisors and mentors. The performance indicators help explain teaching behaviours that interns may exhibit when meeting a particular standard. They also serve as guides for observation, discussion and reflection on practice.

It is interesting to note that these standards set by CETDAR are similar standards developed by the National Board of Certification in the USA for the purposes of advanced certification of teachers (National Board for Professional Teaching Standards, 1999). These standards are explicitly the following: teachers are committed to students and their learning; teachers know their subject(s) and how to teach the subject(s); teachers are responsible for managing and monitoring student learning; teachers think systematically about their practice and learn from experience; teachers are members of learning communities (National Board for professional Teaching Standards, 1999). Each domain requires specific standards and benchmarks for evaluating the extent to which the standards have been met.

Related Studies

In the report of the American Educational Research Association (AERA) Panel on Research and Teacher Education, Zeichner and Conklin (2005) analysed 38 empirical research studies relating to teacher education with nine of these studies specifically addressing the perceptions of pre-service and novice teachers of their teacher education preparation programme. This literature review had multiple strengths. The purpose of the review was clearly stated, review questions and methods were included, and the review conclusions were informative and instructive. Additionally, the inclusion and exclusion criteria required showing quantifiable evidence of a connection of teachers' perception of the teachers' education programme to a sense of preparedness or teacher self-efficacy was included. The reviewed literature supported the claim that teacher education programmes can have a positive impact on novice teacher efficacy, confidence and teacher preparedness. Since that time, there have been additional studies on this subject. An update of the Zeichner and

Conklin (2005) literature was needed as it presented only research studies that had been completed by the year 2002. The purpose of the literature was not only to update the review of Zeichner and Conklin (2005), but to further investigate the relationship of pre-service teacher preparation and pre-service teacher perceptions of such a programme in order to draw conclusion leading to future research and programme adjustment.

Study characteristics

The studies included in this literature review had similar research questions relating to pre-service and novice teachers' perceptions of their preparedness or feelings of efficacy. However, each study approached the topic from a different angle. As indicated below, some of the studies focused on teacher self-efficacy and how it changes over time. Cater (2006) measured teacher efficacy before and after student teaching experience. This study also looked at how the perceptions of teacher self-efficacy of their mentor changed during the student teaching experience. Hoy and Spero (2005) focused on the changes in efficacy during student teaching, and looked at whether different efficacy measures revealed patterns of change. A final question on this study sought to determine if there were factors during the first year of teaching that related to these changes in efficacy. Fives, Hamman, and Olivarez (2007) measured the efficacy, burnout and support of student teachers over time as well as the relationship among efficacy beliefs, reports of burnout and perceived support from the university and cooperating teacher. They further sought to understand the differences between student teachers who report varying levels of cooperating teacher support. Knoblauch and Hoy (2008) measured the change of efficacy after student teaching in relationship to the school setting (rural, urban or suburban) in which they were placed. Knoblauch and Hoy (2008) also sought to determine the factors that were predictive of student

teachers' sense of efficacy. Shaw, Dvorak, and Bates (2007) measured the beliefs pre-service teachers had at the beginning of a semester and if and how changes occurred over the course of the semester. They also sought to determine what knowledge pre-service teachers possessed about reading development and instructional strategies and if these changed after instruction. Finally, Helfrich (2007) looked at the knowledge base of pre-service teachers, measured their perceptions of confidence to teach reading, and then measured these same participants again after teaching fulltime for three months. The remaining four studies focused on the perceptions of pre-service and primarily novice teachers regarding their teacher education programme and their abilities to teach. Pettway (2005) researched the degree to which novice teachers are satisfied with their abilities to demonstrate content, pedagogical, and professional knowledge needed to help all students learn. An additional question asked novice teachers about their satisfaction of their field and clinical experiences.

Schlette (2006) researched how pre-service teachers perceive the teaching career and how novice teachers describe their first year of teaching. Additional question asked if pre-service teachers' perceptions of what teaching would be like differed from new teachers' descriptions of their first year, and whether there were significant differences between the way pre-service and beginning teachers describe their impressions of teaching.

Zientek (2007) replicated a study by Darling-Hammond in 2002. Zientek (2007) compared the differences between novice teachers of traditional and alternate certification programmes. The study analysed teachers' perceptions of their preparedness based on their certification route. Other research questions included whether novice teachers differed in mentoring experiences, reasons for entering the profession and classroom education based on the type of certification they received. A

final question in this study inquired about whether age or prior experiences affected feelings of overall preparedness. The final study by Darling-Hammond (2006) was comprehensive and analysed multiple measures used to assess the effectiveness of teacher education programmes. A variety of questions were addressed focusing specifically on how prepared candidates of the teacher preparation programme felt, how they performed in the programme and how they performed as teachers in the classroom.

All studies used teacher education programmes and classroom experiences as the independent variable, with perceptions of preparedness and responses to feelings of teacher self-efficacy as the dependent variable. None of these studies employed an experimental design methodology that compared groups of pre-service and novice teachers. Thus, it is impossible to draw any strong causal comparative conclusion from the available literature about the effectiveness of a teacher education programme and its effect on teaching ability or student achievement. None of the studies also looked at the perceptions of stakeholders like heads of the schools, and the students taught by the interns concerning the practicum aspect of the programme. Carter (2006) administered the Teacher-Efficacy Scale to 100 students at the beginning of student teaching and at the completion of student teaching experience. Hoy and Spero (2005) administered three instruments to measure self-efficacy. The first was Teacher Efficacy Scale (Woolfolk & Hoy, 1990), a 10-item scale that analysed personal teaching efficacy as well as general teaching efficacy. The second was the Bandura Teacher Self-Efficacy Scale. This 30-item scale, with seven subscales analysed instructional efficacy and disciplinary efficacy among others. Knoblauch and Hoy (2008) administered three instruments in their study. These included the Teacher Efficacy Scale that was designed by Tschannen-Moran and Hoy (2001). These were completed by participants in three separate times: before student teaching, at the 8-week point of student teaching,

and after student teaching. The second, the Collective Efficacy Scale created by Goddard (2001) included group competence items and task analysis items. Responses were on a 6-point Likert scale and participants were administered this scale at 8 weeks and at the end of the semester. The third instrument, the Perceived Cooperative Teachers' Efficacy scale was designed by Li and Zhang (2000). This was used to measure the student teachers' perceptions of efficacy beliefs held by their cooperative teachers.

In Schlette's (2006) study, two surveys were administered. The first was titled the Survey of Teachers' Perceptions while the second was entitled Survey of Beginning Teachers' Perceptions. The items on these two surveys concerned what pre-service teachers expect to experience and what novice teachers actually experience. Fives et al. (2007) administered the Teachers' Sense of Efficacy Scale, the Maslach Burnout Inventory, the Learning to Teach Questionnaire (developed by Hamman & Olivarez, 2005), and the Learning Climate Questionnaire (developed by Deci & Ryan, 2002). On all of these four measures, participants were asked to respond using Likert scales. Zienktek (2007) replicated the study and incorporated a three-part survey using a 6-point Likert scale to determine differences between perceptions of teachers that were certified through traditional certification programmes and those that were certified through alternative route certification programmes.

Some other studies used mixed methods approach. Pettway (2005) administered a survey using a 4-point Likert scale that included some open-ended questions at the end to measure the satisfaction that novice teachers had in their teacher education experiences. Helfrich (2007) used a knowledge inventory of teacher candidates, a survey of perceptions, a follow-up survey of perceptions, telephone interviews of novice teachers, and faculty and staff interviews. Shaw *et al*. (2007) used the

Theoretical Orientation to Reading Profile developed by DeFord (1985), and the Teacher Self Efficacy Literacy Scale (Johnson &Tschannen-Moran, 2004) for quantitative measures. A teacher-made questionnaire constituted the qualitative measures used in that study. Darling-Hammond (2006) on her part utilised multiple measures to assess the effectiveness of teacher education programmes. First, surveys were administered to determine their perceptions of preparedness. A companion survey was also administered to the principals for rating the abilities of these new teachers. Interviews were then used to triangulate the data. Students of the programme were asked about their teacher education, course work and field experiences. Pre/post-tests that assessed teacher knowledge were administered along with a collection of student work samples. Upon their graduation, they were given the Performance Assessment for Classroom Teaching (PACT). The final measure used in Darling-Hammond's(2006) study was observations of graduates in their teaching practice.

The designs of these studies indicate that a variety of measures and formats can be incorporated to determine teacher perceptions and feelings. These studies also provide sources of instruments that had been used in previous studies to assess teacher perceptions and efficacy.

The sample in each study differed in size, number of male and female participants and number of individuals representing different racial and ethnic backgrounds. Three of the studies included less than 100 participants in the sample. Hoy and Spero (2005) reported 49 student teachers; and Shaw et al. (2007) had 52 preservice teachers. Five of the studies reported using around 100 participants. Schlette in 2006 used 118 (23 preservice teachers and 95 novice teachers). Helfrich (2007) reported 53 pre-service teachers from one programme with 50 from a different programme. Carter (2006) and Darling-Hammond (2006) both reported 100

participants. Knoblauch and Hoy (2008) reported 102 pre-service teachers. The remaining two studies had more than 500 participants each. Pettway (2005) reported 608 participants while Zientek (2007) reported 1,197 participants. Six of the 10 studies reported percentages of male and female participants. In all the six cases the female participants were more than their male counterparts.

The programmes examined in all of the studies included both teacher education programmes as well as classroom settings for novice teachers. Of the studies that examined teacher education programmes, only few studies included thorough descriptions of these programmes. The remaining studies provided limited descriptions and were as follows: Carter (2006) listed only those participants enrolled in a teacher education programme at a South-western University; Fives *et al.* (2007) reported only that participants were attending a university in southwest United States; Knoblauch and Hoy (2008) listed that their sample came from a mid-sized university in the Midwest of US; Shaw et al. (2007) reported that their sample of participants attended a large midwestern research university; Zientek (2007) reported that participants in the study varied in their teacher certification programme from traditional to alternative teacher certification routes.

Others gave a more thorough description of the teacher education programme being examined. Hoy and Spero (2005) reported that participants were in a Master's of Education initial teaching certification programme that was based on the Holmes Group Professional Development School model. All students began the programme with an undergraduate degree and completed a Master's degree in five quarters. Students were grouped as cohorts and were in yearlong school placements, building up to ten weeks of fulltime student teaching. The programme emphasis was on diversity and preparing teachers to teach in an urban setting. Helfrich's (2007) study compared

two programmes at the University of Pittsburgh. The Master of Arts in Teaching (MAT) programme included initial certification in elementary education and a master's degree. It was a 12-month programme. Students took graduate-level coursework and participated in a field placement for teaching practice with some stipend. The other programme was known as the Professional Year (PY). Students in that programme received initial certification in elementary education.

Schlette's (2006) study included both preservice and beginning teachers. The programme characteristics of both the teacher education programme as well as the school systems were briefly described. The sample of pre-service teachers was collected from a population of students enrolled in the last semester prior to their student teaching. The beginning teachers in the study were recent graduates who taught in the same geographic region. These beginning teachers were enrolled in an induction programme sponsored by the same university in which the pre-service teachers had enrolled. The programme analysed in Darling-Hammond's (2006) study was entitled 'the Stanford Teacher Education Programme' (STEP), which features a 12-month post-graduate programme offering a master's degree and a California teaching certificate. This programme included a yearlong clinical experience running parallel to the coursework. The conceptual framework of the programme was grounded in the concept that teachers are reflective practitioners and decision makers that are continually progressing and developing. Student teachers were grouped in cohorts with exposure to a curriculum that integrated theory and practice.

The final study by Pettway (2005) did not collect a sample from a teacher education programme but rather from a group of beginning teachers dispersed throughout three separate school systems. These three school systems were selected because of their diverse teaching faculty in terms of ethnicity, grade levels and subject

areas taught, years of teaching experience, types of certification pursued and types of institutions attended. The student population in these participating public schools systems was also considered diverse.

In summary, this analysis emphasises the importance of providing a thorough programme description in research studies. In order to understand more fully what makes a teacher feel more prepared or have a high sense of efficacy, clear and specific information about the curriculum, faculty, clinical experience and supervisory practices of a teacher education programme is highly needed in order to determine what creates high efficacy or confidence in a teacher. This is especially important when trying to tease out the differences between what the teacher education programme and the school setting provides. The present study tries to do exactly that.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Overview

This chapter describes the methodology used for this study. The main sections of the chapter are: research design, population, sample and data collection, instrumentation, validity and reliability, and data analysis. The research methodology section describes the research design utilised for this study. The samples section describes the participants and how the samples were created. The instrumentation section outlines and describes the surveys, interviews and observation schedules that were used and how each was created. The validity and reliability section describes the measures taken to ensure validity and reliability of the instruments used. The data analysis section describes the procedure used in the analysis of the data generated.

3.2 Research Design

This study used one of the popular mixed methods design in educational research: sequential descriptive mixed method design (see Creswell, 2003; Creswell, Plano-Clark, Gutman, & Hanson, 2003) consisting of three distinct phases of data collection. In the first phase, quantitative data were collected using questionnaires. During the second phase, qualitative data collection was done through semi-structured interviews, document analysis and observation of science interns' classroom work. In the third phase, focus group discussions were held with interns during their post-internship seminar. The approach permitted data triangulation. The rationale for this approach was to provide a general picture of the research problem i.e. what internal and external factors contributed to and/or impeded interns' learning in the internship

programme. The qualitative data generated were to refine and explain participants' views in more depth. The dependent variables in this study were the perceptions of the stakeholders (i. e. interns, mentors, supervisors, headmasters and headmistresses and SHS students). They were quantitative variables and were used as grouping variables in the descriptive analysis of data. The main independent variables in this study included the teacher preparation programme of the Department of Science Education, the characteristics of the SHS schools as related to the professional development of the interns and mentoring that the interns experienced. Factors internal to the internship programme such as mentoring style, interns' teaching and learning behaviour, supervisors' participatory role in the practicum which contribute to or impede the interns' learning were treated as independent or predictor variables; because they caused, influenced or affected outcomes.

3.3 The Research Context

The study was conducted in eight administrative regions out of ten in Ghana. There were no science interns in the remaining two regions for the 2009/2010 academic year, because no science intern chose those two regions for internship. The eight regions were Ashanti, Brong-Ahafo, Central, Eastern, Greater Accra, Upper West, Western and Volta. Senior High Schools (SHS) are located in both rural and urban communities in the districts in these regions. Some SHS are well-endowed while others are less-endowed in both infrastructural facilities (well-ventilated and lighted classrooms, furniture, boarding for students) and curriculum materials and staffing. Student-teacher ratio was high in most SHS in Ghana. Majority of teachers who taught SHS science were first degree holders. Science mentors in partnership schools had received training from the Centre for Teacher Development and Action Research

(CETDAR) of the University of Education of Winneba (UEW). Students in SHS had varied socio-economic backgrounds. Only a select few of the students had parents who were government employees and/or private business people, therefore majority of SHS students had low socio-economic backgrounds. This created diversity in the classroom and posed challenge for student teachers to cater for individual needs in the class. Student teachers on internship had had three years of academic course work back at the Department of Science Education, UEW. The academic courses prepared them in both content and methods of teaching science.

3.4 Population of the Study

In this study, the target and accessible population comprised all academic staff of the Department of Science Education of the University of Education, Winneba and all science interns of 2009/10 academic year. Also included in the target population were the head of CETDAR of UEW and the mentors trained by CETDAR in SHS schools who were mentoring UEW science interns on internship, headmasters and headmistresses in the senior high schools, and SHS students being taught by science interns throughout the 10 regions of the country.

3.5 The Sampling Procedure

Purposive sampling was used for selecting science lecturers (university supervisors), mentors, science interns in SHS schools, heads of SHS schools where interns were practising and science students that interns taught. All lecturers who were present in the Department at the time of the study were taken. These lecturers were those who taught the interns prior to their going for internship. All science mentors, the interns they mentored during the 2009/10 academic year and their

headmasters/headmistresses were considered for the study. A sample from intact mutually exclusive classes of SHS students that were taught by science interns was selected. Focus groups made up of volunteers from these intact classes in each school visited were used for focus group interviews. Four focus groups of interns took part in focus group discussion in July 2010. They were volunteers. The internship programme involved different kinds of participants and in-depth information was needed from all the subgroups (interns, mentors, lecturers, senior high school students and heads of partnership schools).

3.6 The Samples

The sample made up of 585 individuals used in this study was composed of the following groups.

University Supervisors

Eleven supervisors of the Department of Science Education took part in this study. They included the Dean of the Faculty of Science Education, the Head of Department of Science Education and nine lecturers of the department. The Dean is the administrative head of the faculty and well informed of the internship programme of the Department of Science Education under his supervision.

The head of the department directly supervised teaching and learning activities in the department. He has background knowledge of staff working under him and sometimes took part in supervising interns. He had an in-depth knowledge of the science internship programme, saw to it that lecturers went out to supervise interns and attended academic board meetings that sometimes discussed issues related to the internship programme. The nine science lecturers who were participants in the study

were lecturers who taught methodology and content area courses in the Department of Science Education. They also supervised science education students on internship and have a number of years of experience in this.

Science interns

All the 152 science interns were served with the questionnaire for science interns but 67.76% (103) returned their completed questionnaires. All the interns for the study had completed three full years of academic work back at the university and were practising how to teach. They provided rich information about their practice, their perceptions of the programme and their mentors and the programme as a whole. Out of the 103 who answered the questionnaire, only 29 (volunteers) of them took part in a focus group discussion and 11(selected by lottery) were observed in their classrooms teaching. Only one science intern was posted to one of the eight regions and was included in the sample. Based on accessibility, five regions were covered for observation of interns' classroom work. These were Greater Accra, Ashanti, Central, Eastern and Western regions. Out of the 11 science interns observed, six were males and five were females. This was to cater for gender balance.

Mentors

Sixty eight mentors of science interns in partnership SHS participated in this study. This constituted for 64.76% of the mentor population of 105 for science interns for the 2009/10 academic year. Purposively, all science mentors in SHS schools where science interns practised were served with the mentors' questionnaire and 100% of them responded. Mentors see to the day to day supervision of interns, mark their lesson notes, observe their classroom practices and give them feedback. They teach and model science lessons for interns to observe. They also help interns in sourcing teaching and learning materials for their work. They are the pivot of the internship programme.

They can give accurate information of the intern under their care and the school environment in which the intern works.

Heads of Partnership Schools

Heads of the schools where interns were practising answered questionnaire about their perception of the internship programme. One hundred questionnaires were sent out and 67(67%) responded. Once an intern in any school is selected as a participant, the headmaster/mistress of that school was automatically selected as a research participant. The heads of schools where interns practise see to the day to day running of the school and know what happens in each department. They in collaboration with the mentors assign interns to classes that they teach. The headmaster/mistress together with the head of department and mentors see to the provision of materials for interns and their welfare within the science department. They get progress reports about the interns working in their schools. They also pay visits to classrooms to see what interns do.

Students of Senior High School

Three hundred and twenty students of SHS who were taught by interns for the academic year 2009/10 took part in the study by answering the SHS questionnaire. Four hundred questionnaires were sent out; 355 were returned out of which 35 were wrongly responded to and were discarded.

3.7 Instrumentation

3.7.1 The Instruments for the Study

Instruments used for this study were questionnaires, interview guides, focus group guides and observations guides. Documents such as lesson notes, mentors reports on interns were collected and used.

(i) Questionnaires: there were five questionnaires, namely: The Science interns' questionnaire; the mentors' questionnaire; the university supervisors' questionnaire; the headmaster's/headmistress' questionnaire and the SHS students' questionnaire.

(ii) Interview guides: There were two interview guides: the mentors' interview guide and individual science interns' interview guide (used for only interns that were observed).

(iii) Focus group guides: Namely, the interns' focus group guide and SHS students' focus group guide.

(iv) Observation guide: the Interns' classroom observation guide.

(v) Documents: the Students' Internship Handbook, Student Records Book and the Programme Booklet of Science Education.

The data collected in this study were largely the perceptions of mentors, interns, headmasters of SHS schools, SHS students and university supervisors involved in the SIP programme. The participants gave their views on how the internship programme was organised and a description of how it affected the professional development and training of interns.

3.7.2 Questionnaires

Questionnaires were used to collect quantitative data for numerical analysis. The variables that were examined were competencies and included the following: planning, pedagogy, assessment, classroom management, communication, post lesson reflection and mentoring. The use of questionnaires in this study was for a number of reasons. It was a suitable instrument for collecting information about a wide range of issues and from large samples so as to describe generalised features about mentors, interns, supervisors, heads of schools and students of SHS.

The Science Interns' Questionnaire

In this study, Likert scaled questionnaire items were used to collect certain information from interns on their professional practices and development during the 2009/2010 internship. The questionnaire items for interns' focused on the way(s) in which their preparation in pedagogy at the university and mentoring process in science by their mentors in SHS system influenced their instructional practices and did include a range of items on topics related to teaching and learning (such as the impact of the programme on their planning for instruction, classroom management, classroom communication, instruction, student assessment practices, student involvement and their students' learning) and their relationship with the mentor. The questionnaire had a total of 48 items that were close-ended. Examples of items in the questionnaire were: "my mentor provided me with instructional materials and handbooks" and "my mentor modelled science lessons for me to observe." The subscales making up the science interns' questionnaire had varying number of items as follows: planning for instruction (5 items), climate (6 items), classroom teaching (6 items), reflections on teaching (4 items), school support (3 items), university supervisor's support (6 items), and duration of internship and supervisors' assessment (2 items). The questionnaire was developed and pilot tested with a sample of 65 science interns in two different regions and analysed using SPSS 16.00. Two items were found to perform poorly and were removed. The alpha reliability coefficient of the science interns' questionnaire based on standardised items was .78. A reliability coefficient threshold of 0.70 or greater indicates that items in the same scale measure the same dimension and is therefore acceptable for research purposes.

Mentors' Questionnaire

The questionnaire items for mentors were focused on the way in which their preparation by CETDAR enabled them in handling interns as novice teachers; the benefits of the mentoring process as they daily interacted with interns, their perceptions of the whole SIP as a scheme for preparing science teachers; the added workload to their original assignment as subject teachers in SHS system; the influence of SIP on their own instructional practices and included a range of items on topics related to teaching and learning (such as the impact of the programme on their planning for instruction, classroom management, classroom communication, instruction, student assessment practices, student involvement in the learning process, incentives) and their relationship with the intern. The questionnaire originally had 28 items and was self-developed and pilot tested with a sample of 40 science mentors in two different regions. One item that performed poorly was removed. Examples of some items in the questionnaire are: "the intern is knowledgeable about planning for instruction" and "I modelled teaching for the intern to observe." The questionnaire had four subscales with the following number of items: PCK-base of interns (7 items); mentor's self-perceived roles (7 items); classroom rating of intern (13 items) and duration of SIP and university supervisor's assessment (2 items). The standardised alpha reliability coefficient of the mentors' questionnaire was .79; which is acceptable for the purpose of research in science education (George & Mallery, 2003).

Heads of Schools' Questionnaire

The questionnaire items for heads of schools were focused on their perceptions of the interns' presence in the school and classroom routine behaviours as they daily interacted with the interns; and their perceptions of the whole SIP as a scheme for preparing science teachers. The questionnaire had two subscales (perceptions of heads

of SHS about science interns = 13 items and perceptions about duration of SIP and supervisor's assessment = 2 items) that dealt with interns' characteristics such as subject matter knowledge, classroom management, classroom communication, instruction, student assessment practices, student involvement in the learning process, motivational strategies and their rapport with the students. The questionnaire was self-developed and pilot tested with a sample of 15 heads of schools in two different regions. Examples of some items in the questionnaire are: "the intern was punctual and regular to school" and "the intern conveyed an enthusiasm for teaching and learning of science." The Cronbach's alpha reliability coefficient of the heads of schools' questionnaire was established as .83. A questionnaire with a standardised alpha coefficient of .83 indicates a good measure of internal consistency of the items of such a scale and is good for data collection.

Senior High School Students' Questionnaire

The questionnaire for SHS students had items that were focused on their perceptions of the interns' presence in the school and classroom routine behaviours as they daily interacted with the interns. The questionnaire had 12 items that dealt with the intern's characteristics such as their knowledge of subject matter, classroom management, classroom communication, instructional strategies, motivational strategies and their rapport with the students. The questionnaire was self-developed and pilot tested with a sample of 40 SHS students in two different regions. The items were found to perform well and hence there was no revision of the items. Examples of some items in the questionnaire are: "the intern was punctual and regular in class" and "the intern knows his/her subject very well." The Cronbach's alpha reliability coefficient of the SHS questionnaire was computed to be .80. This coefficient value was appropriate for research purposes and was therefore used.

Observation Guide

The classroom observation guide was used for observing interns' classroom instruction. Observation was considered as part of the data collection process because this allowed direct collection of data on intern's classroom practices. Secondly, naturally occurring behaviours of the participants can only be observed in natural contexts. Pre-observation interview was conducted before classroom observation. The pre-observation interview of the intern was focused on what was taught, what was expected from pupils' interactions and *special students* if present in the class. Post-observation interviews were carried out or conducted with interns after the observation of the intern's classroom practice. The post-observation interview questions were based on the lessons observed, intern's classroom interaction with students and on the ways in which the internship objectives were implemented during the lesson observed. Both structured and unstructured observational methods were employed because a combination of the two strategies was expected to yield thick, rich descriptions that achieve the depth that other research methodologies lack (Mulhall, 2003). It also provided sufficient information for data triangulation (Guion, Diehl, & McDonald, 2011).

Interns' Classroom Observation Guide

The Centre for Teacher Development and Action Research (CETDAR)'s SIP observation guide was used for classroom observation of interns. It was developed by a committee set up by UEW, and had been face and content validated. The guide was composed of 25 items and covered the following areas: planning and preparation (3), instructional skills (10), classroom management (4), communication skills (4) and evaluation (4). Each item was rated as *observed* or *not observed.* The observer scores each item by making a tick on observed or not observed for a particular skill expected

to be exhibited by the intern in the class when teaching. The inter-rater (observer) reliability of the observation guide was .86 (see Table 1).

