

# The Role of Mentoring and Its Influence on the Effectiveness of the Teaching of Physics in Secondary Schools in the South West Region of Cameroon

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## ABSTRACT

This paper reports on a study which was conducted to investigate the role of mentoring and its influence on the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon. The study adopted the convergent parallel mixed methods design, focusing on respondents in secondary schools in the South West Region of Cameroon. Both quantitative and qualitative data were collected, analysed separately, and the results were compared to see if the findings confirm or disconfirm each other. The quantitative analysis found that majority of the respondents (72% of Physics teachers) affirmed that they had more experienced colleagues as mentors to help build their confidence, improve their teaching, and help them improve their effectiveness and efficiency in guiding learners' achievements. Only 28% of the respondents disagreed with these statements. With majority respondents (72%) agreeing with the statements, it implies that in most secondary schools, experienced Physics teachers act as mentors to build teachers' confidence in teaching and improving students' learning. The interview (qualitative) data analysis summarized how secondary school Principals use meetings with mentors and mentees to promote mentorship in the school milieu. This has helped strengthen teachers' classroom practices in secondary schools in the South West Region of Cameroon. With the results confirming each other, the study recommends that mentoring should focus on helping teachers employ social interactions and instructional practices; feedback and clarity in teaching that have direct measurable impact on students' learning achievements.

**How to cite this paper:** Andrew Ngeim Sumba | Frederick Ebot Ashu | Peter Agborbechem Tambi "The Role of Mentoring and Its Influence on the Effectiveness of the Teaching of Physics in Secondary Schools in the South West Region of Cameroon" Published in International

Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-8 | Issue-1, February 2024, pp.967-984,

URL: [www.ijtsrd.com/papers/ijtsrd64524.pdf](http://www.ijtsrd.com/papers/ijtsrd64524.pdf)



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**KEYWORDS:** Role of Mentoring, Physics Teaching Effectiveness, Secondary Schools, South West Region of Cameroon

## INTRODUCTION

Mentoring as defined by Sullivan and Glanz (2000), is a process that facilitates instructional improvement wherein an experienced teacher (mentor) works with a *novice or less experienced teacher* collaboratively and nonjudgmentally to study and deliberate on ways through which instruction in the classroom may be improved (Murray and Mazur, 2009; Abdullah et al., 2020; Seidman, 2013; Norwell et al., 2017). It differs from peer coaching and cognitive coaching in that mentoring involves a hierarchical relationship between a novice and senior (more experienced) teacher (Okumu et al., 2019; Ali et al., 2018;

Petrovska et al., 2018). In addition, in mentoring, one senior teacher from the same department is assigned as a mentor to one novice teacher. Thus, it is a one-to-one correspondence between senior and novice teachers (Murray & Mazur, 2009).

Mentoring is seen as individualised professional learning aimed at instructional improvement. Educative mentoring is a departure from the prototypical conceptualisation of mentoring as a short-term intervention geared towards socialisation and retention. Educative mentoring situates mentoring

as part of a continuum of ongoing teacher professional development and is practised to improve teacher performance, and ultimately student learning through improved teaching effectiveness (Feiman-Nemser, 1998; Ebot-Ashu, 2014). Educative mentoring is predicated upon social learning theories postulating that learning is situated, collaborative, and scaffolded. As such, mentors spend a great deal of time in new teachers' classrooms to understand the classroom contexts and new teachers' practices. Then, mentors apply their contextual understanding to help new teachers set professional goals. Subsequently, mentors' scaffold new teachers' professional learning, helping them learn in and from their practices through reflection, analysis, problem-solving, and other forms of assisted performance (Norman & Feiman-Nemser, 2005).

### Statement of the Problem

Over the past decades, reports and related research have come out advocating the enhanced use of mentoring to assist novice teachers within their first years of teaching. Smith (