3.7.3 Interviews

Interviews were used to gather data through verbal interaction with the participants. All interview schedules were semi-structured with each item assigned a score. A standard list of questions was asked each participant and this ensured consistencies in scoring each of the interviewees.

Interns' Interview Guide

Semi-structured interviews were employed to elicit interns and mentors ideas about all possible aspects of teaching science. The interns were interviewed on their needs as interns, the perception of their role as interns, mentor's supervision skills, benefits of the programme to them and the effects of the school environment (i.e. role and attitude of headmaster and other teachers, process for mentor matching, etc.) on their practise. The interview guide contained 10 items. Examples of items in the guide are "how well were you prepared by your department for the internship?" and "what have your gained/learned during the internship?" Interview results were used for triangulation with data collected from questionnaire and observation of classroom work of interns.

Mentors' Interview Guide

Mentor interview questions assessed the mentor's perspectives, impact of the mentoring system on mentor/mentee relationship, programme goals and purpose, mentor training and mentor guides, motivation/benefits and resources available to work, challenges, threats, etc. The interview guide was pilot tested with five science mentors during the 2008/2009 internship. The face and content validities of the interview guide was established by two senior professors (experts in research) who used it on five

science mentors to determine if a question was understood and clarifying unclear or poorly worded responses.

Interns' Focus Group Discussion Guide

Interns' focus group discussion guide assessed interns' perceptions of their department's preparation for internship, their mentor's support, university supervisor involvement, the gains and challenges during the SIP and the post internship seminar. Focus group interviews involved open-ended questions with groups of seven to eight students. The focus group discussion guide contained 14 items. Interns who participated in focus group discussions were volunteers. Focus groups were asked the same questions for consistency.

SHS Students' Focus Group Discussion Guide

Students of SHS who were used by interns in practising how to teach were interviewed in focus groups using a semi-structured focus group discussion guide (Appendix H) containing 7 items relating to teaching methods used, assignments taken and the feedback to them by the intern. Focus group interviews involved open-ended questions with groups of eight to eleven students. Focus groups were asked the same questions for consistency. The SHS students' focus groups were 11 in number, which corresponded with the number of interns whose lessons were observed. The discussions were held with various year groups of SHS students (SHS 3, 2 or 1) that were taught by science interns.

3.8 Pilot Testing

According to Borg, Gall, and Gall (2007), it is impossible to predict how items will be interpreted by respondents unless the researcher tries out the questionnaire and

analyse the responses of a small sample of subjects before the main study. The major reasons for the field test were:

1. To evaluate the conversion of responses to data in order to examine the ability of the survey in producing the desired data.
2. To evaluate the wording of the questions and items in the questionnaires and receive comments from mentors, interns, lecturers (university supervisors), headmasters and SHS students in the field test.
3. To evaluate the clarity of the language and directions for completing the questionnaires.
4. To evaluate how long it will take for completing a questionnaire.
5. To discover and decide how to handle unanticipated problems (Cone & Foster, 2006; Borg, Gall, & Gall, 2007).

The questionnaires were pilot tested on a total sample of 139 stakeholders (made up of 35 mentors, 9 lecturers of Home Economics, 15 headmasters, 40 SHS students and 40 Level 400 science interns (2008/09 year group) who were of similar characteristics to the population of study in order to validate these questionnaires before they were used in the same study. Piloted data were subjected to item analyses. All poor items with low item remainder correlations (i.e. correlation between a certain item and the rest of the items excluding that item) were removed. The removal of bad items helped to raise the alpha reliability coefficient of the instruments and hence the internal consistency of the instruments.

3.8.1 Reliability and Validity of the Instruments

In mix methods research, reliability and validity of the instrument are very important for decreasing errors that might arise from measurement problems in the research study. The alpha coefficient of reliability (Cronbach, 1951) was employed to

establish the internal consistency of the questionnaires that were used for data collection from interns, mentors, university supervisors, headmasters and headmistresses and SHS students. The Cronbach's alpha coefficient is an index of internal consistency that indicates the extent to which items in the same scale measure the same dimension. A coefficient threshold of 0.66 or greater is acceptable for research purposes that involve the use of questionnaires (Nunnaly, 1967; George & Mallery, 2003). All scales used in this study for analysis met this criterion. Table 1 lists the reliability measures of the subscales. Thus, it was determined that the different items in the subscales of the survey instruments measured the general constructs and produced similar scores demonstrating that there was internal consistency among the items on the individual scales as well as among the items on the overall scale. The analysis provided information on which some items that needed rewording and/or removal was done. The content and face validities of the semi-structured interviews, focus group and observational guides were established by three senior research experts who read through the instruments and gave some suggestions that were used to fine tune the instruments for use in the field.

Table 1

Reliabilities of the Scales and Subscales from the Various Stakeholders' Surveys

	Scale label	Pilot Data Cronbach's alpha	Alpha based on standardised items	Format	Final Number of items
1	Headmasters' Perceptions'	.825	.828	Numeric	15
2	Mentors' Perceptions:				
	Perception of interns' PCK	.749	.753	Numeric	7
	Self-perceived roles	.843	.843	Numeric	7
	Mentors' observation guide	.776	.776	Numeric	13
3	SHS Student's Scale	.804	.809	Numeric	12
4	Intern's questionnaires:				
	Mentor support	.898	.899	Numeric	21
	Dept. preparation	.904	.907	Numeric	10
	Impact of programme	.753	.770	Numeric	6
	Supervisors' support	.527	.538	Numeric	6
5	Supervisors' observation guide	.863	.861	Numeric	13

According to Thorndike and Dinnel (2001), validity refers to the degree to which a study accurately assesses the specific concept or construct that the researcher is attempting to measure. Content validity shows the extent to which the survey items and the scores from these questions are representative of all the possible questions about interns' experiences and performance in the practicum environment. Content validity of the instruments was established by two senior professors of Science Education Faculty of UEW. The wording of the survey items were examined by them to see whether they covered the perceptions of stakeholders as sought by the study. This helped to assess whether the survey items seemed relevant to the subject it aimed to measure, if it was a reasonable way to gain the needed information, and if the items were well-designed.

The interns' classroom observation schedule was designed by educators, researchers and some educationists of the University of Education, Winneba. It was further discussed at a workshop organised by CETDAR for UEW lecturers in 2010, who examined the wordings, content and number of items it contained. It was accepted after the workshop as a good guide for evaluation of interns' classroom work after certain changes were made. It is used by CETDAR/UEW from 2010 for assessing interns' classroom performance. It was used in this study to observe interns' classroom work.

3.9 Data Collection Procedure

The field work was conducted in three stages. The first stage involved visits to heads of selected senior high schools with letters of introduction from the Head of the Department of Science Education, University of Education, Winneba, seeking for permission to conduct the study. This took place between the third and fourth weeks of May 2010 and covered eight administrative regions of the country. After this, questionnaires were sent out to the selected eight regions to interns, mentors,

headmasters/mistresses and SHS students through university supervisors who went to schools on supervision. Completed questionnaires from mentors, heads of schools and SHS students were sent through the mail. The return rates of these questionnaires were: 64.76% for mentors, 67% for heads of schools and 83% for SHS students.

Completed questionnaire by science education interns were collected when they reported for the Post-Internship Education Seminar in July 2010. The rate of return from them was 67.76%. The university supervisors also completed their questionnaire during this stage in June 2010 with 100% return rate. The second stage of the field work was in the first to third weeks of June 2010. Interviews were conducted with mentors and SHS students in selected schools. The interns' classroom teachings in such schools during the same period were observed. The third stage of field work consisted of data collection from focus groups of science interns who had reported for the Post Internship Education Seminar in July, 2010. The focus group interviews took four days. Each day was devoted to one group.

3.9.1 Procedure of Data Analysis

In organising data for analysis, some considerations were made to reflect the focus of the study. There were five stakeholders whose perceptions of the SIP were sought. First, to determine the science education interns' perceptions of the internship programme, mentors mentoring strategies and supervisors' guidance strategies were the independent variables (predictors) while intern's perceptions of mentor teachers and supervisors was dependent (criterion) variable. Similarly, for mentors' perceptions of the internship programme, the interns knowledge base and teaching strategies (classroom behaviour) and inter-personal relationships became the independent variables, while the perceptions of the mentor teacher was the dependent variable.

Also, for headmasters' and SHS students' perceptions of the interns' performance during the practicum, the intern's classroom behaviour and interpersonal relationship with staff and students were the independent variables while the perceptions of headmasters and students of the programme were the dependent variables. In the case of the university supervisor, the behaviour of interns in the classroom with their SHS students was the independent, and supervisor's perception of such behaviour was the dependent variable.

In order to organise data collected for analysis, a code book was prepared and used to guide data entry into SPSS 16.0 for Windows. Variables made up of multiple items were totalled up and recomputed. For example, each of the variables under classroom performance had a number of items describing a particular activity. Scores for each of the activity (such as planning for instruction or teaching) were summed up and recomputed. The perception scores of mentors, supervisors, interns, heads of Senior High Schools and SHS students were entered, and computed as percentages, means and standard deviations.

3.9.2 Analytical Procedure for Data Analysis

Descriptive Statistics

Large quantities of data were collected using questionnaires. The data were entered into SPSS 16.0 to generate descriptive statistics of percentages, means, standard deviations and bar charts for interpretation through the use of tables and charts. The data were coded as follows: Strongly agree (SA) = 5, Agree (A) = 4, Uncertain (U) = 3, Disagree (D) = 2 and Strongly Disagree (SD) =1. A mean score above 3.00 was considered to be a positive perception and that which was exactly 3.00 meant the individual was uncertain, and anything below 3.00 was a negative perception. All items

of a given questionnaire were pooled. These were then entered into SPSS (version16.0) and analysis was made to determine the mean and standard deviation used to describe the group. For each item, the frequency (number of respondents who chose a particular response) was multiplied by the score to determine the product. The sums of such products were added to get the total score. The grand total of the total scores was then determined. This sum was then divided by the summation of the number of respondents to each of the items to arrive at the mean score. All tables were drawn using the range strongly agree to strongly disagree; but for the drawing of charts, strongly agree and agree were combined and strongly disagree and disagree also combined to make the charts easier for interpretation.

Independent Samples t-Tests

Independent samples t-test procedure was employed to determine if differences between some of the stakeholders' perceptions (mentor teachers' and supervisors' perceptions) were statistically significant. The independent samples t-test was used because the quantitative data was interval in nature. Also it was assumed that the populations are normally distributed and have equal standard deviations (or variances); and that the data used to carry out the test was obtained from two separate (independent) samples of the two populations being compared (Lane, 2012).

3.9.3 Analysis of Qualitative Data: Interviews and Observations

The qualitative data for this study involved analysing emerging patterns through coding and verbally reported. The individual responses to question items were critically examined and categorised to get themes from such responses. Notes taken on individual and focus group interviews were also analysed by summarising recurring themes through close re-reading of the text.

Data from field notes, interview transcripts and comments from lesson notes of participants observed were coded. This coding took place on a variety of levels. The most basic level of coding was identifying texts and contexts of the various events described in the study. Specific codes emerged from the data themselves. Open coding was used for both formal and informal interviews. The smallest unit of coding for interview (including focus group) transcripts was a theme that was arrived at after close reading of the text. For example the interview question for interns that read "what are the major professional benefits of this programme to you as a beginning teacher?" was coded "gained confidence", "gained courage" "handling of difficult children" etc.

Written responses derived from semi-structured interview questions and focus group discussions were examined to reach an agreement (between the researcher and a colleague) on the response categories for each written response. Following this, emerging themes were derived for the subsequent analysis and reporting of findings. Observations were coded as present or absent for observed and un-observed behaviour in the process of teaching. In order to determine which response patterns were in the majority, each response type was tallied and this provided good insight into which response pattern was in the majority and which the least.

3.9.4 Document Analysis

Documents that were collected from the field for study included interns' lesson plans, examination/evaluation reports, and interns' evaluation of mentors. Programme handbook and meeting agendas were collected from the Department of Science Education while the Students' Internship Handbook, Interns' Record Book and some meeting agendas and workshop manuals for mentor training were collected from the Institute for Educational Development and Extension (IEDE). These are papers

containing official information about the internship programme. Analysis of the documents allowed the gathering of facts about the programme to understand why the programme is the way it is. It is useful for understanding the purpose or rationale of the programme. It helped in determining the major stakeholders involved. Documentary summary forms were used to put the documents in context, explain their significance and to give a brief summary.

3.10 Ethics

Ethics in research studies deals with the principles and systems relating to what are right and what are wrong. It deals with the standards and codes of research that the study has to put in place (Robson, 2002). The informed consent of the following was obtained prior to the commencement of the study:

1. The headmasters of the schools participating in the study.
2. The appropriate officers from the district directorates of education of study areas.
3. The mentors selected to take part in the study.
4. The science education interns that are the focus of this study.
5. The Parent Teachers' Association (PTAs) of participating schools in the study.
6. The Director of IEDE and other personnel of CETDAR.
7. Lecturers and students of the Department of Science Education, UEW.

Explicit consent for using tapes to record focus groups discussions with interns was sought.

In addition, raw data including recorded tapes, questionnaires and transcripts have been stored securely for the appropriate period of time according to the requirements of the

ethics committee. The informed consent of other persons who were chosen for close observation was sought at the time they were approached to participate in the study. All data were treated in a way that protected the confidentiality and anonymity of all participants involved in the study.

CHAPTER FOUR

4.0 RESULTS

4.1 Overview

This chapter is devoted to the results of the study. The results have been organised along the lines of the research questions and have been put under the following sub-headings: interns' perceptions, mentor teachers' perceptions, the university supervisors' perceptions, headmasters'/ mistress' perceptions and the senior high school students' perceptions of the students' internship programme.

4.2 RESEARCH QUESTION 1

This research question sought to examine the perceptions of science education interns about the internship programme in which they enrolled and participated and was stated as follows:

What are the perceptions of science education interns of:

(a) the science mentor's support and effectiveness during the SIP?

(b) the partnership school's support during the SIP?

(c) the university supervisor's support and commitment during the SIP?

(d) the internship duration and one time supervisor's assessment?

(e) how well they were prepared for the SIP by the Department of Science Education?

(f) the impact of SIP on their professional development?

(g) the post-internship seminar and the student teacher's portfolio?

A student teachers' perception questionnaire was administered to science interns (n=103) in eight administrative regions of Ghana out of the ten to elicit their perceptions about the mentor, the university supervisor, their preparedness/readiness for

the programme, the impact of the internship programme on their professional development, the post-internship seminar and the portfolio.

4.2.1 (a) Science Interns' Perceptions of the Science Mentors' Support and Effectiveness during SIP

The perceptions of the interns about the mentors were examined under the following subheadings: (i) planning lessons for instruction, (ii) creating a conducive climate for effective instruction, (iii) guiding teaching in the classroom, (iv) supporting reflective practice, and

(v) supporting intern-community relationship. These were looked at in the way mentors handled such issues. The student teachers' perception questionnaire on mentors' support during SIP had items based on a five-point Likert scale. The responses were scored. For positive statements, Strongly Agree was scored 5, Agree 4, Uncertain 3, Disagree 2 and Strongly Disagree was scored 1. This was the opposite for negative statements. All items answering a particular research question were pooled. These were entered into SPSS to generate the means and standard deviations. The calculated mean was then determined and used to describe the participants. For each item, the frequency (number of interns who chose a particular response) was multiplied by the score to determine the product. The sums of the products were added to arrive at the total score (see Table 2). The grand sum of the total scores was then determined. The mean score was obtained by dividing the sum of the total scores, (i. e the grand total) by the summation of the number of interns that responded to each of the items.

Planning of Lessons for Instruction

During internship, mentors are expected to help interns plan their lessons before they use them for practising how to teach. Interns were asked of their perceptions of

their mentors' roles in guiding them plan for lessons. Their responses gave a mean perception of 3.77 with a standard deviation of 1.32 (Table 2) which corresponds to Agree on the Likert scale. This implied that most of the interns agreed that their mentors supported them plan their lessons for classroom instruction.

Table 2

Interns' Perception of Mentors Support in their Planning of Lessons for Instruction

Mentor Supportiveness in Planning	**Score**						
	N	**SD**	**D**	**U**	**A**	**SA**	**Total**
Provision of instructional materials and teacher handbooks	103	6	38	6	124	225	399
Revision of expectations for lesson plans and student assessment with me from time to time	103	7	20	18	216	130	391
Provision of help in the establishment of instructional goals and objectives	103	7	22	18	188	160	395
Developing a plan for me to gradually assume full responsibility for classroom instruction	103	8	22	12	204	150	396
Developed a plan for me to receive feedback on a regular basis	103	12	28	21	192	110	363
Grand Total	**515**						**1944**

Mean perception =3.77, SD = 1.32

Figure 2 captures the scores interns assigned to items in the survey.

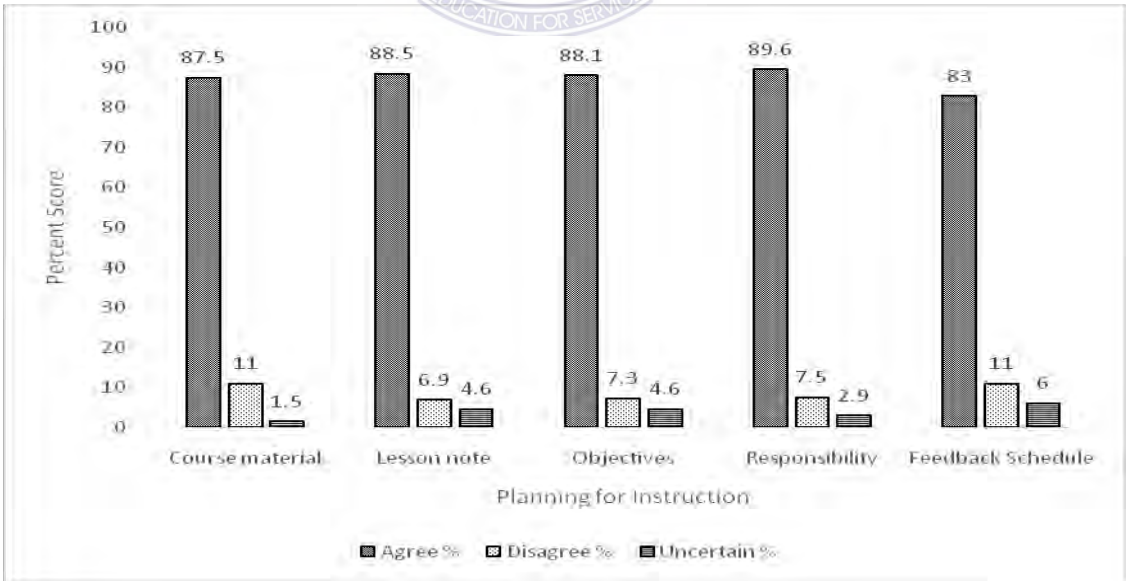


Figure 2: Interns' Perceptions of Mentors' Support towards their Planning for Instruction

Item by item analysis of the data collected to evaluate the interns' perceptions of the mentors' support and effectiveness during SIP are presented in both Table 2 and Figure 2. Approximately 88% of the interns believed that their mentors assisted them with course or instructional materials, preparing and reviewing lesson plans (88.5%), establishing goals and objectives (88.1%), and provided opportunities for them to take full control of and responsibility for the classroom for science teaching and learning (89.6%). Approximately 83% of the science interns thought their mentors had a planned schedule to give them feedback on their classroom performance. However, 11.0% of the interns did not agree to this view which meant that some mentors had no planned schedule for giving feedback to interns; whilst 6.0% were uncertain on the matter.

Conducive Climate between the Mentor and the Intern during the Internship

Interns were asked about their relationship with their mentors during the practicum. The data presented in Table 3 indicate the mean perception of interns with respect to their relationship with the mentor. A mean perception of 4.20 (with standard deviation of 1.00) on the Likert scale meant that most interns strongly agreed that their mentors created good working environments for them to work and adequately learn in their schools of practice.

Table 3

Interns' Perception of Conducive Environment created by Mentors for their Practice.

Provision of Supportive Environment by Mentor	**Score**						
	N	**SD**	**D**	**U**	**A**	**SA**	**Total**
Modelling of teaching	103	16	22	9	160	165	372
Giving of feedback to intern	103	2	0	6	200	245	453
Encouragement of communication for reflections	103	5	6	6	184	235	436
Prompt corrections of mistakes	103	7	12	12	188	195	414
Support for building-good relationships with other staff	99	2	8	6	172	240	428
Giving attention to intern	103	1	4	3	120	345	473
Grand Total	**614**						**2576**

Mean perception = 4.20, SD = 1.00

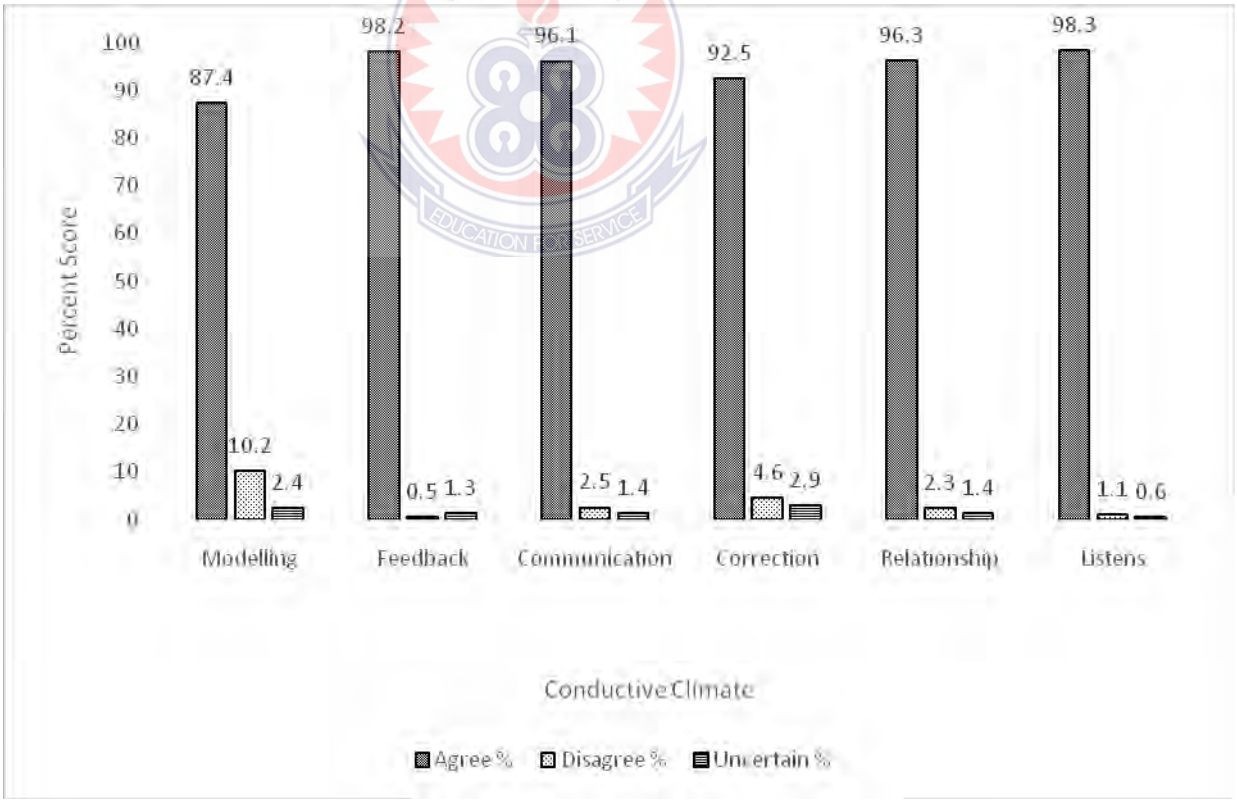


Figure 3*: Interns' Perceptions of Conducive Climate created by Mentors during their Internship.*

Figure 3 is a graphical representation of item by item description of interns' perception of the conducive climate (good rapport) created by science mentors during the internship. Generally, many interns had positive perceptions about their mentors in the creation of conducive climate for them to practise. Between 87% and 98% of interns (n=103) had the perceptions that their mentors modelled teaching, gave them feedback; engaged them to reflect on their practise, gave prompt corrections to their errors and helped them establish good rapport with other school staff. They also had the positive perception that mentors paid attention to issues concerning their practice (98.3%) during the SIP. However, 10.2% of the interns perceived that mentors did not model science teaching for them to observe and learn from them.

Teaching in the Classroom

A pool of the responses of the interns to items on mentor-support for classroom instruction provided a mean response of 3.81 and a standard deviation of 1.02 (Table 4). This meant that most of the interns agreed that their mentors supported them for classroom instruction. The implication is that interns learned and developed as qualified teachers under their mentors. This is further illustrated pictorially in Figure 4. Item by item analysis indicated that most of the interns perceived receiving much guidance from mentors towards their practise in classroom teaching during their internship.

The perceptions of interns with reference to particular activities in which mentors supported were: lesson plan preparation (92.8%), provision of informal observation and feedback on classroom management (93.7%), acted as resource person (90.7%), provision of formal observation and written feedback on classroom teaching (96.1%) (see Figure 4).

Table 4

Interns' Perception of Mentors' Support for Classroom Teaching

Mentor support for Teaching	**Score**						
	N	**SD**	**D**	**U**	**A**	**SA**	**Total**
Provision of feedback on lesson plans	103	4	20	12	240	225	501
Informal observations and feedback on intern's classroom instruction and management	99	3	22	0	204	170	399
Formal observation and feedback of intern's classroom work	99	4	6	3	136	185	334
Provision of teaching and learning resources	103	7	18	12	216	145	398
Working in collaboration with the university supervisor	103	14	50	72	128	40	304
Support for development of planning skills	103	5	32	18	180	155	390
Grand Total	**610**						**2327**

Mean perception = 3.81, SD = 1.02

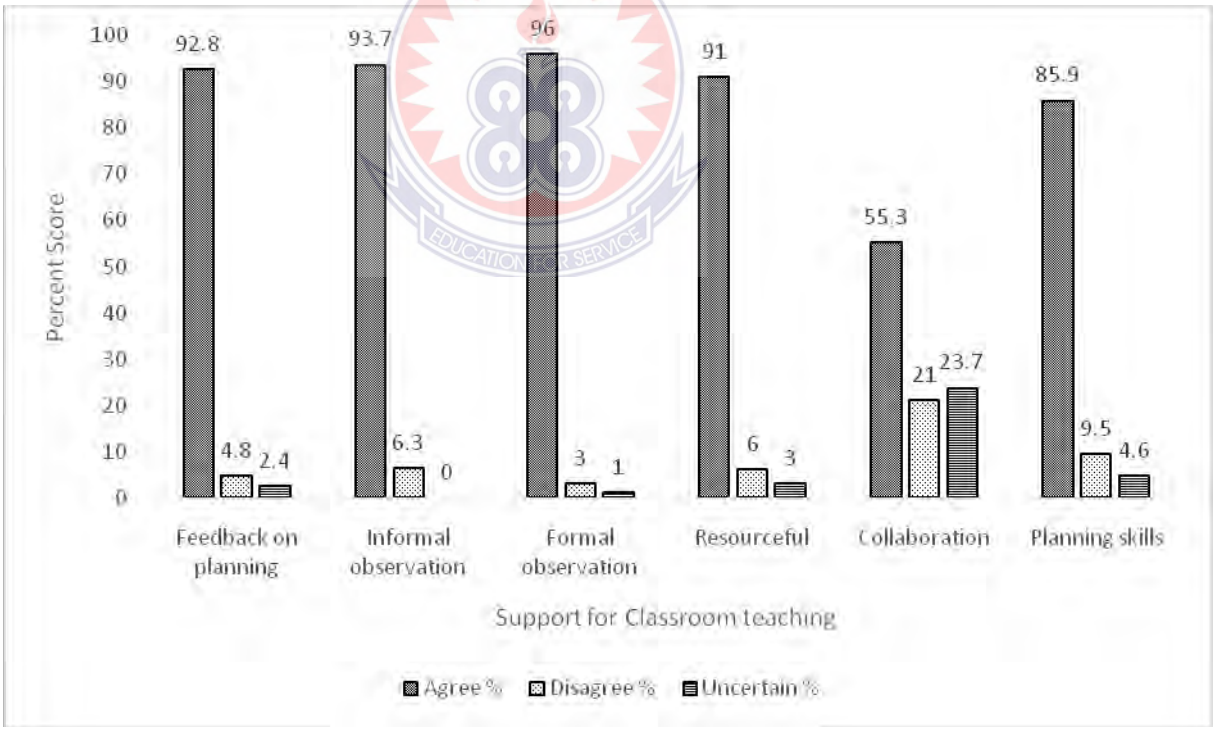


Figure 4: Interns Perceptions of mentors' support for classroom instruction during the Internship

Interns also had a positive perception that their mentors supported them in the following areas: developing their skills in planning (85.9%) and collaborating with university supervisor on meeting programme goals (55.3%). The implication is that interns practised how to teach under supportive conditions. However, some interns (21.1%) felt that there was not so much collaboration between the university and schools during their practicum, whilst 23.7% were uncertain whether the university collaborated with their schools or not.

Support for Reflections on Teaching

Data on interns' perception of mentors' support for practising reflective teaching are presented in Table 5. A pool of the items that sought interns' perception of the mentors' support for their (interns) reflective practice gave a mean of 3.50 with a standard deviation of 1.02. This meant that most interns agreed that mentors supported them to practise self-reflection of their classroom practice. Since interns learned and practised reflection on teaching, it is assumed they had acquired the skills of reflection and therefore would be good reflective practitioners on the job.

Table 5

Interns' Perception of Mentors Support for their Reflective Practice

Mentor Support for Interns' Reflections	**Score**						
	N	**SD**	**D**	**U**	**A**	**SA**	**Total**
Giving of progress reports to the intern	96	5	16	18	228	100	367
Giving of progress reports to the university supervisor(communication)	103	14	50	72	128	40	304
Reviewing of the intern's teaching strategies	103	3	22	18	162	120	325
Providing opportunities for the intern's professional growth	103	1	18	9	232	160	420
Grand Total	**405**						**1416**

Mean Perception = 3. 50, SD = 1.02

Interns' perception of support received from their mentors for practising reflective teaching are further illustrated in Figure 5. The four areas in which interns'

held the notion that they received mentors' support for reflection on practise took the form of letting them know of their progress (89.4%), giving regular information to their university supervisor (55.3%), reviewing their teaching strategies on regular basis (86.8%) and providing opportunities for intern to grow professionally (93.3%) by allowing them to attend professional association meetings.

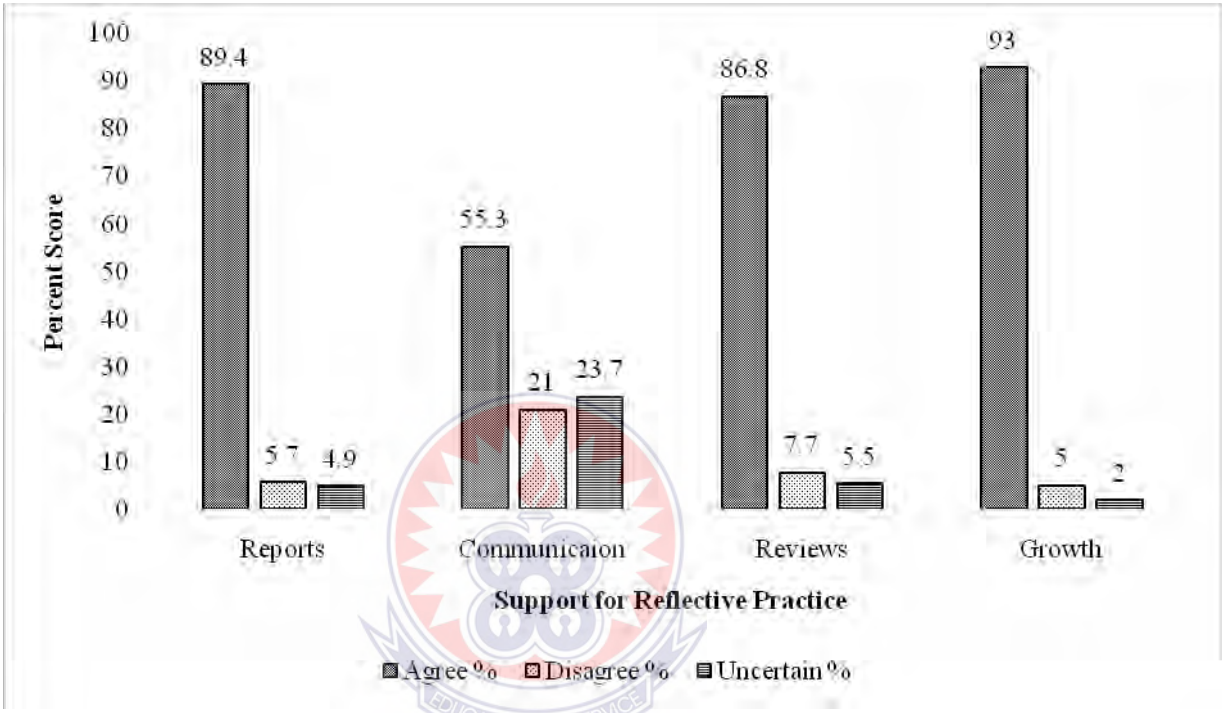


Figure 5: Interns' Perceptions of Mentors' Support in Reflective Practice during the Internship

Majority of the interns, between 87% and 93%, perceived that they were helped most of the time by their mentors to reflect upon their practice teaching. However, an examination of the item labelled "supervisor information" (communication) revealed that 55.3% agreed whilst 21.0% of the interns disagreed that their mentors communicated with their university supervisors on a regular basis concerning their progress. A significant percentage of 23.7 of them were uncertain on whether their mentors and supervisors communicated. It was observed that supervisors on their part

did not also communicate effectively with the mentors and students in practice schools. Supervisors of interns get

to know them only when they go out on supervision. They are often assigned to interns late during the practicum period and therefore cannot have prior access to interns and their mentors to have any meaningful coordination activities with them.

4.2.2 (b) Perceptions of Science Interns about Partnership School's Support during the SIP

There is the need that interns be introduced to the wider school community to provide an open atmosphere in which they can learn the profession without undue hindrances. The wider school community may include people such as departmental secretary, school nurse, school bursar, school domestic bursar, senior housemaster, PTA chairman and the school messenger and other important members of the community (assembly man, circuit officer, watchmen of the school) who affect the school in one way or the other. As in the previous cases, items on the student teachers' questionnaire that dealt with the interns' perception of support from partnership schools were pooled. A mean perception score of 3.90 (SD = 1.14) was obtained (Table 6). That is, most interns agreed that their schools hosted them well. Teachers would naturally work hard under supportive school environment as was the case in this study. Such support makes the interns feel loved by the school and they put up their best and through that learn the "robes" of the profession.

Table 6

Interns' Perception of Partnership School's Support in their Relationship with the Wider School Community

Partnership School Supportiveness	**Score**						
	n	**SD**	**D**	**U**	**A**	**SA**	**Total**
Acceptance of intern by the school	103	4	12	0	168	255	439
Giving intern opportunities to learn outside the class.	102	12	30	27	152	140	361
Giving intern regular feedback on work done	103	7	8	30	220	135	400
Grand Total	**308**						**1200**

Mean Perception = 3.90, SD = 1.14

These items dealt with the intern wider-school community interactions. The data collected on interns' interactions outside the classroom, that is, community interactions have been presented graphically in Figure 6.

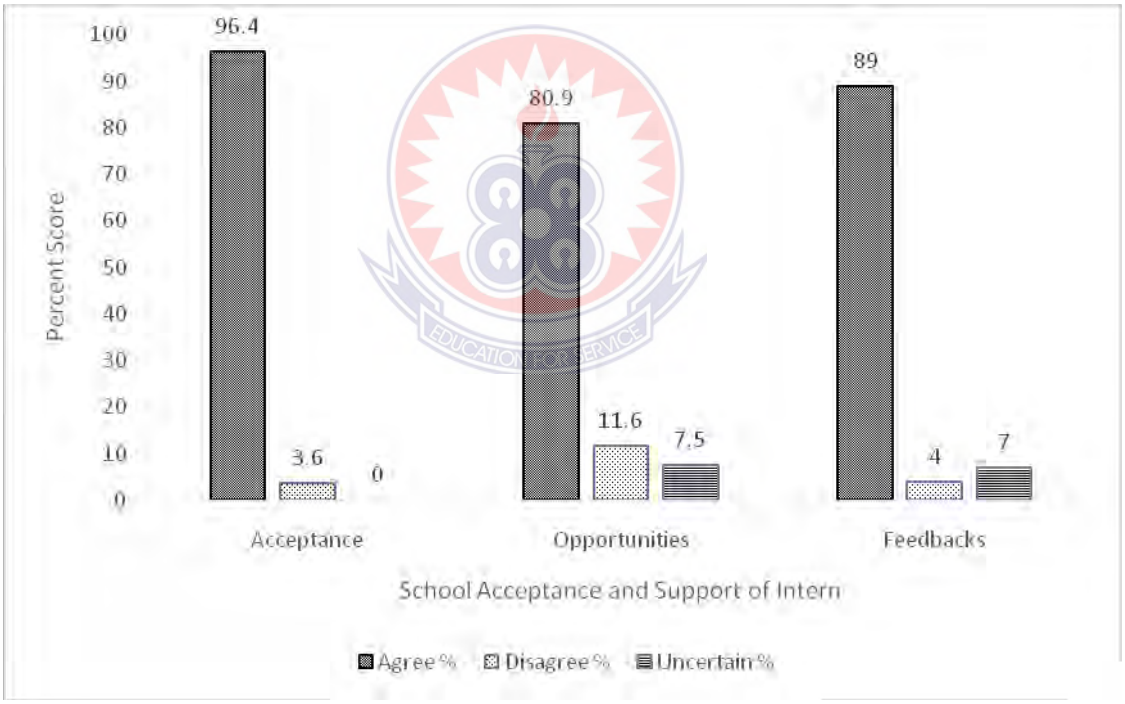


Figure 6: *Interns' Perceptions of the School Support in their Relationship with the Wider School Community during Internship*

Most of the interns, 96.4% of them, felt that they were welcomed by their schools, and 81% of them felt that the schools provided them with opportunities to learn outside the class by interacting with the wider-school community (apart from classrooms

teaching), whilst 89% of them perceived that their schools gave them constructive feedback and ongoing support during their stay in school. However, 11.6% of the interns disagreed that the school provided them with opportunities to learn outside the class by interacting with other staff members; 7.5% of them were uncertain on that particular issue. This means that it was not all partnership schools that provided interns with the opportunity to learn other things outside the classroom situation.

4.2.3 (c) Perceptions of Science Interns concerning the University Supervisor Support and Commitment during the Internship

The supervisor should be one of the stakeholders of teacher preparation who is genuinely concerned about the professional development of the intern during the practicum period. The burden of the field experience of the intern should not be borne by the mentor alone; neither should the supervisor be overbearing on the intern or mentor. In clinical supervision, a supervisor asks interns questions during pre-observation and post-observation conferences so as to encourage reflection and self-analysis by the student teacher. It is important to know how pre-service science interns perceive their university supervisors' supervisory practices.

Data on interns' perceptions about university supervisors' support during the SIP are indicated in Table 7. Their responses to items that sought their perceptions on the university supervisors' support were pooled. A mean of 3.87 was obtained, that is majority of the interns perceived that their university supervisors supported them well. The support was in the form of holding observation conferences with them and giving them prompt feedback on lessons observed. This support helped them in many areas of their development as teacher interns.

Table 7
Interns' Perceptions of the University Supervisor's Support during the Internship

University Supervisor Supportiveness	**Score**						
	N	**SD**	**D**	**U**	**A**	**SA**	**Total**
Giving of feedback on lessons observed	103	4	8	0	88	365	465
Holding of pre-observation conference	99	7	30	15	124	225	401
Holding of post-observation conference	100	9	12	18	120	245	404
Perceptions about the intern's classroom management	99	10	20	27	156	155	368
Concerns about the intern's development	103	6	18	15	184	185	408
Communication with the mentor on the intern's progress	103	18	52	54	112	65	301
Grand Total	**607**						**2347**

Mean Perception = 3.87; SD = 1.09

Their perception scores for the different areas of the university supervisors' support are indicated graphically in Figure 7 in percentages. These illustrate how supervisors faired in specific areas of support offered to the interns.

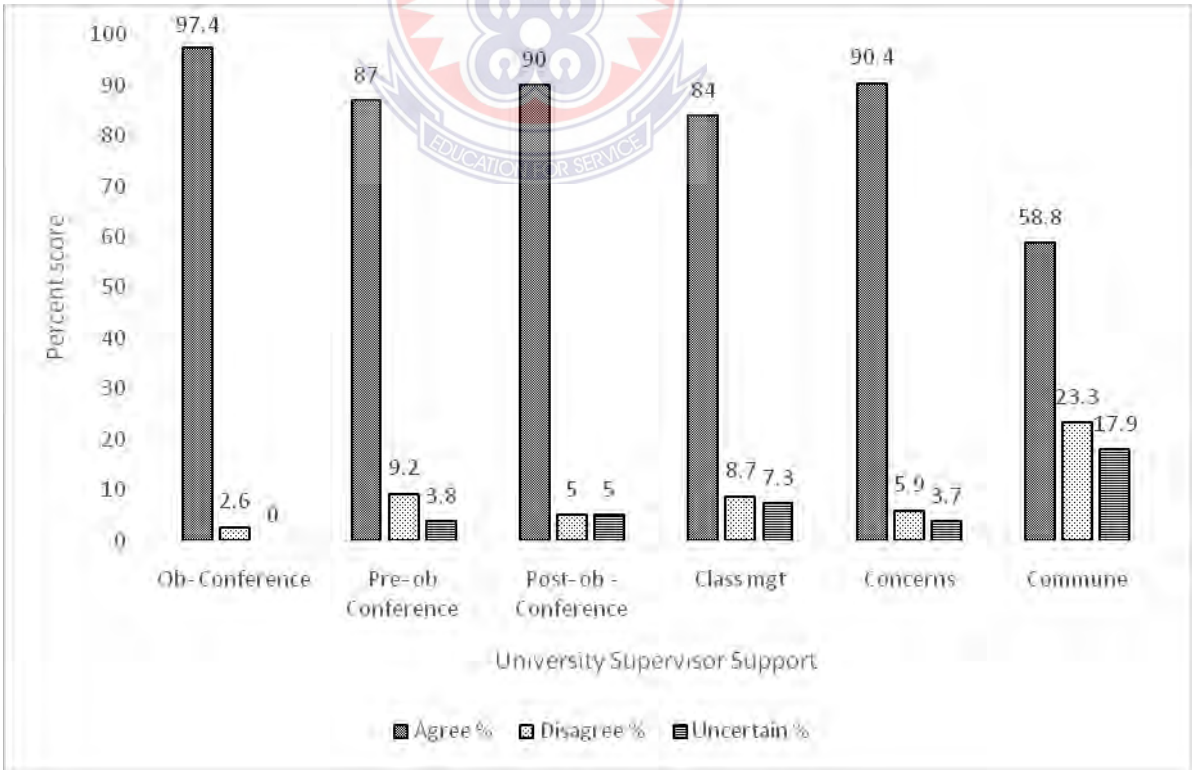
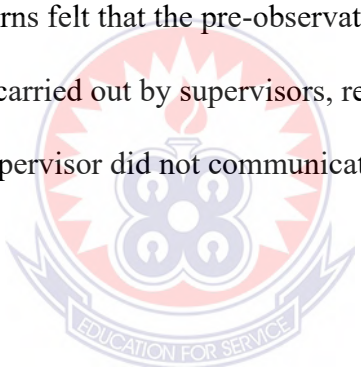


Figure 7*: Interns' Perception about the University Supervisor's Support during the SIP*

Generally, most of the interns had the perception that the university supervision of the SIP was well carried out in the areas of pre- and post observation conferences, giving them feedback after observing their lessons in class, and also showed genuine concern about their professional development. In particular, majority of the interns, 97.4% of them perceived that their supervisors gave them prompt feedback after observing their lessons. Almost 90.4% of the interns agreed that the university supervisor was genuinely concerned about their development as interns. On whether university supervisor had pre-and post-observation conference with the interns they visited, 87.0% and 90.4% of the interns respectively responded that supervisors had pre- and post-observation conferences with them. However, substantial percentage of 13.0% and 9.7% of the interns felt that the pre-observation and post-observation conferences were not well carried out by supervisors, respectively. An important observation was that the supervisor did not communicate with the mentor on progress of the intern.



4.2.4 (d) Perceptions of Science Interns of the Internship Duration and the One time Supervisor's Assessment?

Interns were asked of their opinion concerning the one year internship duration and the one slot supervision given by the university supervisor. Data collected from their responses to the items are presented in Table 8. The pooled responses to items gave two means of 4.51 and 2.24 for duration and one slot assessment respectively.

Table 8

Interns' Perception of Internship Duration and Adequacy of Supervisor's Assessment

Duration of internship and assessment	**Score**						
	N	**SD**	**D**	**U**	**A**	**SA**	**Total**
Adequacy of duration of internship	**103**	0	0	15	160	290	**465**
Adequacy of supervision by faculty	**103**	5	166	0	60	0	**231**

Mean Duration = 4.51; SD = 0.25; **Mean of Supervision = 2.24; SD = 0.27**

A mean perception of 4.51 (approximately 5) with a standard deviation of 0.25 indicated that most interns found the one year period for internship to be adequate; and a mean of 2.24 (approximately 2) with a standard deviation of 0.27 means the one-time assessment by the university supervisor was perceived by interns to be inadequate. Moreover, the timing of the supervision was very close to the end of the internship and any feedback from supervisors was not so beneficial to them. Figure 8 indicates the surveyed perceptions of science interns on the two issues.

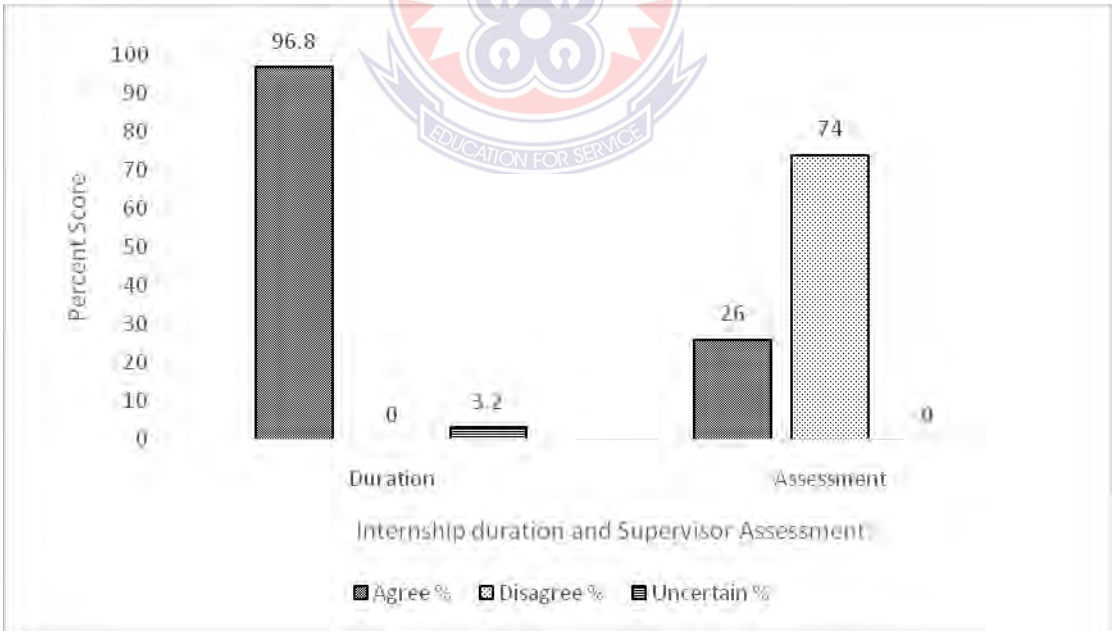


Figure 8: *Interns' Perceptions of the Internship Duration and Supervisor's Assessment*

Approximately, 97% of the science interns had the feeling that the practicum duration of one academic year was adequate. On the part of supervision, 74% of them

perceived that the one slot university supervision was inadequate. The supervision by the university supervisor was inadequate for decision making on grading. However, 26.0% of them thought faculty supervision was adequate. The time the supervisor also visited the intern was rather too late and not helpful as feed back to the intern for his/her professional development.

4.2.5 (e) Science Interns' Perceptions of How Well they were Prepared for the SIP by the Department of Science Education

This question sought to find out the perception of interns on how ready they were for the internship and whether they thought their Department prepared them adequately for the field work. The Likert scale items on this particular question ranged from strongly agree (5) for being very well prepared to strongly disagree (1) for being poorly prepared. A pool of interns' responses to ten items on how well they were prepared for SIP was made. Table 9 indicates the pooled scores of interns' responses. A mean score of 3.97 (with standard deviation of 0.72) in this particular case indicated interns' opinion of being well prepared by their department for the SIP.

Table 9
Interns' Perceptions of how Well they were Prepared for the Internship Programme

Department preparation of interns	**Score**						
	N	**SD**	**D**	**U**	**A**	**SA**	**Total**
Preparation on content knowledge	103	0	12	0	88	365	465
The use of multiple teaching strategies	103	6	18	15	184	185	408
Creation of suitable learning environment	96	0	30	15	124	225	394
Designing of classroom assessments that are aligned with content standards in curriculum	100	9	12	18	120	245	404
Designing of formative assessments	103	7	12	12	188	195	414
Integration of technology into instruction	100	5	70	0	160	100	335
Building collegiality with peers	103	4	12	0	168	225	409
Monitoring of student learning	99	2	8	6	172	240	428
Reflection upon teaching practise for improvement	103	1	18	9	232	160	420
Building relationship with parents	101	2	100	15	16	200	333
Grand Total	**1011**						**4010**

Mean perception = 3.97; SD = 0.72

Figure 9 shows an item by item analysis of the responses of interns on the extent to which they were well prepared by the Department of Science Education for the 2010 internship programme in senior high schools in Ghana. Between 78.0% and 97.0% of the interns had the perception that they were well prepared by the department for practicum. Interns had positive perception that they could create meaningful learning experiences based on the content knowledge of the SHS students they handled. Those who had this perception constituted 97.4% of the interns. Majority of the interns, 90.4% of them, perceived that they were well prepared in the use of multiple teaching strategies to encourage critical thinking among SHS students. About 89% of them had the perception that they were well prepared by the Department of Science Education to create an environment that will engage SHS students in learning. This is an indication of how confident interns were in their schools of practice.

About 90.4% of the interns had the perception that they were well prepared to design classroom assessments that were aligned with content standards of the Ghanaian senior high school curriculum. This finding corroborated results of focus group discussion which concluded that they were well prepared in many areas they experienced during the internship.

Approximately 93.0% of the interns felt well prepared in the area of designing formative assessment items and use the same to assess students and thereby give purposeful feedback to SHS students. Only in the use of technology as an integral part of instruction to support student learning were interns poorly prepared. About 7.7% were well prepared to integrate technology in instruction, 5.5% were uncertain whilst 86.8% of the interns felt they were not well prepared to use and integrate technology in their instructional activities. On the part of working cooperatively with peers, 96.1% of the interns held the view that they had been prepared well to collegially work with peers

to improve student learning. The science interns, 96.3% of them also perceived that they were well prepared to monitor SHS students and help them achieve full potential in their academic work.

Similarly, for "reflecting daily on teaching practises to improve teaching and students' learning", interns' responses showed that they were well prepared; 93.3% of them felt this way. The lowest positive response by interns was their ability to "develop good relationship with parents and guardians to support students' learning".

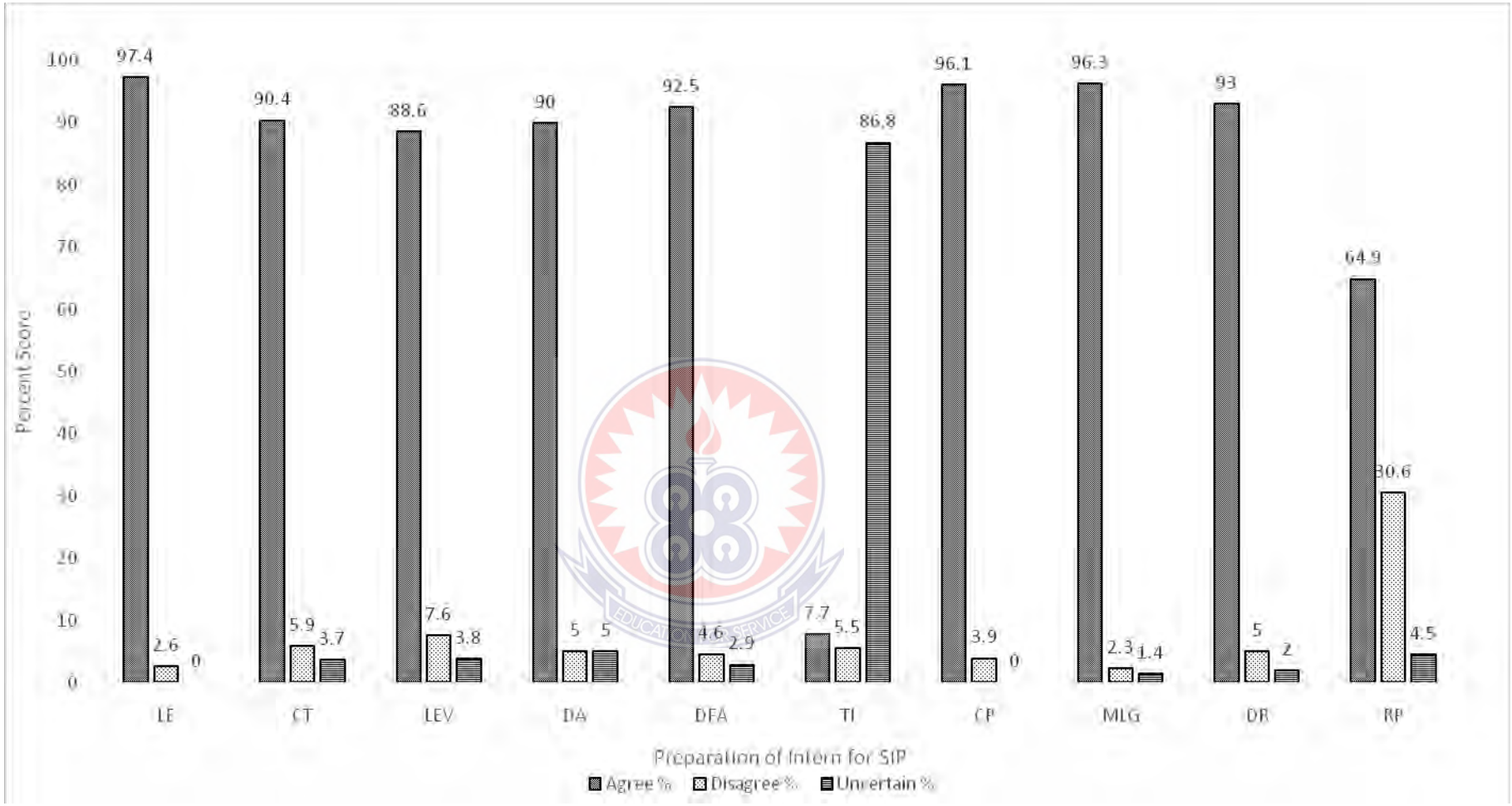


Figure 9: *Interns' perceptions of their preparation for the Practicum*

As indicated in Figure 9, approximately 65% of interns perceived that they were well prepared to relate with parents and guardians of SHS students of their schools; about 35% felt they were either not prepared for this or were not even sure. This finding confirms the fact that there is no clear -statement of department objective on student teacher interaction with parents of children; neither is this issue discussed during pre-internship seminar for the internship programme.

4.2.6 (f) Science Interns' Perceptions of the Impact of SIP on their Professional Development

Interns' perceptions about their SIP experiences and its impact on their professional development were investigated using six Likert scale type items. The six items were pooled and summated to arrive at a total score of 2750 and average of 4.58 (Table 10). In general, most of the interns were emphatic that the practicum programme they went through had positive impact on their professional development. It implied that the objective of the SIP in broadening interns' experiences, understanding and awareness of the realities of teaching and working in schools has been achieved. It is further implied that interns had developed skills in professional-decision making, capacities for reflective learning and self-evaluation as professional teachers.

Table 10

Interns' Perceptions of the Impact of SIP on their Professional Development

The impact of SIP	**Score**						
	n	**SD**	**D**	**U**	**A**	**SA**	**Total**
Confidence as a teacher	103	1	2	3	80	400	486
Enthusiasm for teaching	103	1	4	9	184	255	453
Interest for research and the integration of technology into teaching	97	0	0	9	136	300	445
Encouragement for self development	97	0	0	6	68	390	464
Increase of knowledge of science content	97	0	0	9	72	380	461
Commitment to learning and seeking new ideas	103	0	0	6	200	235	441
Grand Total	**600**						**2750**

Mean Perception = 4.58; SD = 0.55

Analysis of the six items that were used to investigate interns' perceptions of the impact of the SIP programme on their professional development and growth had a percent agreement score above 96% for each of the items (Figure 10). The findings of this study highlight the impact that SIP had on the science interns' confidence as teachers, enthusiasm for teaching, interest in research and the use of technology in teaching, knowledge of science content and commitment to learning and seeking new skills on their own.

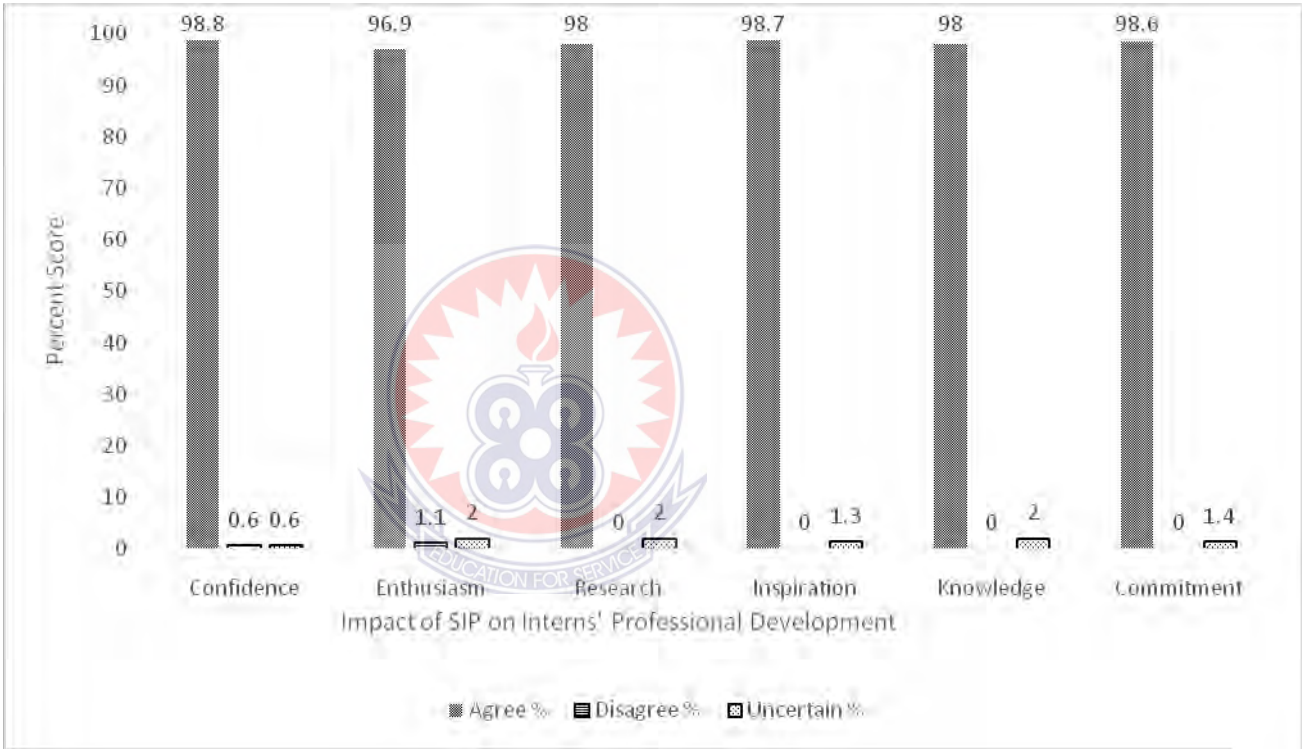


Figure 10*: Interns' Perceptions of Impact of SIP on their Professional Development*

Specific findings were: (i) the majority of the science interns, 98.8% of them had experiences that made them confident as teachers; (ii) 96.9% of them gained enthusiasm for teaching; (iii) in the area of gaining content knowledge, 98% of them felt the mentoring interaction helped them much. Approximately, 98% of the interns had the perception that the field experience they had increased their interest in research and the way that technology could be applied to teaching and learning. Almost all the

respondents, 99.0% of them, believed that the practicum made them to think of ways by which they could improve themselves in the teaching profession. Similarly, most science interns (98.6%) had the perception that the programme increased their commitment to learning and seeking new ideas on their own. Observation of interns' classroom work by the author confirmed these issues as they spoke with confidence as they practised to teach.

4.2.7 (g) Science Interns' Perception of the Post-internship Seminar and the Student Teachers' Portfolio

The post-internship seminar and the student teachers' portfolio are the last components of SIP to be carried out for student teachers to be graduated. During this time, post-internship students come face to face with their university supervisors and are quizzed about their experiences while they were on practicum. This sub-question was answered by using data collected from interviews and focus group discussions.

Focus group discussion revealed the following perceptions of interns about the post-internship seminar organised by the Department of Science Education for the 2010 group of interns. The interns were asked of their opinion of the seminar they had just gone through. Among what was said by interns were:

> *(i)The post-internship seminar was not a good assessment; (ii) the assessment was not a uniform one and varied from one group to the other; (iii) in one group the panel members will accept something, in another the panel members will say no and reject it; (iv) the exercise was frustrating, and there was high tension, fear and anxiety among everybody and (v) it looked like the seminar was fault finding.*

As one intern commented strongly:

> *at the beginning it looked like I was bearing my own cross but as the days rolled by it subsided. However, it taught us of what is expected of us on the job market.*

The interns also complained of financial obligations they had to bear as depicted by the following:

> *It is difficult to come from internship and arrange to stay only one month. The financial and social arrangements are also frustrating during the period and it affects your performance. Our colleagues from Legon and UCC have completed (their programmes) long and what are we still doing here?*

Legon and UCC are two sister universities that also train undergraduates for the Ghanaian economy.

Interns were somehow divided on the issue of the post internship seminar. While majority said it was good to have this programme, a significant number, 17.24% of them (focus group members) were against its organisation and said it did not add any value to them as teachers.

Perceptions of the Interns about the Student Teacher's Portfolio

The portfolio programme is an integral part of the curriculum and is thus an obligatory assignment for all final year students on internship. Interviews and focus group discussion was used to find out interns' perceptions of the portfolio. The course on student teacher's portfolio was run concurrently with other components of the curriculum, such as the teaching practice placement and post internship seminar. Inevitably, the portfolio building alongside teaching activities influences the interns' self-regulatory and/or reflective skills. The construction of learning

portfolios by interns was not an easy task as was captured during focus group discussion narrated below:

> *building up a portfolio was a big challenge to some of us; we did not know how to prepare it. We did not know exactly what the portfolio should contain. We had conflicting statements that what was contained in the student teachers' handbook was not exactly what the university examined during post internship seminars.*

One intern commented thus-

> *I was helped by an old student; I did not know whether he guided me well, whether what he was saying was the right thing. It was during the post internship seminar that I realised that some of the things he said were wrong.*

Another intern confirmed this statement by her comments as: *we did not know the contents of the portfolio. I faced hell when I was presenting my portfolio.* Yet others said thus: *we had inadequate preparation on portfolio; we did not know much about it, especially we those who came direct from SSS/SHS to the university.*

An Intern's narration of how he constructed his student portfolio

> *During my internship 2009/2010 year, I created a learning portfolio, which I began by writing a teaching statement. I tried to use my teaching statement to develop the portfolio. What I anticipated to be a fairly*

straightforward task evolved into an extended confrontation with the inconsistencies between my beliefs and my practices.

My portfolio contains several analyses of student performance on class assignments. In each case, I tried to explain the discrepancies between my goals and what students were able to do. And, in each case, this led me to propose changes in my teaching that might help enhance students' learning on future assignments. I was able to make some of these changes as time went by. However, it was not an easy thing.

Building a student learning portfolio has prompted and facilitated the most extensive changes I had made in any course. One of the most important lessons I learnt is that it is crucial to represent one's best thinking about teaching and learning, even if that means revealing the problems, disappointments, and disasters that take place in a classroom. The portfolio serves as a guide or map. I can see more clearly where I had been, where I want to be, and have better ideas about how to get there" (Intern's written commentary on Portfolio, June 2010).

The student teacher portfolio is a complete course in UEW that carries three credits. If it is organised and supervised, it will indicate the growth profile of the student teacher from the time he/she enters the practicum to the period of exit from the programme.

4.3. RESEARCH QUESTION 2

4.3.1 Perceptions of Science Mentors about the Students' Internship Programme

RQ 2: What are the Perceptions of Science Mentors about the Students' Internship Programme?

Typically, a student teacher is assigned to an experienced teacher for support. Within this mentoring relationship, the intern is assisted with lesson planning, curriculum development, classroom management and instruction. It was necessary, therefore, to find out the perceptions of mentors about the interns they mentored during the SIP. Mentors' opinion about their interns would provide the Department of Science Education of UEW and other stakeholders with information that would form a basis for good policy decision making. A total of 29 items were used to find out the views of science mentors of the SIP. They were rated on a 5-point Likert scale of Strongly disagree (1), Disagree (2), Uncertain (3), Agree (4) and Strongly agree (5). Perceptions of mentors about the SIP were examined under the following sub-headings:

(a) mentors' perceptions of intern's pedagogical content knowledge base, teaching effectiveness and commitment during the SIP (7 items);

(b) mentors' perceived roles during the SIP (7 items);

(c) mentors' perceptions of the one year duration of SIP and one slot assessment of the intern by the university supervisor (2 items); and

(d) mentors' perceptions of interns' classroom practise (13 items).

Seven items were intended to gauge science mentors' perceptions of the pedagogical content knowledge (PCK) base of the interns during the SIP. Seven other items were related to mentors' self-perceived roles in the development of the science interns during the period. Two items sought

to find out the science mentors' opinion on the duration of practicum and the one slot evaluation of the intern by the faculty. The remaining 13 items related to mentors' perceptions of the science intern's classroom practise.

4.3.2 (a) Mentors' Perceptions of the Pedagogical Content Knowledge Base, Teaching Effectiveness and Commitment of Interns during the SIP.

Mentors responded to seven items on their perceptions about the pedagogical content knowledge base of their interns. Their responses were pooled and mean score of 4.30 was obtained from the data analysed using version 16 of SPSS. That is, most of the mentors agreed that the science interns had sound pedagogical content knowledge base for practising how to teach science. This implied that interns would be able to teach well and become good science teachers by the end of their training.

Table 11

Mentors' Perceptions of the Pedagogical Content Knowledge Base of Interns on Practicum

Interns' PCK base	Score						
	n	**SD**	**D**	**U**	**A**	**SA**	**Total**
Planning for instruction	67	1	2	0	180	100	283
Classroom management	67	1	2	0	128	165	296
Subject content	67	1	0	0	112	190	303
Assessment techniques	67	0	6	15	188	60	269
Technology and how to integrate it into teaching	67	0	10	45	128	125	308
Learning theories and their application in class	67	2	4	15	156	95	272
Motivating of students to learn	67	1	4	3	144	135	287
Grand Total	**469**						**2018**

Mean Perception = 4.30; SD = 0.66

A pictorial representation of the item analysis of mentors' opinions of interns' pedagogical content knowledge indicated their opinions as follows (see Figure 11): Approximately ninety nine percent (99.0%) of mentors found the interns to have good knowledge about planning for instruction; another 99.0% said, the interns were knowledgeable about classroom management; 99.7% of them were of the view that the interns had good content knowledge of the subject; whilst 92.2% of the mentors felt the interns were knowledgeable about assessment techniques. Also, 82.1% of the mentors perceived the interns to be knowledgeable about technology and how to integrate it into teaching; 92.3% of the mentors were of the view that the intern was knowledgeable about learning theories and how to apply them in class. Most of the mentors, 97.0% of them said, the intern knew how to motivate students towards active learning. This indicated that the mentors had a positive outlook of their interns.

The percentage was equally high in technology where 82.1% of them (though low as compared to other skills) employed it for teaching. However, 18% of them had not employed technology in their classroom work. This variability may indicate that some interns have not received sustained assistance from their faculty on information technology and its use in the classroom. The overall implication was that the mentors saw their mentees as people who have developed professionally through developing appropriate pedagogical content knowledge.

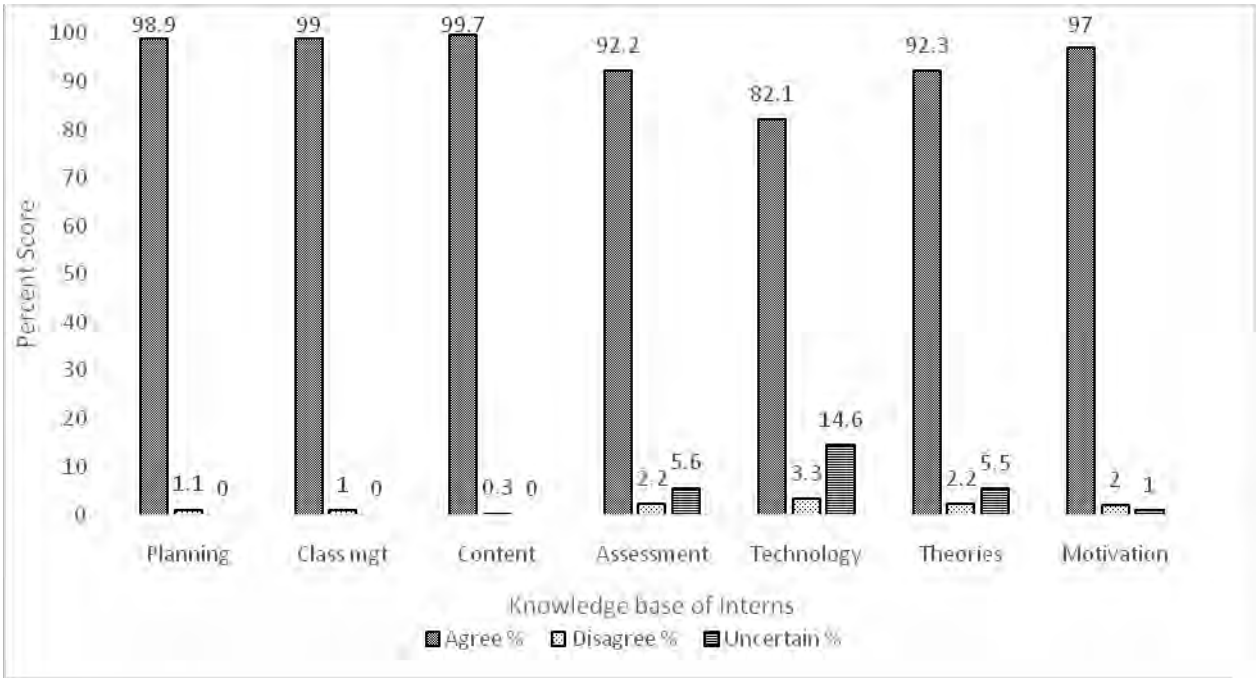


Figure 11*: Mentors' Perceptions of PCK- base of Interns during the SIP*

4.3.3 (b) Mentors' Perceived Roles in the Professional Development of the Interns during the SIP

Mentors were asked of their roles in the professional development of their interns during the SIP. A five-point Likert type questionnaire composed of seven items was responded to by the mentors. A mean score of 4.18 was obtained from a pool of their responses to the items. That is, most mentors were of the opinion that they supported their interns in most aspects of their professional development to make them well groomed for the job.

Table 12
Self- Perceived Roles of Mentors during the SIP.

Mentor responsibilities	Score						
	n	SD	D	U	A	SA	Total
Preparation of lesson plans	67	4	14	6	132	105	261
Observation of intern's lessons and feedback	67	1	2	0	104	190	297
Modelling of science lessons	67	2	18	24	108	105	257
Feedback on classroom management/discipline	67	1	6	0	152	125	284
Guidance on reflective practises of intern	67	1	4	0	152	120	277
Guidance on assessment and evaluation practices	67	1	8	6	152	120	287
Assisting the intern in building portfolio	67	4	18	18	156	105	301
Overall Total	**469**						**1964**

Mean Perception = 4.18; SD = 0.80

In Figure 12, item analyses of the variables used to assess the self-perceived roles of mentors during SIP are presented. Ninety nine percent of the mentors reported that they observed the intern's teaching and gave them feedback; 97.5% of them perceived that they gave their interns regular feedback on their classroom management and discipline strategies. Approximately, 98.0% of the science mentors said, they guided their interns regularly to reflect upon their teaching practises, whilst 94.8% of them guided the interns on assessment and evaluation of students. The mentors (82.9%) also played moderate roles in the modelling of science teaching for the intern to observe. Almost 87.0% of the mentors assisted the interns in the building of their portfolios. A significant number of the mentors (13.0%) did not assist their interns in the building of their portfolios. This suggests that the mentors in the schools did not use the portfolio as a tool in assessing student teaching. The possible reason could be that the mentors themselves do not know how to use the portfolio as an assessment tool. The weakest areas in the mentors' support for the professional development of the interns are modelling and building of portfolio.

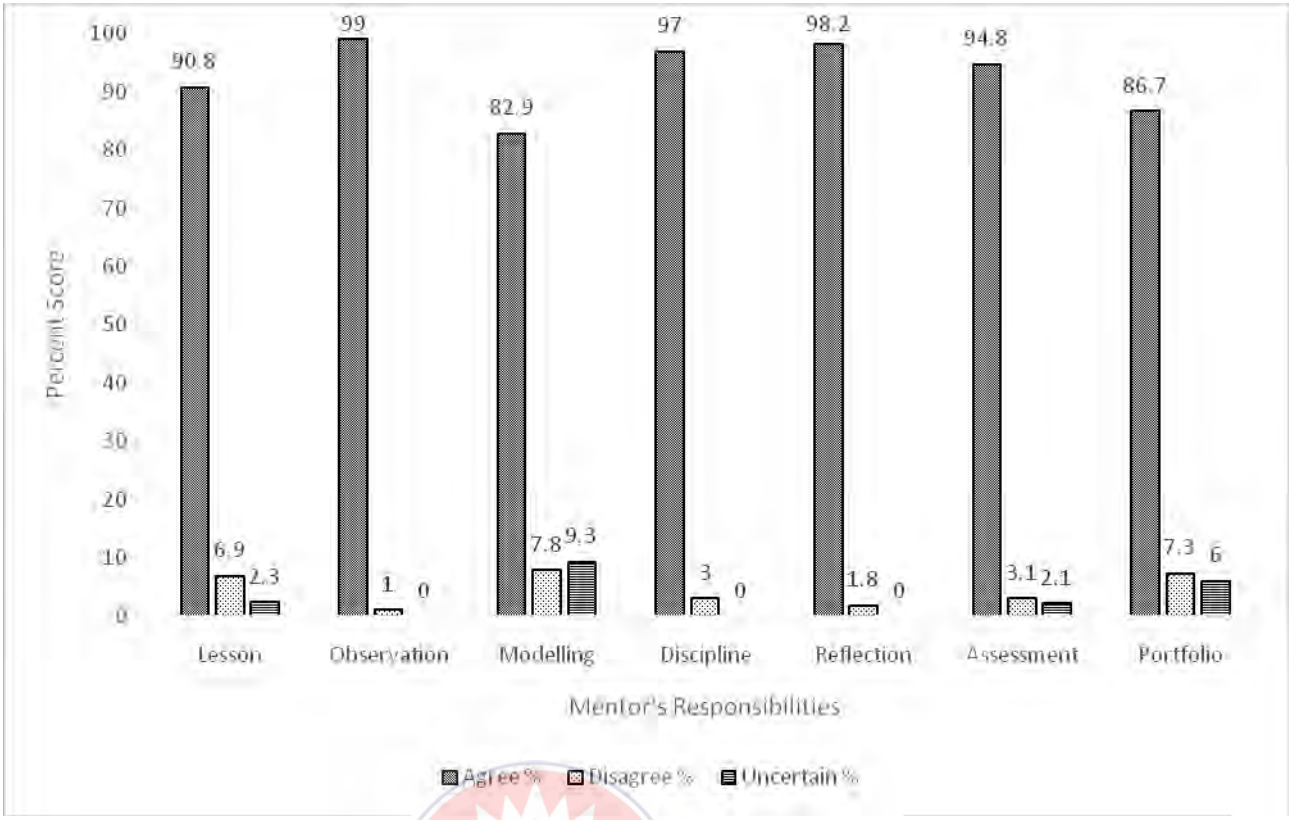


Figure 12**:** *Mentors' role in the professional development of interns*

4.3.4 (c) Mentors' Perceptions of the One year duration of SIP and One Slot Assessment by the University Supervisor

In assessing the perceptions of mentors on the duration of the one-year SIP and the one slot assessment by the university supervisor, a two item questionnaire based on a five-point Likert type was used. The responses of mentors to these two items were summated separately for each item. SPSS analysis of the responses produced two mean scores of 3.95 and 2.15 for the one year duration of SIP and the one slot evaluation by university supervisor, respectively (Table 13). The mean of 3.96 is approximately 4.00 on a 5-point Likert scale and stands for agree. This meant that the mentors agreed to the idea that the one year duration for the practicum was adequate. Similarly, a mean of 2.15 approximates 2.00 for disagree on the Likert scale rating. This meant that the mentors did not agree with the statement that 'the one slot evaluation of the intern by

the university supervisor was adequate for its intended purpose'. Results of individual interviews with the mentors during field visits substantiated the opinions of the mentors.

Table 13

Mentors' Perceptions of the Duration of SIP and the One Slot Assessment of the Intern by the University Supervisor.

		Score					
Adequacy of duration and assessment of SIP	n	SD	D	U	A	SA	Total
Adequacy of Duration of internship	**67**	4	36	0	0	225	**265**
Adequacy of University supervision	**67**	0	124	0	20	0	**144**

Mean Duration = 3.96; SD =0.56; Mean Supervision = 2.15; SD =0.45

Further, an item by item analysis produced results presented in Figure 13.

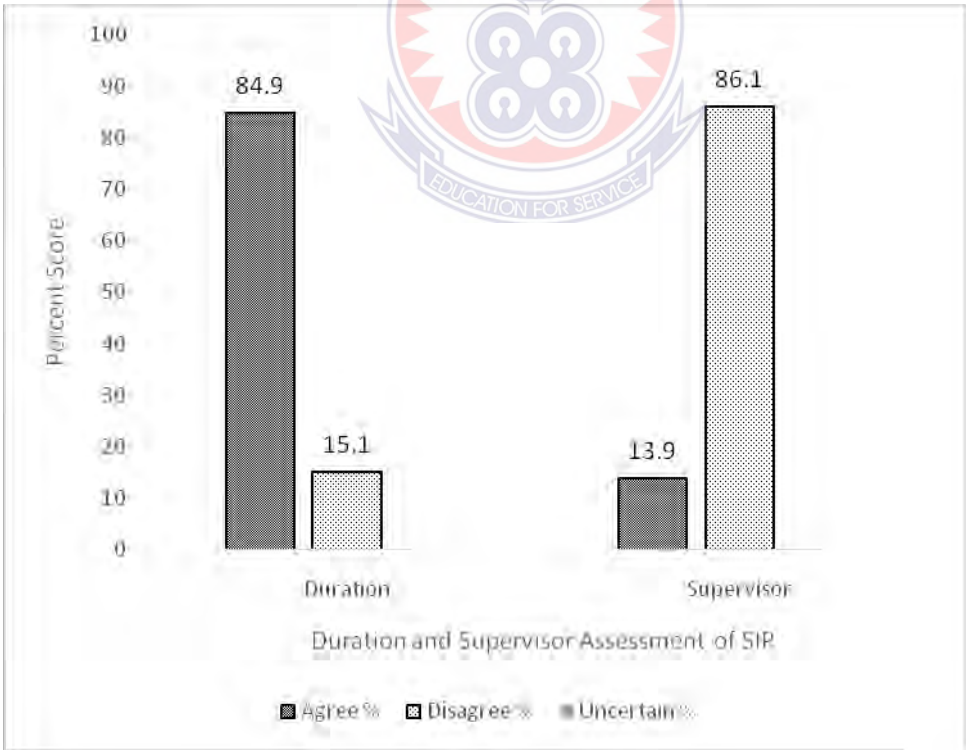


Figure13. *Mentors' Perceptions of Duration of Internship and University supervision*

Majority of the mentors (84.9%) agreed that the duration of the SIP was adequate whilst 15.1% felt the duration was too long. This meant that mentors are in favour of the one year duration of the practicum. On the part of the one slot assessment of the intern by the University, 86.1% of the mentors felt that was inadequate whilst 13.9% of them thought it was adequate.

4.3.5 Mentors' Perceptions of Interns' Classroom Practice

Mentors were asked to rate interns' classroom practise using a 13 item questionnaire based on the Likert scales with anchors of one for strongly disagree through 3 for uncertain to 5 for strongly agree. A mean of 3.56 with a standard deviation of 1.03 (Table 14) was obtained from data on mentors' perceptions of interns' classroom practise - implying that mentors were of the opinion that the interns performed well in their learning to teach.

Table 14

Mentors' Ratings of Interns' Classroom Practice.

Intern's Classroom Effectiveness	Score						
	N	SD	D	U	A	SA	Total
Knowledge of subject matter	67	0	2	0	76	230	308
Articulation of instructional objectives during instruction	67	10	4	0	104	145	263
Quality of lesson plans	67	5	110	0	8	25	147
Motivation of students during instruction	64	3	86	15	40	15	159
Use of relevant previous knowledge of students	67	20	21	0	108	40	189
Maintaining discipline and management of class	67	9	30	15	60	155	269
Use of chalkboard	65	2	12	6	92	170	282
Clear and audible voice	67	2	20	0	76	180	278
Conclusion of lessons	67	0	14	0	116	135	265
Using a variety of teaching strategies	67	10	20	0	116	80	226
Using questions for assessing lesson	65	4	100	6	8	35	153
Communication during instruction	67	4	110	0	8	25	147
Rapport with students	67	0	0	0	96	215	311
Total	**864**						**3080**

Mean perception = 3.56; SD = 1.03

Item by item analyses of the mentors' perceptions of interns' performance in the classroom is graphically illustrated in Figure 14. The mentors were of the view that the interns performed well in some classroom practices but were weak in others.

Ninety-six percent of the mentors perceived that the interns were strong in the knowledge of subject matter, 86.7% of them felt the interns were able to use a variety of instructional strategies to make learning meaningful and purposeful. Approximately 95% of the mentors were of the opinion that the interns showed good articulation of instructional objectives. Approximately 95% of the mentors felt that the interns were competent in handling matters of discipline and classroom management. All the mentors , 100% of them perceived that the interns were strong in establishing good rapport with their students.

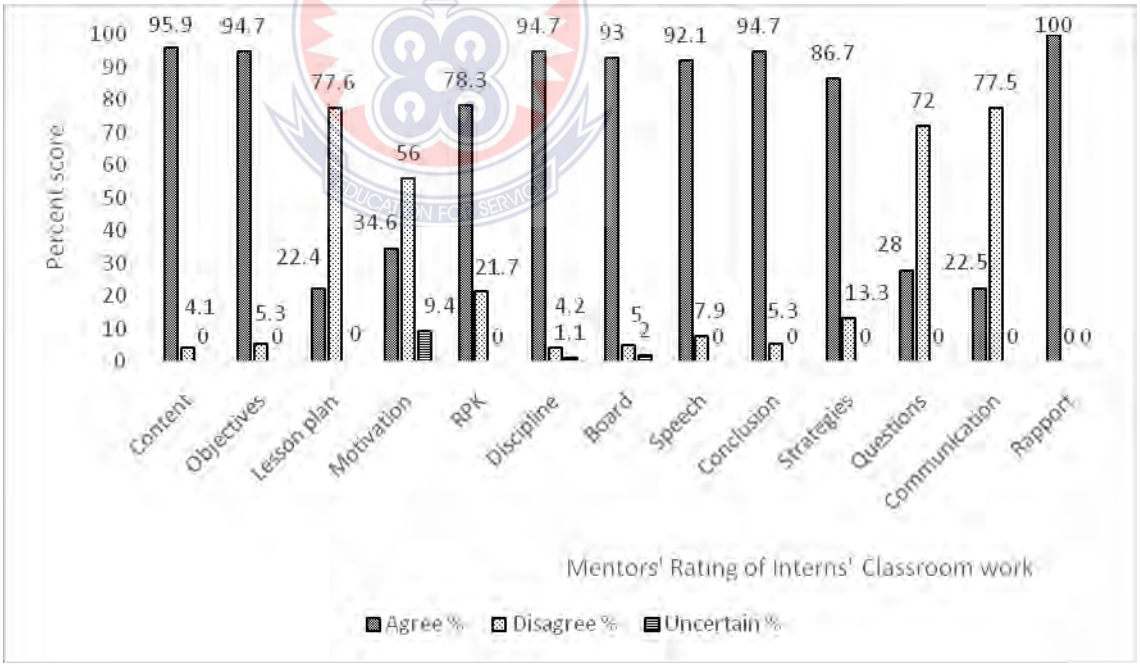


Figure 14: Mentors' Perception of Interns' Classroom Performance

The mentors perceived that the interns also had strong knowledge and skills in the following areas: 92% of them felt the interns made good use of chalkboard, 92.1% said interns had clear and audible voice for emphasis, 94.7% of them felt interns orderly concluded their lessons and 78 % said interns had moderate ability to review students' RPK. However, the mentors had the view that the interns were weak in the following categories of knowledge and skills: preparation of lesson plans (22.4% agreed, 77.6% disagreed), motivation of students (34.6% agreed, 56.0% disagreed, 9.4% uncertain), art of questioning (28.0% agreed, 72% disagreed) and communicating with students (22.5% agreed, 77.5% disagreed). This meant that interns on the whole fared well in most the skills that promote effective teaching and learning of science but weak in four areas mentioned above. The researcher observed that some student teachers had difficulties on how to introduce their lessons and closure. The skill of linking current lesson to previous ones was virtually lacking amongst most of the student teachers. This contrasts the views of mentors on the same item. The interns, most of the times literally lectured. Examination of interns' lesson notes revealed the listing of some teaching and learning materials that were never used in practice/or even provided for the lesson.

4.4 RESEARCH QUESTION 3

4.4.1 Perceptions of the University Supervisor of the Student Internship Programme

RQ 3: What the 1 Perceptions of the University Supervisor of the Student Internship Programme?

The university supervisor is a member of faculty and a major stakeholder of teacher education at UEW. He/she prepares the student teachers in subject matter and pedagogy before they proceed for the SIP. Such a stakeholder's view of the SIP was necessary since it contributed to a holistic view of the programme. The perceptions of the university supervisor of the SIP were measured under the following:

(a) the intern's teaching effectiveness and commitment during the SIP and

(b) the duration of internship and onetime assessment of the intern by the supervisor during the SIP.

4.4.2 (a) The University Supervisor's Perceptions of the Intern's Teaching Effectiveness and Commitment during the SIP

Lecturers of the Department of Science Education of UEW were asked of their perceptions of interns' classroom practices. They responded to a questionnaire that consisted of 13 items, which required them to tick the appropriate response. The pooled data using SPSS produced a mean score of 3.05. This is just above 3.00, which implies that in the opinion of the university supervisors, the interns on the average performed only marginally well in the classroom in most of the knowledge and skills they observed.

Literature is clear about the low ratings given by university supervisors to student teachers on practicum (Anderson, Walker & Ralph, 2009). This was confirmed by the low rating s of interns' classroom work by the university supervisors in the study. Item by item analysis of the university supervisors' perceptions of the intern's classroom practice is pictorially indicated in Figure 15.

Table 15

University Supervisors' Ratings of Interns' Classroom Practice.

Effective Intern Characteristics	Score						
	n	SD	D	U	A	SA	Total
Knowledge of subject matter	55	15	10	3	128	10	166
Articulation of instructional objectives	55	5	28	6	136	0	175
Planning of lessons	55	0	90	0	4	25	119
Intern motivation of students during instruction	55	1	82	0	8	50	141
Review of relevant previous knowledge of students	55	8	22	6	116	25	177
Ability to manage and maintain discipline in class	55	1	12	6	164	25	208
Proper use of chalkboard	55	1	28	0	148	15	192
Clear and audible voice when speaking	55	1	32	3	140	10	186
Conclusion of lesson	55	1	32	3	140	10	186
Inability to use various strategies in teaching	55	0	86	0	0	60	146
Use of low level oral questions for assessment of students during instruction	55	0	90	0	0	50	140
Lack of good communication skills	55	0	80	15	40	0	135
Rapport with the students	55	0	18	9	140	40	207
Total	**715**						**2178**

Mean Perception =3.05, SD = 0.93

For most of the classroom strategies or skills surveyed, the university supervisors had varying degrees of perceptions about the intern. The knowledge and skills observed and the corresponding percentage of lecturers who agreed or disagreed that interns possessed these attributes were: 83.1% of the university supervisors

perceived that the interns had good knowledge of subject matter, 15.1% disagreed, 1.8% were uncertain; 77.7% of the supervisors agreed that the interns possessed good articulation of instructional objectives, 18.9% disagreed, 3.4% uncertain, for review of students' RPK ,79.7% of them agreed, 17.0% disagreed, 3.3% uncertain, for maintaining discipline and good management of class, 90.9% agreed, 6.3% disagreed, 2.8% uncertain respectively, the use of chalkboard had 85% of supervisors agreeing, 15% disagreed and for interns having clear and audible voice, 80.6% of supervisors agreed, 17.7% disagreed, 1.7% uncertain; orderly conclusion of lesson by interns had 80.6% agreed, 17.7% disagreed, 1.7% uncertain; and establishing good rapport with the students 87.0% of supervisors agreed, 8.7% disagreed while 4.3% were uncertain.

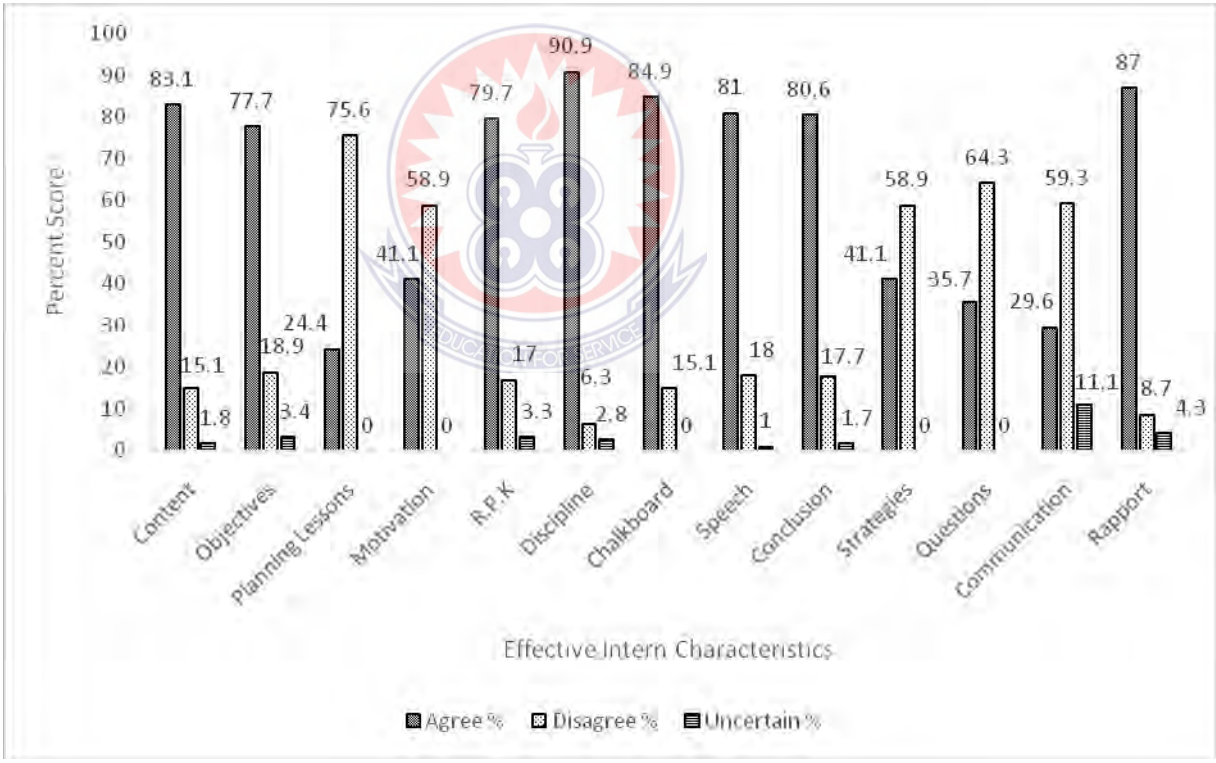


Figure 15: University Supervisors' Perception of interns' Classroom Performance

This meant in some of the skills, the interns exhibited strong knowledge (above 80%); in others areas they exhibited moderate knowledge (70-80%). The university

supervisors were of the opinion that the interns exhibited weak knowledge and skills in the following five areas: lesson planning, motivation of students, the use of questions for assessing students in class, using varying teaching strategies to make learning more meaningful and purposeful to students and communicating well with students. The university supervisors' agreements or disagreements for the five factors were as follows: planning and preparation of lessons, 24.4 % of supervisors agreed, 75.6% disagreed that the interns had this skill; motivation of students to learn well, 41.1% of supervisors agreed, 58.9% disagreed; for assessing students' learning with questions, 35.7% of the supervisors agreed, 64.3% disagreed to that fact.

On the part of using a variety of teaching-learning strategies in class, 41.1% of supervisors agreed, 58.9% disagreed and for interns communicating effectively with students during instruction, 29.6% of the supervisors agreed, 59.3% disagreed while 11.1% were uncertain.

4.4.3 (b) University Supervisors' Perceptions of Internship duration and One the Slot Assessment

University supervisors were also asked of their opinions on the internship duration and the one slot assessment that the university gave interns during a whole year practicum. An item each was set for the two areas. Responses of lecturers were pooled and entered into SPSS and two separate means calculated for the areas investigated (see Table 16).

Table 16

Supervisors' Perceptions of the Internship Duration and the One Slot Assessment

Duration of internship and assessment	SCORE						
	n	SD	D	U	A	SA	Total
Adequacy of duration of internship	55	1	8	0	40	200	249
Adequacy of university supervision	55	0	0	0	44	220	264

Mean Perceptions: M_1=4.53; SD = 0.03 and M_2 =4.80; SD = 0.04

Two means of 4.53 and 4.80 (Table 16) were obtained for internship period being adequate and one assessment being highly inadequate respectively. The university supervisors had very strong opinion that the one-year duration of the internship was too long a period for the practicum in teacher preparation. They also held the strong view that the one slot observation of students' classroom work by faculty was highly inadequate.

4.5 RESEARCH QUESTION 4

RQ 4 Is There any Significant Difference in Perceptions between the Mentors and University Supervisors of the Student Internship Programme?

To answer this question, a null hypothesis was stated as:

4.5.1. Ho: There is no Significance Difference in Perceptions between Mentors and University Supervisors about the Student Internship Programme.

Data for answering this research question were obtained from a questionnaire completed by the mentors and university supervisors based on their perceptions of the interns' classroom performance during the SIP. The classroom performance was

measured because the ultimate goal of the internship is to make the intern an effective classroom teacher.

Table 17:

t-test comparison of Mentors' and Supervisors' Perceptions of SIP

Variable	n	df	Mean	SD	t-cal	p
Mentors	67	76	3.56	1.03	3.39	0.03
University Supervisors	11		3.05	0.93		

df = 76, t-critical = 1.96, p =0.05

The mean perception of mentors of the interns' classroom practice was 3.56 with standard deviation of 1.03 and that of the university supervisors was 3.05 with a standard deviation of 0.93 (Table 17). An independent samples t-test was conducted using a pool of the responses of both groups. A t-value of 3.39 was obtained at p =.05. The observed $t_{(120)}$ =3.39, p = .032 is greater than t-critical = 1.96, p = .05; hence the null hypothesis that there is no significant difference between mentors' and university supervisors' perceptions of interns' classroom practice was rejected at p = .05. This meant that there was a statistically significant difference between mentors' and university supervisors' perceptions of interns' classroom practice favouring the mentors.

4.6. RESEARCH QUESTION 5

4.6.1 Perceptions of Heads of Senior High Schools of the Student Internship Programme?

RQ 5 What are the Perceptions of Heads of Senior High Schools of the Student Internship Programme?

The question sought to determine the perceptions of headmasters and headmistresses of partnership schools of the internship programme that they directly supervised. Knowledge of their views of the interns' work in the school is essential for the university in their future preparation programmes. The heads responded to a 15 - item questionnaire based on the Likert type scale of Strongly Disagree (1) to Strongly Agree (5). Two of the items dealt with the duration of SIP and the one slot supervision of the intern by the faculty. Responses to the individual items were pooled and entered into SPSS and the mean determined. A mean of 4.46 with a standard deviation of 0.52 (Table 17) was obtained from data on perceptions of headmasters and headmistresses of partnership schools about the internship programme. Most of the heads of the schools agreed that the science interns in their schools contributed positively to teaching and learning and other activities in the schools. Information in Table 17 is illustrated in Figure 16. All heads (100%) of partnership schools agreed that the interns were disciplined, humble, always punctual to school and hard working in school.

Table 17

Perceptions of Heads of SHS about Science Interns in their Schools.

Attributes of Interns	SCORES						
	n	SD	D	U	A	SA	Total
Good knowledge of subject	67	0	4	0	152	135	291
Hard working/Industry	63	0	0	0	116	170	286
Regularity and punctuality to school	67	0	0	0	128	175	303
Regularity and punctuality in class	67	1	0	0	124	175	300
Engagement of students in studies	62	1	0	0	164	100	265
Enthusiasm for teaching and learning science	67	1	0	0	140	155	296
Humility and respect to leadership and staff	67	0	0	0	72	245	317
Accessibility and communication	65	0	6	30	108	125	269
Discipline	67	0	0	0	88	225	313
Dressing	67	0	0	3	108	195	306
Rapport with students	67	0	0	6	148	140	294
Solution of staffing problem	67	1	6	15	104	160	286
Friendliness	66	1	0	0	92	210	303
Total	**859**						**3829**

Mean Perception = 4.46; SD = 0.52

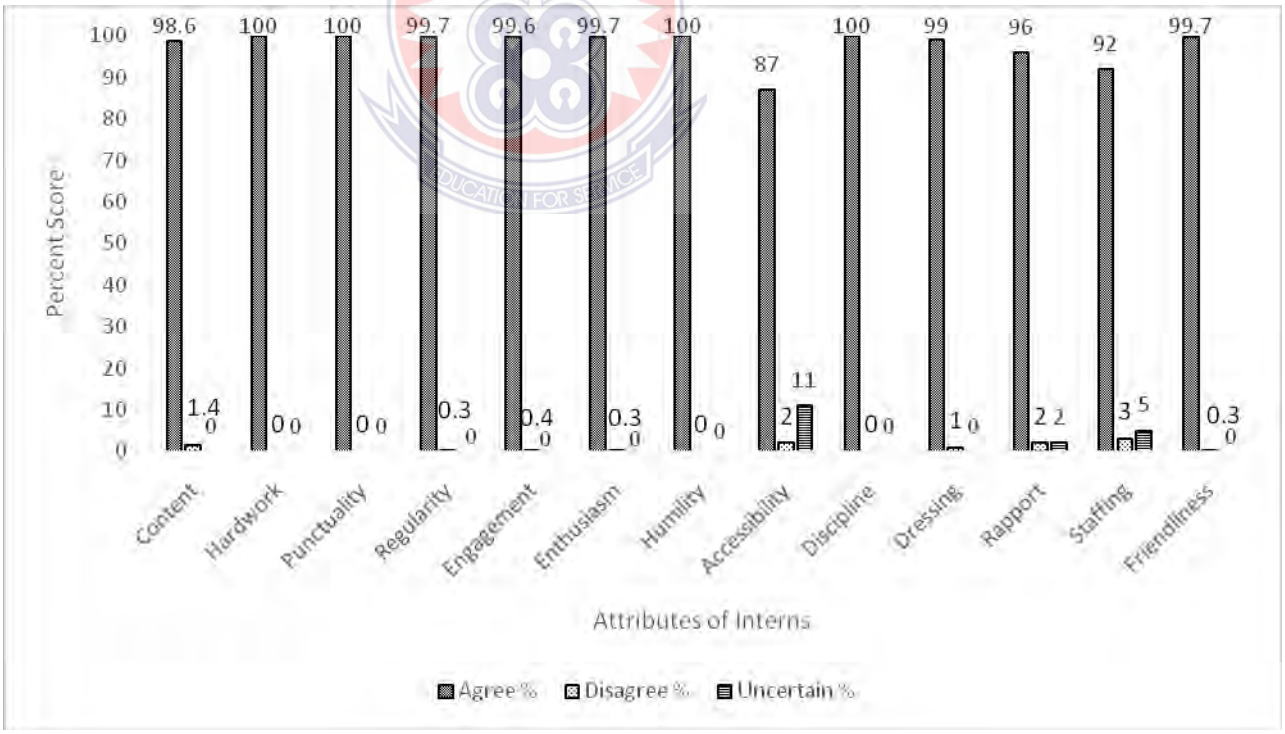


Figure 16: Heads of SHS Perception of the students' Internship Programme

More than 91% of the heads also agreed in eight areas of school activities that interns were found to function well. These eight areas included regularity in class, successful engagement of students in studies, enthusiasm about work, regularity in class and school, possession of good content knowledge, decency of dressing and friendliness with members of staff of the school and having good rapport with students. Approximately, 87.0% of the heads of schools had the opinion that interns were accessible to staff at all times and 92.3% opined that the presence of the interns in the school solved partly their staffing problems. The results obtained for analysing the two items on the one year duration of SIP and the onetime assessment of the intern by faculty were as follows:

On the part of the one-year duration of the internship, headmasters/headmistresses felt that length of the SIP was adequate (Mean = 4.48) that the period was not too long. They also held the opinion that the one session assessment/visit of the university supervisor was inadequate (Mean =4.85.00; Table 18).

Table 18

Heads of Schools Perceptions about the Duration of the SIP and the One Slot Supervision of Interns by the University Supervisors.

Heads of SHS perception of SIP	Score							
	n	SD	D	U	A	SA	Total	M
Adequacy of duration internship	67	2	30	0	100	175	307	**4.48**
Adequacy of supervision by supervisors	67	0	0	0	40	285	325	**4.85**

Mean Perceptions: M_1= 4.48; SD = 0.53 and M_2 4.85; SD = 0.50

On percentage analysis, 89.58% of the heads of SHS agreed with the statement that 'the internship period of one year was adequate. All heads (100%) of partnership schools agreed that the one slot assessment given by university supervisors to interns

was inadequate for its purpose. The implied meaning is that there is the need for faculty to increase the number of times it supervises the intern. Some headmasters and headmistresses suggested that the practicum period should be rescheduled to coincide with the time that first-year SHS students report to school and end with final year students' writing their West Africa Senior School Certificate Examinations (WASSCE). Some headmasters in their confidential reports (Headmaster's Confidential Report on Interns, July 2010) suggested that interns spend two terms at the partnership schools and go back to the university to fine tune their pedagogical content knowledge before they enter the field of actual practice. This is not in agreement with the Heads' own assessment of the interns (see Table 17).

4.7 RESEARCH QUESTION 6

4.7.1 Perceptions of Senior High School Students of the Student Internship Programme

RQ 6 What are Perceptions of Senior High School Students of the Student Internship Programme?

Senior high school (SHS) students who are directly taught by the interns in their practise are a very good source of information regarding the performance standards of the intern. They were made to respond to a questionnaire of the Likert type that contained 12 items that sought to know their perceptions about the daily work of the student teachers with them. Again, the scores were anchored on Strongly agree 5, Agree 4, Uncertain 3, Disagree 2 and Strongly disagree of 1. Negative items were reversely

scored. The responses to the items were pooled using SPSS for analysis. The calculated mean was 4.18 (Table 19). This approximates 4.00 on the 5-point Likert type scale. This meant that most of the students agreed that the interns (student teachers) did well in their work with them (SHS students). The SHS students' perceptions of interns' possession of teaching skills ranged between 90.80% and 99.07%.(see Figure 17) This suggests that student teachers were very serious with their practicum assignment and were up to the task and challenges of the practicum. This also confirms the headmasters' positive opinions about interns' work in their schools during the SIP.

Table 19

Senior High School Students' Perceptions about the Interns' Competencies

Student Teacher Competencies	Score						
	n	SD	D	U	A	SA	Total
Good knowledge of subject	320	2	8	18	324	1135	1487
Hard working/Industry	320	2	0	15	308	1180	1505
Regularity and punctuality at school.	320	0	2	30	336	1125	1493
Regularity and punctuality in class.	320	1	4	9	308	1185	1507
Enthusiasm	320	0	10	57	472	890	1429
Teaching quality	316	2	16	30	432	940	1420
Flow of lessons	318	0	6	48	404	990	1448
Engagement of students	318	1	14	72	640	630	1357
Use of teaching aids	320	15	26	81	484	720	1326
Impartiality in class	316	2	8	30	440	950	1430
Motivation when teaching	318	0	6	48	404	990	1448
Command over language	320	1	6	42	484	905	1438
Humility and friendliness	320	0	2	21	420	1035	1478
Total	**4151**						**17338**

Mean Perception = 4.18; SD = 0.65

Figure 17 indicates the perceptions that SHS students had of the intern in their class. Majority of the SHS students, 99.1% of them agreed that the intern was punctual and regular in class, 98.9% said that they were hard working. Almost, 98.5% of them said the interns were humble, respectful and friendly, whilst 97.9% of the students felt that they were regular and punctual to school. Touching on knowledge of subject matter of the science interns, 98.1% of the SHS students were of the opinion that the interns knew their subject very well. Also, 97.2% of the SHS students were of the view that the interns were very fair and firm (impartial) with everybody in class, and 96.6% perceived that the science interns spoke very good English.

Most of the students, approximately 96% of them, said that the interns' lessons were interesting with 96.62% of them having the perception that the interns explained things clearly to their understanding. Another 96.27% of the SHS students saw the interns as a source of motivation to them. They felt the interns were lively when teaching (95.31%) and that they engaged them in lessons at all times (93.59%). Ninety-one percent of the students said that for most of the time, the interns used teaching aids in teaching. From the foregoing analysis it was evident that the student teachers worked very hard on the field of practice during the 2009/2010 SIP. It meant that, this crop of science interns were well mentored and may grow up to be dedicated teachers in the profession.

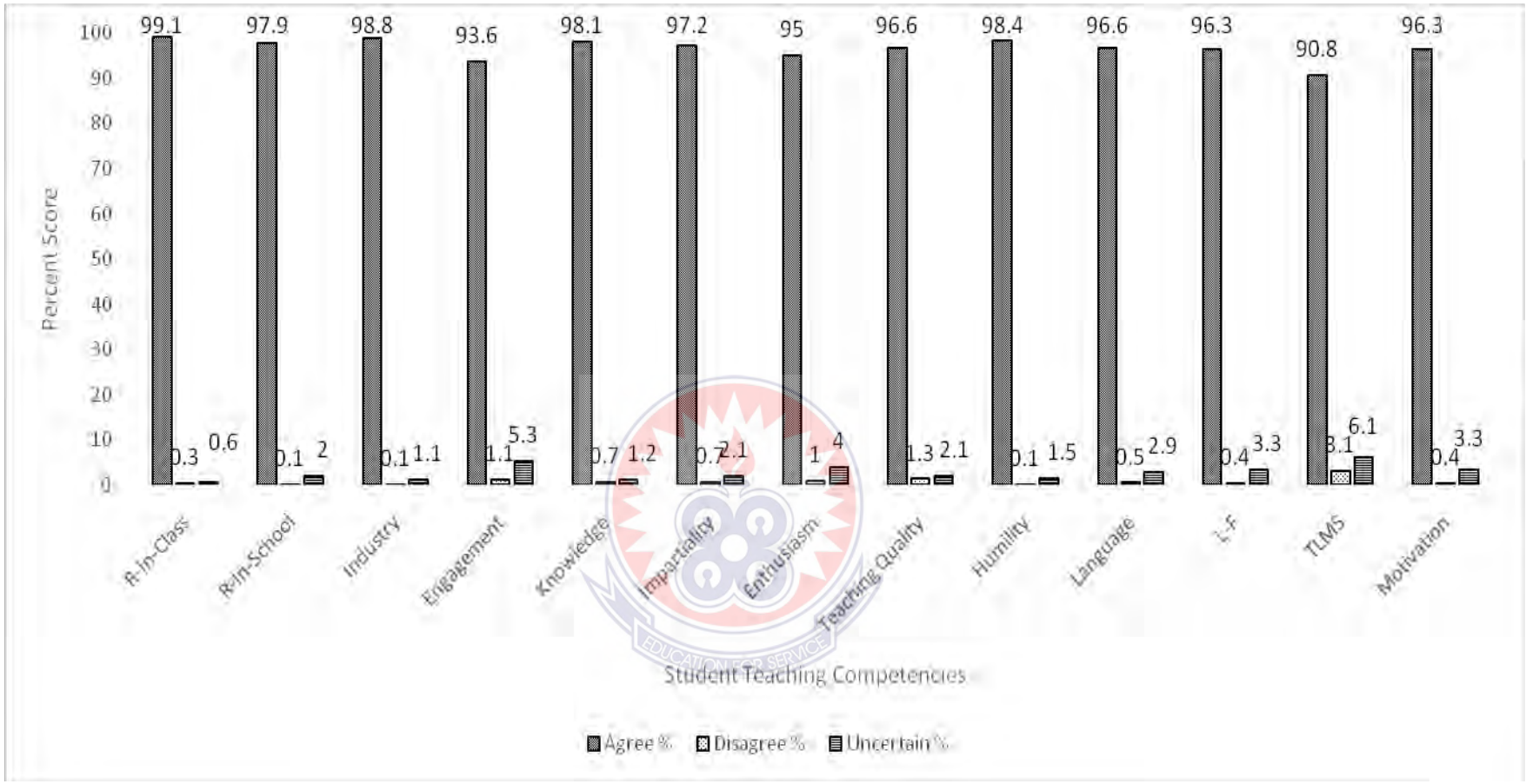


Figure 17: SHS Students' Perception of Interns' Competencies in Class

4.8 RESEARCH QUESTION 7

4.8.1 The Practice of Students' Internship Programme in the Schools Aligns/Agrees with the Objectives of the Programme

RQ7: How does the Practice of Students' Internship Programme in the Schools Aligns/Agrees with the Objectives of the Programme?

This question was asked to find out the extent to which the objectives of SIP were achieved in the schools as interns learned through practise. Results from individual interviews, focus group discussions with interns and classroom observations of their practise provided data that was used to answer this question. Two main themes emerged from the responses of the interns about the various aspects of their practicum experiences. They are:

Internship Practice Requirements/Content Connects with Departmental Course Content

Most of the interns felt that what and how they practised to teach at internship connected well with the departmental courses they studied at the university. They said that, some of the departmental courses were more connected to SHS science than others. This could be so because some departmental courses were focused on teaching methods and strategies and improvising materials for use in the classroom. Many of the interns commented that the internship programme helped them to ''solidify" the content knowledge they had learned at the university; but prior to the internship the concepts they learned lacked follow-through. During the focus group discussions, the interns said that the internship allowed them to apply what they had learned in the university to a real-teaching experience. The interns also felt it was good to compare what they

learned in an ideal situation or context like lectures and textbooks to what really happens in a practicum classroom and how you had to adjust and adapt. Some interns remarked during interviews: *The internship programme also helped us to better understand the theory we were taught in the departmental courses back at the university*. The implication was that the internship helped the interns build up their pedagogical content knowledge (PCK).

However, some of the interns had the perception that a lot of the topics they taught during the field practice were not treated at the University. They suggested that the content component of the pre-service programme should be up-graded to add more credit hours for subject matter study. They remarked as follows: *education courses have almost taken up all we have to learn; there was also a repetition of some education courses. We gathered from our colleagues of sister universities that we people (interns) from Winneba lack sufficient content.* Some interns said they were not teachers prior to their entry to UEW. Such students faced serious problems in lesson planning and preparation. They said: *we were not taught very well on how to prepare lesson notes at the university prior to teaching practice*. From such statements made by interns, it can be said that not all the departmental courses connected well with science courses in the Senior High School. The implication is that the University needs to consider revising aspects of its curriculum to include SHS syllabi material since these students are trained to teach at that level.

4.8.2 The Connection between University Courses and Internship Activities

Similarly all the science interns who were interviewed spoke of the connection between theory and practice as one of the positive aspect of their experience. They

explained that they had the opportunity to link what they knew in theory to practice. Some of their remarks were:

> *…it provided me the opportunity to practice the theory we had learned in university in real school situation. I have taken various theoretical courses related to my programme of study and professional courses. In practicum, I got the opportunity to practice the theoretical knowledge learned in the university such as application of different teaching methods. I also learned some classroom management skills and time management. My mentor taught me to master lesson preparation and the use of different teaching-learning materials. I have also learned how to deal with difficult students in class. I have developed the courage to speak to large groups*
>
> (Individual intern interviews, June 2010).

Likewise, another intern explained:

> *through practicum I got the opportunity to test my theoretical knowledge in real school teaching. I applied different evaluation techniques to assess my students such as class test, individual assignment and group work. I was able to identify students with peculiar problems and how to deal with slow and fast learners in the class; I was able to develop collaboration and the spirit of teamwork with colleague teachers* (Individual interviews, June 2010).

As indicated in the statements above, the science interns believed that the practicum linked the theory they learned with practical experience of practising to teach. These illustrative responses substantiate previous research which stated that internship helps pre-service teachers to see theory in practice (Brown, 2008; Ligadu, 2009). From the description, it can be inferred that the internship programme mediated the theory provided by the university with the school practical experience.

These narrative discourses given aligns much with the objective of SIP which states that SIP "provides opportunities for interns to apply and practise the principles of teaching and learning in the classroom setting and in the school context." It is also in line with the first objective of SIP that indicates that "the internship provides an opportunity for interns to broaden their experiences, understanding and awareness of the realities of teaching and working in schools." It is also in agreement with the objective of "developing in the pre-service teacher an understanding of children and young people (SHS students), and skills required to respond appropriately to their needs, interests and capabilities." The conclusion that can be drawn from the above is that the courses run by the university links well with the student internship programme.

CHAPTER FIVE

5.0 DISCUSSION

5.1 Overview

In this chapter the results for the research questions which cover the perceptions of stakeholders regarding the Students' Internship Programme of the Science Education Department of the University of Education, Winneba are discussed as:

5.2 Interns' Perceptions of the Student Internship Programme

Interns' perceptions of their mentors, their partnership schools, university supervisors, their preparation by their department, the impact of SIP on their professional development, post-internship seminar and the student teachers' portfolio were examined. The study revealed that generally, the interns received instructional support from their mentors in lesson planning and preparation for instruction, and classroom management support including the management of time and student behaviour, which tend to reduce the high levels of dread and anxiety experienced by most protégés as reported by Brock and Grady (1998). The quality of a good mentor should be one's ability to provide pedagogical support to interns. Through the mentoring relationship, a good mentor should be willing to coach student teachers on how to maintain discipline in class, ask questions, and react to students' responses to questions, motivation techniques and hints on how to get all students participating in their lessons to improve their performance regardless of their skill level at the start of the programme. The mentors were also reported to have created good rapport with their interns, observed them teach and provided them feedback. Mentors equally supported

interns in practising reflective teaching, and created an environment that enabled them to be functionary within the wider school community.

An important finding of the study was that, the university supervisors guided the interns well during their visit to them at the field. The supervisors held pre- and post observation conferences with them and gave them feedback. During the post-observation conference the university supervisors gave them prompt feedback on their strengths and areas that needed improvements. The interns felt that their supervisors gave them adequate time to teach and they seemed to be pleased with the kind of interaction they had with their university supervisors. The discussions were healthy and informative and they learned to be more open and frank and spoke about their fears, anxieties, strengths and weaknesses. The university supervisors were also concerned with interns' future plans. The interns during focus group discussion said some of the supervisors asked them questions that sought to know their progress in work. Some of the recurring questions asked were: *"how far have you gone with your action research project?" "Have you developed your portfolio? "What are your plans after your first degree?"* Though, this was what happened between the interns and the university supervisors, the fact remains that one visit to the intern during practicum cannot provide enough formative feedback that could help in transforming the pedagogical content knowledge of the intern.

Secondly, evidence from focus group discussions indicated that most post-observation conferences were not triadic but dyadic (supervisor with intern). That means the views of the mentors were not incorporated. When the views of the mentor about the intern are not incorporated into the feedback given by the university supervisor to the intern, there will be a gap created between the opinions of the supervisor and that of the mentor which the intern cannot resolve. It means that most

university supervisors did not know what was going on between the mentor and the intern. Since the two assessors have not met together with the intern and dialogue on issues of lesson preparation, class management, assessment of students, etc., it will hinder the PCK growth of the intern. The interns had the opinion that the support provided to their mentors to enable them provide the needed assistance in moulding them to become effective teachers was generally inadequate. For example, university supervisors seldom communicated with the mentors because they usually had limited time during their visits. This is evidenced from the perceptions of science interns that there was virtually no communication between mentors and university supervisors during the 2009/2010 SIP. This certainly could derail the success of the programme to a large extent since the two supporting systems – the university and the school – are unable to discuss the interns (their experiences, short comings, progress etc) to help provide the needed support in the moulding them to become effective teachers.

On the part of the university supervisor, interns had the perception that the supervisor was genuinely concerned about their professional development though he/she visited the intern only once during the period. The general perception was that the supervisor held pre- and post-observation conferences with them and gave them feedback after observing their lessons. For example, 87% and 90% of the interns felt that the supervisors held pre-observation conferences with them before the lesson, and had post-observation conferences with them after the lesson and gave them feedback respectively.

Looking at the timing of the visits, this was, however, late and of little relevance for the practicum activities (apart from the fact that they needed grading by the supervisor in order to graduate). The interns had the same view like the mentors that there was no regular communication between the university supervisors and their

mentors. This reflected interns' desire for closer ties between the mentors and the supervisors for building confidence in the interns.

The interns also perceived that the one year internship period was adequate, but the single slot supervision offered by the university supervisor was inadequate for the purpose of evaluating an intern's performance during the internship in order to offer the needed support. They suggested that, at least two visits should be made by the university supervisor. This view of the interns should be the concern to the Faculty of Science Education and the University. The purpose of assessing interns on SIP was to help them improve upon their weaknesses. One slot of supervision by the faculty and which also came at the end of the programme could not have served the formative evaluation purpose for which the supervision was to be done and hence defeated the objectives of the programme to some extent.

(1). Interns' Perception about their Mentors

Generally, interns had positive perceptions of their mentors. They perceived their mentors as offering the needed support in lesson planning, creating conducive climate (rapport) that enabled them to acquire the needed skills and competencies of a professional graduate teacher. The interns also had the view that their mentors guided them well in acquiring classroom management skills and supported them to practise reflective teaching. The mentors in addition supported them adequately to model science lessons and usually provided them good feedback.

According to some interns, their mentors perceived the internship period as a period of relaxation for them as classroom teachers, who took leave of them and 'did their own thing' (Focus Group, June 2010). The interview responses of focus groups agreed with the perceptions of a few of the interns that some of them were not given good feedback on their practice by their mentors. These findings give credence to previous

investigations in various countries which repeatedly showed that student teachers were not always very happy with the feedback they received as they considered such feedback unhelpful, critical or negative (Beck & Kosnik, 2002; Arnold, 2006; Vasquez & Reppen, 2007). Student teachers desire to receive accurate and appropriate feedback with a good balance between compliments and criticisms. For the mentors' feedback to be effective in leading to a change in student teachers' classroom practise, perhaps it should be well received by the interns at whom it was directed. Mentors can positively impact the professional growth and development of student teachers' teaching by making their feedback to interns constructive.

Feelings of Isolation among some Interns

The results of focus group discussions indicated that some mentors left the classroom to the interns and never bothered to find out how they faired. Such mentors had to be begged or ''pulled'' to the classrooms to observe their interns for the purpose of assigning grades needed by the university to complete records to enable the university graduate the trainee teachers. It should be noted that when mentors make themselves available to student teachers, the student teachers are more likely to reach out to their mentor for advice and support. Frequent visits from the mentor to the intern are a way of minimising the mentee's sense of isolation and a sign of supportiveness (Stansbury & Zimmerman, 2000). The laxity shown by some mentors in the study implies that some of the interns did not have the full benefits of the SIP. Interns who suffer from lack of attention from their mentors are likely not to have benefited adequately from the internship programme and by inference not to have acquired the needed skills to be a functionary science teacher. It behoves on all stakeholders to play their various roles to offer the mentors the needed support to make them functional and effective in the teacher training programme.

Mentor Support for Planning for Instruction

Majority of interns in the study, between 83-90%, had the perception that their mentors supported them well in planning for instruction. Approximately88% of the interns perceived that their mentors did well in providing them with course materials , whilst 88.4% of the science interns felt that their mentors vetted lesson plans. Eighty eight percent of the interns felt their mentors help them in establishing goals and objectives for their lessons; yet 89.62% perceived that the mentor made provisions for intern to practise teaching and to gradually take responsibility of the class. The pivotal value of lesson planning was recognised more readily by the interns, a greater number of them indicating that their lesson plans were vital: *lesson plans were preparing questioning and organising a lesson properly.*

> *Lesson plans and planning was vital to a successful lesson. Teaching practice would not be as beneficial without the use of lesson plans and post-lesson appraisals.* During focus group discussions, interns spoke at length about how they felt lesson plans were developed, for example, they said: *lesson plans were beneficial to our teaching but you could leave some parts of them out. I had to put in some things to keep my mentor and university supervisor happy and they were a waste of time. Lesson plans were mainly written to keep our supervisors happy; lesson plans should have more variation but not always stuck to 'teacher activity/student activity and core points.* The interns indicated how they met varying requirements which were assessor dependent.

They perceived inconsistencies between the mentors' and the university supervisors' specifications for lesson plans; for example, at a focus group discussion it was stated:

> *the university supervisors criticised most of the lesson plans presented by us, which had been approved by our mentors*

> *for use in class.* One of the interns lamented remarkably as: *I was told, scrap what you have written and write them all over, and present this plus the new to me when you report for post-internship seminar in June. Going to schools next year, we are never going to write lesson plans again; we will write little paragraphs on what we might do or points for what we will teach. The problem of lesson plans ends with the end of teaching practice* (Focus Group, June 2010).

Some of the interns saw some of the comments of the university supervisor as uncalled for. Probably, the interns were merely resisting corrections and innovative teaching practices. Though IEDE has a sample lesson format for the interns to use and/or modify to suit their purpose, there is still the need for the university to ensure that mentors and supervisors agree on the elements in a lesson plan.

The Mentor-Intern Relationship

The relationship between the student teacher and the mentor is a significant component in the preservice education of teachers. If the relationship that is established is a hierarchical one, the mentor tells the intern what and how to teach or how to resolve problems based on the mentor's own practices. Certainly, such an approach is at variance with the expectations from graduates of UEW. In a more collegial relationship, the intern and the mentor are expected to work together to determine what should be done with regard to teaching or resolving problems that occur in the cause of teaching. Effective and successful mentoring in teacher preparation requires mutual respect and reverence from both the mentee and the mentor. When new teachers teach in a school culture where the faculty share common goals and work collaboratively, they are more inclined to have a positive teaching experience. On the other hand, novice teachers who start their teaching careers in an unstructured environment are more likely to experience a less positive climate and even isolation (Smith, 2010).

The study found that mentors related well with their interns. The mentors modelled science lessons for the interns to observe, observed their classroom teaching and gave interns feedback on their practise. The mentors were reported to be open with the interns, created suitable learning environment for the interns to work and corrected them when there was the need to. They also encouraged interns to relate well with other staff members in the schools and were attentive to interns' needs. In addition to visits made by mentors to interns' classrooms, there were warm interactions with the interns even out of the classroom, for example, during lunch, breaks or other free periods during the day when they were together. Some mentors also encouraged their interns to phone them at home in the evenings if the need arose. When student teachers feel their mentors are personally and emotionally supporting them, they view the mentor as more than a peer. Interns will normally feel free to share their concerns and frustrations with their mentors when they feel secured and are motivated to learn more on daily basis. While such support may not directly improve teaching performance of the interns, it does build their confidence and improves upon their self-efficacy.

Mentor Support for Reflective Practice

A key part of teacher development is supporting the teacher trainee to reflect on his/her teaching (Farrell, 2003). Reflection as a process involves recall of experience, evaluation, decision making and planning and action (Farrell, 2003). Reflection creates the foundation for assessing situations and making rational decisions and provides teachers the opportunity to generate connections between theory and practice, to come to deeper understandings about their personal beliefs while adapting new perspectives, and to use inquiry to inform instructional decisions (see Conderman & Morin, 2004).

Results of the study indicated that interns were supported by their mentors to have regular reflections on what they practised to teach. This was often done during their

post-observation conference period. The mentors made interns to know their progress from time to time, reviewed the interns' teaching strategies and methodologies on a regular basis and provided some opportunities for their professional growth. The results of this study suggest that student teachers gained ample experiences of reflection for action and on action. Experiences for reflection in action, however, appeared to be lacking during the practicum. Reflection in action is critical because it could change teacher's instructional behaviours almost instantly and have effects on their future action (Woolfolk, 2007).

About 13.23% percent of the interns in the study did not receive support to reflect on their practices from their mentors. Similar negative behaviour is reported of mentors in not aiding their interns to reflect is reported by Hudson (2007) and Hudson, Usak, and Savran-Gencer (2010). The mentor is supposed to engage the interns in 'learning conversations' to help them make sense of their learning and help them develop reflective capacities. Reflective practice is to help student teachers develop a coherent philosophy of learning and to connect their philosophy to classroom practice. If this is not done, as the case was, 13.23% of interns in this study, such interns cannot fully develop their philosophy of teaching and learning and to use such in the classroom. We should expect to have some of our classrooms occupied by ill-prepared, non-reflective and incompetent teachers. Twenty percent of the science interns in this study did not receive support to reflect on what they practise in the classroom and to improve upon it. It goes to imply that a significant number of the interns return to the university still having problems of how to reflect on practice and develop as a competent teachers; it behoves on the university to stress the reflective component very well during the pre-internship seminar (On-Campus Teaching Practice) with student teachers before they leave for internship.

Collegiality is one of the outcomes of reflective teaching, since by working in small groups interns question and examine teaching behaviour and provide honest feedback, and they develop trust and respect for each other as teachers and professionals. According to Smyth (1992), reflection places an emphasis on learning through questioning and investigation in order to lead to a development of understanding. As a matter of fact, exploring the nature of reflective practice, Calderhead (1993) found that reflective teaching contributes to professional development by encouraging teachers to analyse, discuss and evaluate practice. From a constructivist point of view, Colton and Sparks-Langer (1993) contend that teachers are expected to learn from their experiences by constructing mental representations of their personal meanings when they are stored in memory to be revised as experience dictates. Ferraro (2008) also perceived that teachers could improve their effectiveness in the classroom by gaining a better understanding of their own individual teaching styles through reflective practice. As has already been said above, interns who are not guided to reflect on their classroom practises will not be well prepared and competent teachers as are some of the goals of SIP. Science interns need to collaborate and interact closely with mentors and other people in the school settings in order to be en-cultured into the profession.

Partnership Schools Support to Interns

The study found that the interns were well supported by their partnership schools during the SIP. The interns were introduced to other members of the wider school community. Members of the wider school community included the staff secretary, the school bursar, the domestic bursar, senior house master, school nurse, PTA chairman, security men and other important members of the community (assembly man, circuit officer) who in one way or the other were of help to the interns, which further

facilitated the interns' learning and professional growth. A healthy social/school environment promotes successful mentoring. This was in line with Bandura's (1987) view that interns learn the robes of their profession through close interaction with experts in the profession.

University Supervisor's Support to Interns

Planned discussions between faculty and school in terms of supervision and evaluation of lessons (to reach a consensus in grading) and in case of challenges faced by interns will alleviate problems of the mentoring process. As evaluation is an integral part of the teaching practice, awarding grades plays a crucial role in the SIP. Discussion on this issue is important so that both parties will reach a consensus (especially in a case where the university supervisor visits and gives only one assessment). Supervision should in that case be done together by the two assessors. This will help correct erroneous ideas and establish a common platform of grading the intern. However, the involvement of university faculty in supervising preservice students in their practicum placements does not occur to the degree one might expect. In the study, the university supervisors visited the schools only once. The purpose was to assess and assign a grade to the student teacher to enable the intern complete one of the requirements for certification.

It has been observed that in programmes where teaching practice supervision is carried out by tenured faculty, supervisory staff often make just the minimum number of school visits needed to assign a practice teaching grade (Slick, 1998; Beck & Kosnick, 2002). This observation by earlier studies mirrored what occurred in the study. There are several reasons for the phenomenon of limited faculty supervision as observed in the study. The most obvious reason was time pressures on university supervisors. Many supervisors rushed through the supervision in order to cover many

students in a day. In addition to pre-service teaching, university supervisors typically have commitments to graduate teaching, sandwich programmes, thesis and project supervision, research, publishing, workshops, administration and committee work.

It was said earlier that most interns were of the opinion that their university supervisors supported them well during the practicum. But if the communication between the supervisor and mentor was not frequent and regular, then the said support offered by supervisors was just on the day of their meeting with interns for the purpose of evaluating their classroom work. It will be nice to see the university supervisor make e-mail contacts with mentors.

The Duration of the Internship

The duration of practicum experience by interns in any organisation is important in producing qualified professionals for such an organisation. The UEW internship programme lasts for one academic year where student teachers spent the time in partnership schools with their mentors. It was thought by management of UEW that such a period was essential if qualified teachers were to be produced by the university.

The study found out that, 96.8% of the interns perceived that the one-year duration for internship was adequate (see Figure 8). However, focus data contradicts this assertion of adequacy. During focus group discussions, the interns said the long nature of the out segment of internship makes it boring (Focus Group, June 2010). They found the whole experience very tiring; both physically and mentally draining and because of this they would like the duration to be shorter than it was. But many studies have established that long duration of practicum has profited the novice teacher more than shorter terms (Arbaugh, Abell, Lanni, &Volkman, 2007). In their evaluation of field-based internship, Arbaugh et al. (2007) found that interns felt the long duration of the practicum experience has been very beneficial to them. The interns commented that the

year-long nature of their internship allowed them to experience the scope of what teachers and students do across an entire school year. Some of the interns in that study said thus: *the year-long nature of the experience provided exposure to a great deal of high school mathematics or science content; content that they had not thought about many years. They had thought their knowledge in mathematics or science had been rusty* (Arbaugh et al., 2007). The current study and those of earlier studies were carried out in different countries with different cultures with different commitments assigned to the practicum and this could have resulted in the different results obtained.

The essence of supervision during internship is to give feedback to interns to reflect and correct their errors. Feedback that contains information on technical qualities of the teaching is an important variable in providing positive changes; for student are able to identify gaps between current and desired performance and then take action to close the gap. Evaluation should therefore be formative. The supervision given by the university supervisor served only the summative purpose of grading the intern for certification and often times was very close to the end of the practicum. The implication is that faculty supervision does not help the intern so much in terms of growth and development as a teacher.

Preparation of Interns by the Department of Science Education for Practicum

Results of the study indicated that majority of the interns, 97.42% said they were well prepared in content and pedagogy for their internship programme. This finding corroborates well with the results of mentor interviews and focus group discussions with interns which indicated that interns felt confident in practising to teach during the practicum. This was reflected in statements such as: *I can handle a large class with*

confidence; the training I received from the department made me more courageous and confident in handling difficult situations (Interns' interview, June 2010).

In a similar study by Vistro-Yu (2009) into student teachers' practicum, the results indicated that the interns were dissatisfied with certain aspects of their faculty preparatory programme. About 3% of the interns had the feeling of not being well prepared by their Department. This could be caused by the pressure and stress that interns often go through during the internship. This might be due to lack of good rest as a result of planning, lesson preparation, and heavy teaching load per week; marking of exercises, waiting for mentor feedback and feeling un-prepared for the visit of the university supervisor.

The Effect of SIP on Interns' Professional Development and Growth

The internship programme had positive effect on the professional development of the intern. Interns perceived that they learned how to manage the classroom, handle problems as they occurred during teaching, learned how to collaborate with peers for teaching, dealt with extra curriculum assignments and learned the rules, demands, discipline and culture of work. Also, the SIP helped raise the confidence and interest levels of interns towards teaching, increased their content knowledge and their commitment to learning and seeking for new knowledge. The implication is that the SIP had positive impact on the interns' pedagogical development who are prepared for the classroom. Partnership between the university and the schools provides a pathway that allows the pre-service teacher to mature and become socialised into the teaching profession more quickly than in traditional student teaching (Denson, 2008; Rice, 2006).

The science interns in the study held the view that the SIP had helped transformed them greatly. That the SIP had helped developed their efficacy in teaching.

An in-depth focus group discussions and individual interviews with participants in June 2010 provided this excerpt:

> *Through the practicum, I developed the competencies that I learned theoretically in the university. I was involved in different activities of teaching. I now know what is expected from teachers, like school norm, behaviours and dressing style. I understood the roles and responsibilities of a teacher of SHS. Through practice I developed the confidence to act as a teacher and to stand and speak before a large group of students including other teachers. I have developed confidence in doing any activity related to teaching such as standing and talking in front of students in class and even at an assembly. I have also tried to be friendly to students and to discuss certain problems relating to their studies.*

In the description above, it was evident that these science interns underscored the development of confidence and competence as important outcomes of internship experience. When the students in the current study were asked to make self-assessment, 96% (see Figure 10) of the science interns perceived that they were more professionally competent after the completion of the teaching practice than before. More than 98% felt they were confident in themselves. Another dimension of the impact of SIP on the interns' professional lives is teacher commitment. More than 98% of them had the perceptions that they were committed to their work. They held the view that their experiences at the SIP had intrinsically motivated them towards helping

students to learn by carrying their work beyond minimal expectations. By this, they are ready to confront challenges of the profession in the classroom.

Interns' Perception of the Student Teacher Portfolio

During the post-internship seminar, the interns were asked to present their written statements of teaching philosophies and constructed portfolios. The intern's teaching portfolio is a course offered in the 8th semester of their undergraduate programme. The construction of teaching portfolios helps to promote reflection among student teachers (Borko, Michalec, Timmons, & Siddle, 1997; Qazi, Rawart, & Thomas, 2012). Thomas (2007) observed that the construction of portfolios by student teachers as a learning tool enhances their reflective practices as well as their professional sustainability. During their face -to -face presentations of their portfolios, the interns observed as follows: *our teaching portfolios have helped us to remember our classroom events more fully and accurately* (Focus Group Discussion, June 2010). As one of the interns said, *I see my portfolio as a vital component of my curriculum vitae. It had helped me keep track record of my progress by keeping records of some teaching aids I prepared and used.*

It is during the teaching internship that student teachers develop their philosophy of teaching. The mentor with whom a student teacher is placed may contribute to the development of this philosophy. However, sometimes this influence may not be a positive one. There could be the possibility of the student teacher's philosophy being different from that of the mentor and may be influenced to practise how to teach in a manner that does not align with his or her philosophy. However, if the interns are given freedom to try out their own teaching methods there may be no problem.

5.3 **Mentors' perceptions of the Student teachers' Internship Programme**

The study found that more than 70% of the mentors felt that the interns had sound science content knowledge base that enabled them to practise well during the SIP. The mentors perceived that interns were knowledgeable in content, planning for instruction, classroom management and control of students. They said, interns exhibited appropriate assessment techniques, and applied learning theories to teaching and learning. Mentors also perceived that interns had good knowledge of technology and that they did apply technology in their lessons. They also perceived that the interns knew how to motivate students to learn. As one mentor puts it: *The two science interns that I mentored have been the best that I have ever had the privilege to work with. For some of their lessons, they used power point for teaching.*

However, some of the results indicated that mentors felt that most of the interns were weak in some areas. More than 70% of mentors thought that the interns were weak in lesson preparation, questioning techniques (interns used low levelled and recall questions), timing and distribution of questions, communicating their ideas clearly to students and using a variety of teaching and learning strategies in the classroom. If student teachers have problems in the preparation of lesson notes, questioning techniques and communicating well their ideas to students, then their lessons will be fraught with problems and there will be little learning taking place among their students. Questioning is directly linked to communication in classroom situations. Communication in the class is said to be effective when the student decodes the information given by the teacher and takes appropriate action or reaction. The role of effective classroom communication between the teacher and student in ensuring appropriate feedback in the teaching-learning situation cannot be over-emphasised if the required quality learning is to be attained in schools.

On the duration of internship, 84.6% of the mentors thought that the length of the SIP was adequate and should be maintained. During individual interviews the mentors said that the length of the SIP was adequate for the interns since they were novices. They opined that the interns needed enough time to learn about classroom management, lesson plans, scheming and certain rudimentary issues that the university has no time to teach them. As studies have shown (Kitchel, 2006; Arbaugh et al; 2007), longer duration of practicum (32 weeks to 40 weeks) experience make the student teacher better prepared for the profession. Student teachers who are novices need more time to learn and relearn what is new to them. But as experience has shown, it is not just the length of programme but the commitment of the key stakeholders of the programme. Whilst too short a period may be insufficient for meaningful professional experiences to be acquired by teacher mentees, too long a period (as the case of UEW SIP). To some extent the researcher agrees with the views of Kitchel (2006) and Arbaugh et al (2007), but would like to add that without full commitment of the partners concerned may amount to un-realised dreams.

5.4 University Supervisors' Perceptions of the Student Teachers' Internship Programme

The study found that the university supervisors viewed the student teachers to be weak in pedagogy as compared to their knowledge of subject matter. Whilst 83.1% of the supervisors felt that the interns had sound knowledge of subject matter, 41.1% of them said the intern had good knowledge of teaching strategies. University supervisors perceived that interns performed fairly well but not up to the expectations of the University in their classroom practice. This may explain why the student teachers see the university supervisors as "hard" assessors. The university supervisors said (on the average) interns were competent and knowledgeable in subject matter, reviewed their

students Relevant Previous Knowledge (RPK) in lessons they taught, practised teaching in line with lesson objectives, established good rapport with their students, had good control of their class and concluded their lessons well. On the other hand, supervisors said that interns were weak in lesson note preparation, motivation of students, distribution and timing of questions, communicating with students and in using varying teaching strategies to suit particular situations in the class. These same points were mentioned by mentors as weak areas of the interns with regards to their classroom practice. This may suggest that some departmental courses and experiences failed to connect theory to practice in the preparation of the student teachers in the study. The findings of the study agree with the results of Ogonor and Badmus (2006) evaluation of student teachers' reflective practices during teaching practice in Nigeria. As Ogonor and Badmus (2006) observed, faculty ranked student teachers' performances in descending order as follows: student teachers had adequate knowledge of subject matter, ability to remind students of relevant previous knowledge, good use of teaching aids, good class control, adequate lesson plan presentation and appropriate use of chalkboard. The most commonly rated challenge in respect of the flaws of interns revolved on improper distribution, timing and frequency of questions (Ogonor & Badmus, 2006). It may be that the interns were not well groomed on these aspects during their pre-internship seminars (on-campus teaching practice). Methodology lecturers in the University will have to have a second look at how they approach the teaching of pre-internship seminar and method courses. It will be ideal if student teachers are given some opportunities that would allow them make essential connections between practical experiences and their base of theoretical knowledge. At the same time, the mentor should be able to teach interns the core task of linking subject matter, knowledge of learning theories and pedagogy.

The university supervisors said that the duration of the SIP was too long. A mean perception value of 4.53 on the 5-point Likert scale with standard deviation of 0.03 for the university supervisor affirms this view. They suggested that the length should be reduced to two terms of the senior high school calendar. Whilst the university supervisor felt the length of the SIP was long, the school heads and their mentors were of the contrary view. So who do we believe? It could be that presence of the interns in the schools is a big relief to them hence their tendency to feel that the length of the SIP was adequate. But the stress and financial constraints that interns go through all this period of one year makes the programme at a certain stage frustrating. However, this finding is in contrast to Kitchel's (2006) recommendation that lengthening the period of experience of practicum with added responsibilities to student teachers will improve their teaching and self-confidence.

5.5 **Mentors' and University Supervisors' Perceptions of Interns' Classroom Practice**

The study sought to find out whether there were significant differences in mentors' and university supervisors' perceptions of the classroom practice of the interns. The interns' classroom performance was selected because the ultimate goal of the SIP is to improve and perfect the classroom practice of interns. Ideally, as Yost, Senter and Forlenza-Bailey (2000) suggested, teacher educators should strive to provide pre-service teachers with course work that provides them with solid foundation for them to be critical thinkers. In addition, they should be given some opportunities that would allow them make essential connections between practical experiences and their base of theoretical knowledge. At the same time, mentor teachers should be able to teach interns the core task of linking subject matter, knowledge of learning theories and pedagogy.

There were some differences in perceptions recorded between the two. The data analyses highlighted that the mentors rated student teachers' confidence extremely high. The university supervisors' rating for the same skill on the other hand, remained low. While the mentors' mean rating was 3.56 on a 5-point Likert scale which meant that the interns were performing well in their classroom work, the university supervisors' had a mean of 3.05 and felt the interns were weak in their classroom work. Several reasons could have accounted for this difference. During SIP, the mentor and the intern are much closer to each other in terms of social roles.

The daily contact the mentor has with the mentee allows him/her to observe the gradual progress exhibited by the mentee in the classroom practice. This situation is likely to make the mentor grade the mentee highly Also, the knit kind of relationship established between the mentor and the intern calls for sympathetic grading of the intern by the mentor. On the other hand, the university supervisor does not know the daily progress of the intern yet he/she expects to see excellence in the performance. He therefore gives low grades to mentee. Also, previous opinions held by faculty of the student teacher weaknesses in PCK could have influenced them in their scoring of the intern. Earlier studies had reported of the tendency of the university supervisor awarding low grades to interns in practicum (Anderson, Walker, & Ralph, 2009) based on their previous interactions with them.

Student teachers' confidence was associated not only with their pedagogical skills but also domain specific knowledge. For example, if a student teacher had weak science background knowledge, they performed poorly during instruction. They also had difficulty in explaining topics/concepts well and handled students' questions poorly. The independent sample t-test conducted indicated that there was a significant difference in perceptions between mentors and university supervisors of the interns'

classroom performance. The observed significant difference might have occurred due to assessment standards set which are likely to be different for the mentor and the university supervisor. Literature reveals that in many pre-service programmes, there is little connection between academic programme and practicum (Beck & Kosnik, 2002; Zeichner & Conklin, 2005). In many programmes, there is not a coherent philosophy of teaching and learning that guides both the campus programme and the practicum (Darling-Hammond, 2005; Zeichner & Conklin, 2005). Studies by Bonura (2004) and Arnold (2006)on the role of mentors revealed a gap between their views and that of the university faculty about practicum. Mentors often see their task as a fairly practical one - a matter of initiating student teachers into the realities of teaching. Many university supervisors, by contrast, feel mentors should take an interventionist stance. They advocate that mentors should take a critical approach, inquiring into current practices rather than merely transmitting them. The differences in expectations could account for the significant differences reported in the study. As long as university faculty and school mentor live in separate worlds, it will be difficult to resolve these issues and develop a sound and shared approach to teaching and learning.

5.6 Heads of Partnership Schools' Perceptions of the Student Internship Programme

Heads of SHSs views of SIP were sought in the study. Headmasters and headmistresses were of the view that interns did contribute to teaching and learning in their schools during the practicum. The study found that 100% of the heads perceived that interns were hard working, punctual and regular at school, were humble and respected authority and other members of staff and also well disciplined. Headmasters had the perception that interns were good all round with respect to professional

responsibilities in class and out of class and in terms of morality. Interns informed the heads when they were to be absent in school. The heads were impressed with interns' activities in their schools in terms of punctuality at work, participation in school activities, classroom work, mastery of subject matter and their interpersonal relationship. In an earlier study by Kwame-Asante (2005), the heads of schools had similar opinions about the student teachers in their schools. Kwame-Asante (2005) reported their views of the interns as follows: *they (the mentees) are more confident; they introduced new methodologies of teaching with variety of teaching aids; they are part of the school participating in all activities just like the regular teachers and they cannot simply act or pretend to impress when the university supervisor comes around(Kwame-Asante, 2005).* These reports implied that UEW interns had always been seen as hardworking by heads of partnership schools.

The current study found 92.31% of the heads of SHSs saying that the presence of the intern in their school solved to some extent their staffing problems. This could be due to the fact that, at the end of every academic year, some members of staff leave the school on study leave or on retirement; and heads will have to find immediate replacement for such vacant positions. The presence of interns at such a time will help hold the 'fort' until the heads found permanent replacement. However, this goes against the goals and objectives of the SIP of UEW which is to get the interns supervised and guided under trained mentors in basic skills of the teaching profession. If novice interns occupy classrooms as teachers without mentors, then this is akin to the blind without a guide. Such interns are likely to commit mistakes in the classroom without corrections and could be confused because they may have no opportunity to connect their learnt theories to practice.

The results of the study also indicated that 89.58% of the heads of schools said the length of practicum was adequate. This view of the heads of schools was at variance with the views of interns and university supervisors who said the period was too long. The SIP is a great help to many senior high schools in the country, especially schools in rural settings where many graduate teachers refuse to take up teaching appointments. Student teachers often put up their best in terms of effort, time and preparation for instruction. However, the objective of the SIP of UEW is that student teachers will learn classroom dynamics under supervision by mentors not to be alone in the classroom.

5.7 Senior High School Students' Perceptions of Student Internship Programme

The responses of SHS students in the study indicated that the interns did well in their classrooms during the practicum. More than 90% of SHS students felt that the intern did well. The findings were that interns were hard working, regular and punctual at school, punctual and regular in class, always engaged students in work, knew very well their subject matter, were fair and firm in their dealings with students, taught with enthusiasm, used teaching aids for teaching and motivated students to learn. In a group discussion with SHS students, they said they felt free to discuss their difficulties with the intern teacher than their regular teachers. It is usual for student teachers to be free with students than the normal classroom teacher because student teachers want to establish good rapport in order to have good class control. Classroom observation of the science interns by the researcher indicated that the interns were often enthused with their teaching; though not perfect in what subject matter they were dealing with they were confident of themselves.

5.8 Alignment between Science Interns' School Activities and the Objectives of SIP

Results of interviews, focus group discussions and classroom observations of interns' teaching indicated that the internship practice requirements/content did not connect very well with what the interns learned at their department/faculty. The methodology courses at the university department connected with the demands of internship; but the interns suffered in some areas of subject matter (Interns' Focus Group, June 2010). The general perception of interns during focus group discussions and interviews was that a lot of the courses that they taught during internship were not courses taken at the university. Some of the interns faced serious problems with lesson preparation. Whilst the university supervisors demanded detailed lesson notes, the schools on the other hand accepted brief or scanty lesson notes.

The result of the study confirms what Sands and Godwin (2005) said about student teaching. In their study, Sands and Godwin (2005) concluded that student teachers often complain that what they perceive to learn at the university does not match what they see their mentors do. However, there was that general satisfaction that the internship programme helped them develop some pedagogical skills such as confidence in preparing good lesson notes, teaching using multiple teaching strategies, understanding the needs of slow learners, developing good items for assessment of learning, developing skill of reflective thinking and teaching and collaborating well with colleagues. They were now able to face a large class than before the SIP.

They also explained that the internship programme had broadened their experiences and created awareness in them of the realities of teaching and working in a school. They further explained the benefits they derived through peer collaboration in teaching. Collaboration between mentors and interns and between interns themselves promoted discussions of teaching plans and post-lesson reflections in ways that

facilitated their practise teaching and professional development. The implied meaning was that most of the objectives of SIP had been attained at the schools. However, there were still some issues to be addressed regarding courses taught by the university vis-a-vis what is taught at schools. The university training system is to prepare the individual to stand on his/her own so that after going through the programmes one is expected to have professional skills to be able to learn and teach at the level prepared for. It will be a misconception if student teachers think that faculties should treat all the curriculum materials of basic and second cycle schools with them to get them equipped for the job market. Student teachers must learn to learn for themselves and stop the blame game on their universities.

CHAPTER SIX

6.0 Summary, Conclusions and Recommendations

6.1 Summary

The study investigated the perceptions of various stakeholders on the state of the Students' Internship Programme using the 2009/2010 group of science interns.

The study used a mixed method approach. Questionnaires, interviews and focus group discussions were employed for collection of data. Classroom practise of some interns was also observed as part of data collection procedure. The total sample was 585; which comprised science interns, university supervisors, school mentors, headmasters/headmistresses of partnership SHS and SHS students taught by the interns. Findings indicated that there was similarity in perception among respondents. All stakeholders were positive on student teachers' performance. Major findings were that majority of mentors supported their interns in planning for instruction, provided conducive climate for them to work, gave them feedback on their current competencies and helped exposed them to the wider school community. The supervisors visited the interns only once during the practicum; this the interns, mentors and headmasters felt was inadequate. From the perspectives of headmasters/headmistresses of partnership schools and SHS students, it was evident that student teachers had performed creditably. Mentors and the university supervisors also gave good comments on interns' practicum performance; however, they felt that the interns did not perform to the level that they expected of them. The general perception was that interns had developed confidence as teachers and their level of self-efficacy had also heightened.

6.2 Stakeholders' Perception of Internship Programme

Majority of the interns perceived that their mentors guided them well during the Internship Programme. The interns underscored the development of confidence and competence as an important outcome of their practicum experience. They perceived that they could manage the classroom and teach effectively as a result of the impact of SIP. They also felt that the post-internship seminar helped to concretise their knowledge of instructional skills such as pedagogical content knowledge, communication, classroom management and students' rapport. They had also become confident in facing and talking to large groups of students.

The mentors perceived that interns had sound PCK that enabled them to practise well; but did not perform to the level of their expectations. Mentors perceived that interns possessed good knowledge of classroom management but this was in contrast to findings from earlier studies (Brock & Grady, 2001; Johnson & Birkeland, 2003; Berry, 2005; Jones, 2008) that most interns were poor in classroom management. The mentors had the opinion that the one-year duration of the internship was adequate. They perceived that faculty participation in the supervision of the intern during the practicum was inadequate and would not serve its purpose.

The university supervisor viewed the interns to have strong skills in students' rapport, communication, content knowledge and teaching strategies. At the extreme, they viewed the interns to be weak in linking students RPK to new lessons.

The heads of schools rated the academic work and social behaviour of interns in their schools very high. They said that the interns were disciplined, humble, regular and punctual to school and were hard working. The heads of schools said that the support offered by the university supervisors in terms of assessment of the interns was inadequate. This was also the view of mentors. Senior High School (SHS) students

were of the opinion that the intern was a good teacher, knowledgeable in his subject, regular and punctual in class, hard working, humble, respectful and friendly.

6.3 Alignment of the Practice of SIP in the Schools with the Objectives of the Programme

The SIP provided opportunities for interns to develop their professional skills and knowledge and their personal confidence. The interns learned the teacher's major roles as well as skills that are required to perform these roles. The interns underscored the development of confidence and competence as an important outcome of practicum experience. It enabled the student teachers to eliminate fear of teaching large classes. This finding affirms what Jeffery (2008) stated: *student teaching experience increases teachers' confidence in their abilities and their desire to remain in the profession*. It could be said that as the student teachers became more involved in the classroom they became more familiar with school routines, procedures and curriculum, as well as gained better understanding of themselves in their new role as teachers to be. This made them to feel more confident and hopeful that they will become effective teachers.

6.4 Conclusions

The findings of the study revealed the following major conclusions. First, all stakeholders were positive on student teachers' performance during the internship. Based on the perspectives of mentors, heads of schools, SHS students and university supervisors, it can be said that interns would be effective teachers on the field. It is expected that with such teachers going into the schools, teaching and learning will be effective with the resultant improvement in the academic performance of Ghanaian SHS students. Second, there is linkage between the activities of SIP and its objectives as revealed from the perceptions of the stakeholders. Third, the practicum experiences

had heightened the pre-service teachers' level of self-efficacy. The spirit of competence and confidence had been developed among interns. Fourth, a few of the interns were abandoned by their mentors and this posed a major challenge to such mentees since they were yet protégés and needed guidance. Such interns would face some few challenges on the field. The university supervisor's visit to the schools was inadequate. Mentors and supervisors had positive perception of the intern's classroom practice but the mentors had a higher rating than the supervisors on the interns' competencies and effectiveness. The science interns perceived that the portfolio building helped them always to reflect on their classroom work. There was limited communication between the science mentors and the university supervisors; this is likely to reduce the quality of mentoring and may affect the professional growth of the intern.

6.5 Implications of the Study and Recommendations

The results of this study have implications for teaching, research and overall approach to teacher training.

Implications for the Department of Science Education

The need to use technology or instructional media for classroom instruction in the 21st century is imperative. It is an increasingly important aspect of modern school life and has dramatically changed the way teachers and students go about their daily school activities. A significant number of interns failed to use technology for classroom instruction during the practicum. This calls for the Department of Science Education to integrate technology into their curriculum and train their students on how to use power point and other ICT facilities in teaching. Given the rapidly advancing technology of today's workplace, continuing upgrading of university supervisors' knowledge in these

technologies is essential for the development of curricula to meet the changing needs of student teachers and service teachers. This implies that lecturers in the Faculty of Science Education will have to undergo in-service training on the use of technology for teaching; and how to prepare student teachers on the use of such facilities for classroom instruction. This is the way forward to achieving the overarching mission of UEW of preparing highly reflective teachers with the necessary skills to be productively employed in the fast-changing teaching profession and other workplaces where internal completive market demands on-going pursuit of learning.

There is also the need for the department to include course materials from SHS textbooks in their curriculum to make interns familiar with books they will be using at the schools. The interns are learning to cross the academic culture with its theoretical knowledge about teaching into the practical field with rich practical knowledge of teaching; therefore having previous knowledge of course materials and syllabuses they will work with, would greatly enhance their practice to cross over.

Implication for the University of Education, Winneba

The practicum period of one academic year should be seen as the appropriate period required for the student teacher internship in University of Education, Winneba, Ghana as observed by mentors, interns and heads of SHS schools. In countries where the practicum period is short, such as in Japan, teachers receive extensive in-service opportunities to practice under strict supervision (Bayrakci, 2009). Since in-service opportunities are not available or limited in Ghana, and there is no induction of beginning teachers, a longer practicum period is preferable. Also, majority of the student teachers entering UEW now are products of SHS and have no initial training in pedagogy of teaching; hence they need a longer practicum period to learn the “robes” of the profession.

Secondly, there is the need to introduce a course on student teacher portfolio. This will enable student teachers practice how to build portfolios as they go through the programme.

Implications for the Centre for Teacher Development and Action Research (CETDAR) of the Institute for Educational Development and Extension (IEDE) of UEW

On the issue of lesson notes, the university will have to come to clear terms with partnership schools on the elements expected in a pre-service teacher lesson plan. This will eliminate the conflict between supervisors and student teachers on one hand and mentors and student teachers on the other hand as regards the core structure of the lesson plan.

There should be two visits made by the university supervisor to interns on internship. The first visit should be made in the first quarter of the practicum when the student teacher has been assigned a class. By that time the intern should have settled down to be able to practice what he/she has observed from modelled lessons conducted by the mentor. It will also be useful to give feedback to mentees during this time which can be used as remedial lessons in correcting their errors in teaching. The second one should be made close to the end of the practicum to assess and found out the progress of the intern, his/her professional development and growth.

Communication between partners is highly essential for the success of the SIP. There is the dire need for both parties to redesign their lines of communication so that the interns are not made to suffer for something that could be easily resolved. However, the responsibility of this lies squarely with CETDAR/IEDE of UEW.

Implications for Partnership Schools

Partnership schools should assign student teachers to only mentors who have undergone training with CETDAR of the Institute for Educational Development and Extension (IEDE) of the University of Education, Winneba. Secondly, schools should match student teachers to their subject specific mentors. Specific subject mentors would have to be trained in their subject disciplines to enable them mentor their mentees. This will help avoid student teachers being matched with mentors who have problems with the lesson plans or classroom instruction of interns.

6.6 Recommendations of the Study

The following recommendations have been made:

The interns felt they were well received by their schools and the wider community. This attitude should be appreciated by the university and encourage schools to continue showing that kind of reception.

The university supervisor should visit the intern at their schools more than once. This will acquaint them with the state of the interns' development as teachers. This will also guide them to give adequate feedback to the interns. The problem of limited communication between school mentors and university supervisors can be curtailed by the university providing a communication system where both partners can communicate at the expense of the funding body (the university).

Lesson notes format used by the faculty should be well explained and discussed with the mentors during their training so that there is no conflict when interns use such format for their lesson plans. There is the need for CETDAR/IEDE to tactfully discuss with the heads of partnership schools on the issue of some mentors leaving the intern to his/her own fate in the class with very little guidance.

This research is believed to represent at least a small step forward in a largely unexplored area in UEW and in Ghana. It is hoped that this study will lead to increased attention to teacher internship, and provide a clear map to chart future inquiry into teacher preparation in the country.

The interns felt their mentors and the entire school community received them well. The interns practised under safe environments and that made them learn well the rudiments of their profession. This attitude of schools is appreciated by other stakeholders; and the schools are encouraged to continue showing that kind of reception to other student teachers in the future.

Partnership schools should try as much as possible to match student teachers to subject specific mentors in the area of interns. Secondly, the interns are yet learning to become teachers; they are novices and should not be left on their own to do what they think they are teaching. They should most often observe and model mentors' practice. Once student teachers have observed a variety of approaches to instruction, they are better armed to attempt to replicate. In this case student teachers are given the opportunity to see how professional teachers run class sessions and manage encountered problems. Interns should therefore be given less workload that will enable them have enough time to observe and model the experienced mentor. This should be done for some time before interns are entrusted with a class for practise teaching.

6.7 Suggestions for further study

It is suggested that further research be done to found out the perceptions of parents and guardians of Senior High School students of the Student Internship Programme of the University of Education of Winneba. This is an aspect worth considering but which was not considered due to time constraints.

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APPENDIX A

STUDENT TEACHER PERCEPTIONS ABOUT THE INTERNSHIP PROGRAMME

Feedback from the Student Teacher on the Mentor Teacher and University Supervisor

The University of Education, Winneba, conceptual framework, *Teacher as Reflective-Practitioner*, emphasises that teachers thoughtfully reflect and continue to grow throughout their professional careers. For UEW Science Faculty and the mentor teachers that work with UEW science interns, one source for supporting this professional growth is feedback from the intern about his/her perceptions of the internship experience. Your feedback will contribute to the re-shaping of the internship programme to make it more responsive and beneficial. The information you will provide is going to be used as group data for the purpose of analysis and will not be store d as individual data. Your confidentiality is therefore assured. Complete the statements bellow about your mentor teacher and the university supervisor. Please return the form(s) to:

Mr. Azure J. Awuni (020-9166213)
The Coordinator of Students' Internship Programme,
Department of Science Education,
P. O. Box 25, Winneba

Bio Data of student teacher

Gender of student teacher: [male] [female]

Age of student teacher in years: [Below 25] [25-30] [31-35] [36-40] [41-45] [46-50] [Above 50]

Subject area of student teacher: [biology] [chemistry] [Physics]

Subject taught by student teacher: [biology] [chemistry] [Physics] [Integrated Sc]

Region of practice 1. Ashanti 2. Brong Ahafo 3. Central 4. Eastern 5. Greater Accra 6 Northern 7. Upper East 8.Upper Wet 9. Volta 10. Western.

Your Perceptions about the Mentor

For each of the statements that follow, please indicate your degree of agreement by circling the appropriate number.

Strongly Disagree (SD) =1, Disagree (D) =2, Undecided (U) =3, Agree=4 and Strongly Agree(SA)=5

Part 1: Planning for instruction (5 items)

My mentor	SD	D	U	A	SA
Provided me with instructional materials and teacher's handbooks					
Reviewed his/her expectations for lesson plans and student assessment with me from time to time					
Helped me established my instructional goals and objectives					
Helped to develop a plan for me to gradually assume full responsibility for classroom instruction					
Developed a plan for me to receive feedback on a regular basis					

Suggestions in this area to help with future student teachers (especially for items that were rated low):

1……

2……

Part 2: Conducive Climate (6 items)

My mentor	SD	D	U	A	SA
Provided the opportunity for me to observe his/her teaching					
Shared advice and constructive feedback with me.					
Encouraged open communication between us for my self-reflection and professional growth.					
Immediately corrected me if I did something wrong.					
Fostered the support of building-good relationships with administrators, staff and other members of the department.					
Paid attention to me if I had something to discuss					

Suggestions in this area to help with future student teachers (especially for items that were rated low):

1……

2. ……

Part 3: Classroom Teaching (6 items)

My mentor	**SD**	**D**	**U**	**A**	**SA**
Provided feedback on my lesson plans before I used them in class.					
Observed me informally and provided oral feedback on both classroom instruction and management skills on regular basis.					
Observed me formally and gave me thorough feedback on my classroom work					
Served as a resource person for me regarding supplies, equipment and the teaching process.					
Worked cooperatively with my university supervisor to see that I met programme goals and expectations.					
Helped me to develop planning skills. for teaching					

Suggestions in this area to help with future student teachers (especially for items that were rated low.

1……

2……

Part 4: Reflection on teaching (4items)

My mentor	**SD**	**D**	**U**	**A**	**SA**
Kept me continually informed of my progress and revised his/her goals and expectations as necessary					
My mentor teacher kept my university supervisor informed of my progress on a regular basis					
My mentor teacher reviewed my teaching strategies with me on regular basis after observing me.					
Provided me with opportunities for professional growth by encouraging my attendance at professional meetings, and participation in the entire school's programmes					

Suggestions in this area to help with future student teachers (especially for items that were rated low):

1…….

2……

Part 5: Wider School Community (3 items)

My partnership school	**SD**	**D**	**U**	**A**	**SA**
Welcomed me as a contributing member of a professional body.					
Provided me with the opportunity to observe other teaching and learning situations during my student teaching experience.					
Provided me with constructive feedback.					

Suggestions in this area to help with future student teachers (especially for items that were rated low):
1……
2. …….

Part 6: Student teacher's perceptions about the university supervisor

My University supervisor	**SD**	**D**	**U**	**A**	**SA**
Provided prompt feedback on lessons observed					
Held pre-observation conference with me					
Held post-observation conference with me and my mentor					
Had no problem with my classroom management strategies					
Was genuinely concerned about my development as a protégé					
Communicated regularly with my mentor concerning my progress					

Part 7: Internship duration and one slot assessment

The internship	**SD**	**D**	**U**	**A**	**SA**
The one year internship period is adequate for practicum					
The one slot supervision by the supervisor is adequate					

Part 8: Academic Preparation of Intern by the Department of Science Education towards the SIP

Please circle the number that most closely represents *your own assessment* about how well the Department of Science Education of UEW prepared you for each of the items listed below. Rate the items using:

Strongly disagree (1), Disagree (2), Uncertain (3); Agree (4) and Strongly agree (5)

My Department taught how to:	**SD**	**D**	**U**	**A**	**SA**
Create meaningful learning experiences based on content knowledge					
Use multiple teaching strategies to encourage critical thinking among students					
Create a learning environment to actively engage students in learning					
Design classroom assessments that are aligned with content standards of the Ghanaian school curriculum					
Design and use formative assessment that give purposeful feedback to students					
Use technology as an integral part of instruction to support and extend student learning					
Work collegially with peers to improve student learning					
Monitor student learning to help students achieve full potential					
Reflect daily on teaching practice to improve student learning					
Develop good relationship with parents or guardians to support students learning					

Part 9: Impact of Programme on Interns' Professional Development.

To what extent do you agree or disagree with each of the following statements concerning the impact of the internship programme on your professional development? *(Circle one number on each line)*
Strongly disagree (SD) =1, Disagree (D) =2, Undecided (U)= 3, Agree(A) =4, Strongly agree (SA)=5

The SIP had great impact on me in the following ways:	**SD**	**D**	**U**	**A**	**SA**
It increased my confidence as a teacher					
It helped to arouse my enthusiasm for teaching					
It increased my interest in research and the ways that technology can be applied to teaching.					
It stimulated me to think about ways I can improve myself in the teaching profession.					
It increased my knowledge of content in science					
It increased my commitment to learning and seeking new ideas on my own					

In your opinion, what was the ***primary*** professional or personal benefit of the internship experience?

What did you like about the internship?

……

What did you dislike about the internship?

.....

State the most important challenges of practising how to teach.

……..

What did you think you should have known before getting to the internship?

…….....

APPENDIX B

Perceptions of the Mentor of the Students' Internship Programme

The University of Education, Winneba, conceptual framework of teacher as a reflective practitioner, emphasizes that teachers thoughtfully reflect and continue to grow throughout their professional careers. For UEW Science Faculty that educate student teachers, one source for supporting this professional growth is feedback from the Mentor Teacher about his/her perceptions of the student teaching experience. Your feedback will be needed to improve the internship programme. Please return the completed form to:

MR. AZURE, J. AWUNI. Tel. (020-9166213)

Coordinator of Students' Internship Programme, Department of Science Education, *Winneba.*

Thank you for your assistance!

SECTION A

General information

Gender of mentor: [Male] [Female]

Age of mentor in years: [30-35] [36-40] [41-45] [46-50] [51-55] [56-60]

Major subject area: [Biology] [Chemistry] [Physics] [Integrated Science]

Region where school is located: [Ashanti] [Brong Ahafo] [Central] [Eastern] [Greater Accra] [Northern] [Upper East] [Upper West] [Volta] [Western]

SECTION B: Mentor Daily Observations of Intern's Performance at SIP.

Part 1

For the following items below show how the intern performed in class, rank them in terms of your observations made about the intern during your sittings with him/her in the class.

The statements represent your observation of the intern during the teaching practice.

1=strongly disagree, disagree=2, uncertain=3, 4= agree, 5=strongly agree.

The intern was	**SD**	**D**	**U**	**A**	**SA**
Knowledgeable about planning for instruction					
Knowledgeable about classroom management					
Knowledgeable in subject content					
Knowledgeable about assessment techniques					
Knowledgeable about technology and how to integrate it into teaching					
Knowledgeable about learning theories and how to apply them in class					
Knowledgeable on how to motivate students to learn					

Part 2: The Mentor's Role in the Professional Development of the Intern (7 items)

As a mentor teacher, I: :	SD	D	U	A	SA
Assisted the intern to prepare his/her lessons					
Observe the intern's teaching and gave him/her regular feedback					
Modelled teaching for the intern to observe					
Gave intern regular feedback on his/her classroom management and discipline strategies					
Guided the intern to reflect regularly about his/her teaching					
Guided the intern on assessment and evaluation practices					
Assisted the intern in building his/her portfolio					

Part 3: Mentors' Perceptions of the Duration of SIP and the One Slot Assessment of the Intern by the University Supervisor.

As a mentor, I.....	SD	D	U	A	SA
See the one year internship period to be too long					
See the one slot supervision of the supervisor to be highly inadequate					

Part 4: Mentors' Ratings of Interns' Classroom Practice.

Observed Classroom practices	SD	D	U	A	SA
The intern exhibited good knowledge of subject matter					
The intern exhibited good articulation of instructional objectives during instruction					
The intern developed good lesson plans					
The intern motivated of students during instruction					
The intern showed poor distribution and timing of questions					
The intern maintained discipline and managed the class well					
The intern showed good use of the chalkboard					
The intern's speech/voice was clear					
The intern showed good conclusion of his/her lessons					
The intern utilised a variety of teaching strategies in class					
The intern used low level questions throughout the lesson					
The intern exhibited poor communication skills during instruction					
The intern exhibited good rapport with the students					

APPENDIX C

The university Supervisor's Perceptions of the Internship programme.

Introduction**:** The University of Education, Winneba, conceptual framework, *Teacher as Reflective-Practitioner*, emphasises that teachers thoughtfully reflect and continue to grow throughout their professional careers. For UEW Science faculty and the mentor teachers that work with UEW science interns, one source for supporting this professional growth is feedback from the university supervisor about his/her perceptions of the student teaching experience. Your feedback will contribute to the re-shaping of the internship programme to make it more responsive and beneficial. The information you provide is going to be used as group data for the purpose of analysis and will not be store as individual data. Your confidentiality is therefore assured. Complete the statements below about the mentor and the intern and return the completed form to:

James Azure Awuni (Tel. 020-9166213)
Coordinator of students' internship programme
Department of science education, P.O. Box 25, UEW-Winneba

SECTION A: Biographic Data of the university supervisor

Sex: [Male] [Female]

Age in years: [30-35] [36-40] [41-45] [46-50] [51-60] [Above 60]

Major subject area [Biology] [Chemistry] [Physics] [Integrated Science]

Position: [Dean of Faculty] [Head of Department] [Lecturer].

Part 1: Supervisors' Perceptions of the Internship Duration and the One Slot Assessment

University Supervisors' Ratings of Interns' Classroom Practice

For each of the following statements below indicate your degree of agreement by providing a tick (√) one of the alternatives. The statements represent your observation of the intern during the teaching practice.

1=strongly disagree, disagree=2, not applicable=3, 4= agree, 5=strongly agree.

During my observation, the intern exhibited/showed:	SD	D	U	A	SA
Adequate knowledge of subject matter					
Ability to review students' previous knowledge					
Ability to use various strategies in teaching					
Adequate articulation of instructional objectives					
Good planning of lessons					
Motivation of students during instruction					
Ability to manage and maintain discipline well in class					
Proper use of the chalk board					
Clear use of voice for emphasis					
Proper conclusion of lesson					
The use of low level questions throughout the lesson					
Lack of good communication skills					
Good rapport with the students					

For each of the following statements below indicate your degree of agreement by providing a tick (√) one of the alternatives.

Duration of internship and one slot assessment	SD	D	U	A	SA
The internship period of one year is too long.					
One slot supervision by faculty is inadequate					

Thank you

APPENDIX D

Perceptions of Heads of SHS about the Internship Programme

Introduction**:** The University of Education, Winneba, conceptual framework, Teacher as Reflective-Practitioner, emphasises that teachers thoughtfully reflect and continue to grow throughout their professional careers. For UEW Science faculty and the head masters/mistresses that work with UEW science interns, one source for supporting this professional growth is feedback from heads of partnership schools about their perceptions of the student teaching experience. Your feedback will contribute to the re-shaping of the internship programme to make it more responsive and beneficial. The information you provide is going to be used as group data for the purpose of analysis and will not be stored as individual data. Your confidentiality is therefore assured. Complete the statements below about the mentor and the intern and return the completed form to:

James Azure Awuni (Tel. 020-9166213)
Coordinator of students' internship programme
Department of science education, P.O. Box 25, UEW-Winneba

Biographical Data

Gender: [Male] [Female]

Age years: [30-35] [36-40] [41-45] [46-50] [51-55] [56-60]

Region where school is located: [Ashanti] [Brong Ahafo] [Central] [Eastern] [Northern] [Greater Accra] [Upper East] [Upper West] [Volta] [Western]

Part 1: Heads of SHS Perceptions about the internship programme

For each of the following statements below indicate your degree of agreement by circling one of the alternatives:

Strongly disagree (SD) =1, Disagree (D)=2, Uncertain(U)=3, Agree(A)=4, Strongly agree(SA)=5.

The intern:	SD	D	U	A	SA
Has very good knowledge of his/her subject					
Was hard working					
Was regular and punctual to school					
Was punctual and regular in class					
Successfully engaged his/her students in their studies at all times					
Conveyed an enthusiasm for teaching and learning science					
Was humble and respectful to leadership and staff					
Communicated with me about his/her where about when not in school					
Was well disciplined					
Was well dressed at all times					
Has good rapport with students of the school					
The presence of the intern solved our staffing problem					
Was friendly with all staff Was friendly with all					

Part 2: Heads of schools' Perceptions of the Internship Duration and the One Slot Assessment

For each of the following statements below indicate your degree of agreement by providing a tick (√) one of the alternatives.

Duration of internship and one slot assessment	SD	D	U	A	SA
The internship period of one year is adequate.					
One slot supervision by faculty is inadequate					

Any other comments:.....

APPENDIX E

Senior High School Students' Perceptions of the Internship Programme

Introduction: The University of Education, Winneba, conceptual framework, Teacher as Reflective-Practitioner, emphasises that teachers thoughtfully reflect and continue to grow throughout their professional careers. For UEW Science faculty and the senior high students of partnership schools that work with UEW science interns, one source for supporting this professional growth is feedback from students/pupils of partnership schools about their perceptions of the student teaching experience. Your feedback will contribute to the re-shaping of the internship programme to make it more responsive and beneficial. The information you provide is going to be used as group data for the purpose of analysis and will not be stored as individual data. Your confidentiality is therefore assured. Complete the statements below about the mentor and the intern and return the completed form to:

James Azure Awuni (Tel. 020-9166213)
Coordinator of students' internship programme
Department of science education, P.O. Box 25,
UEW-Winneba

Biographical Data

Gender: [Male] [Female]

Age years: [Less than 15] [15-17] [18-20] [Above 20]

Region where school is located: [Ashanti] [Brong Ahafo] [Central] [Eastern] [Northern] [Greater Accra] [Upper East] [Upper West] [Volta] [Western]

Part 1: Senior High School Students' Perceptions about the Internship Programme

For each of the following statements below indicate your degree of agreement by circling one of the alternatives:

Strongly disagree(SD)=1, disagree(D)=2, undecided(U)=3, agree(A)=4, strongly agree(SA)=5.

0	Our student teacher	SD	D	U	A	SA
1	He /she knows his/her subject very well					
2	Is hard working					
3	Is regular and punctual at school.					
4	Is punctual and regular in class.					
5	S/he teaches with joy and is full of vigour.					
6	He explains things clearly to our understanding					
7	Her/his lessons are interesting					
8	Engages us in our studies at all times					
9	She/he uses teaching aids to teach us.					
10	Is very fair and firm with everybody in class					
11	S/he speaks good English					
12	Is humble, respectful and friendly					

Thank you for being a participant

APPENDIX F

Interview Guide for Interns

1. How well were you prepared by your department for your internship?

2. Which courses or activities were particularly useful to you in this respect?

3. What did you missed during your preparation for the internship?

4. How well have you been supported during this internship?

5. Who in particular among the following was/is a good support to you during the internship?

6. What have you learned/gained during the internship?

7. What are the major professional benefits of this programme to you as a beginning teacher?

8. Please comment on your mentor noting both his/her strengths and weaknesses.

9. Would you recommend your mentor to a would-be intern? Explain your reason.

10. How easy was it for you to develop your portfolio based on your teaching philosophy?

Thank you for talking with me.

APPENDIX G

Focus Group Interview Guide for Interns

1. How well were you prepared for your internship programme?

2. Which university courses were particularly useful to you during the internship?

3. What did you missed during your preparation for the internship?

4. How well were you supported during the internship?

5. Who (e.g. peers, mentor, supervisor, headmaster) was in particular a good support to you? What was the kind of support you got from such a person?

6. What are the major professional benefits of this programme to you as a beginning teacher?

7. Please comment on your mentor, noting both strengths and weaknesses.

8. Would you recommend your mentor to a would-be intern? What are your reasons?.

9. How easy was it for you to develop your portfolio?

11. Comment on the university supervision, stating both strengths and weaknesses.

12. State the benefits and weaknesses of the post-internship seminar you just attended.

13. Suggest ways by which the Department can improve upon the post-internship seminar programme to make it more beneficial to beginning teachers.

14. Any other comment?

Thank you all for participating

APPENDIX H

Interview Guide for SHS Students

1. What is the name of your student teacher?

2. How many periods do you have for science in a week?

3. How many times in a week do you meet with your teachers for science lessons?

4. How often do your teacher give you take home assignment?

5. How long does it take your teacher to mark and give back your assignment to you?

6. What are some of the comments he/she writes on your marked assignments?

7. What is the form of class test your teacher gives you? (Objective test, short answer type, mixture

of objectives and short answer type; ***choose one***)

8. Does your teacher become angry when you commit an offense?

Thank you for taking part in this conversation

APPENDIX I: Observation Guide **Grade.....** **Topic.....** Date ..... Duration.....		REMARKS	
PLANNING AND PREPARATION		Observed	Not observed
1	Exhibits knowledge of subject matter		
2	Objectives are SMART and align instructional strategies with lesson objectives		
3	Content connects with and challenges students' present knowledge, skills and values		
INSTRUCTIONAL SKILLS			
1	States purpose, objectives, and procedures for lessons		
2	Gives procedural and instructional directions clearly		
3	Uses a range of strategies for whole class, small group and individual teaching/learning		
4	Motivates students		
5	Relates lesson to prior knowledge and life experiences		
6	Presents lesson in a systematic manner		
7	Uses effective questioning techniques of the level of students		
8	Engages students in critical thinking and problem-solving		
9	Uses techniques that modify and extend student learning		
10	Engages students in lesson closure		
CLASSROOM MANAGEMENT			
1	Manages classroom routines effectives		
2	Respect diversity among students		

3	Maintains positive rapport with students		
4	Know each student as an individual		
	COMMUNICATION SKILLS		
1	Communicates with confidence and enthusiasm		
2	Communicates at students' level of understanding		
3	Uses appropriate and accurate non-verbal, oral/sign and written communication		
4	Projects voice/hand shapes/orientation properly		
	EVALUATION		
1	Monitors students' participation and progress		
2	Provides immediate and constructive feedback		
3	Bases evaluation on instructional goals/objectives		
4	Uses formal/informal assessment strategies to assess student learning before/during/after instruction to enhance learning		

Comments from Observation:

APPENDIX J

Documents

Documents that can be collected from the field for study include meeting agendas, evaluation reports, newspaper articles, budgets, brochures, lunch menus, minutes of meetings and rosters. These are papers containing official information about an organisation. A document summary form puts the document in context, explains its significance and gives a brief summary. NB: see Carley (1990), Webber (1990), Bailey (1982), Krippendorff (1980b) for good review of document analysis including content analysis.

Document Summary Form: Written Document Analysis Worksheet

1	Type of document (check one) [ ] Handbook [ ] Mentors and university supervisors logbook [ ] Diary
2	Unique physical characteristic of the document (check one or more) [ ] handwritten [ ] typed [ ] Seals [ ] received stamp [ ] Others
3	Date(s) of document
4	Author or creator of the document/ description of the document Position (Title)
5	For what audience was the document written/significance of document
6	Document information/brief summary of content a) list three things that the author said you think are important
	b) why do you think this document was written c) what evidence in the document helps you know why it was written.
	d) list two things the document tells you of life in Ghana at the time it was written e) Write a question to the author that is left unanswered by the document.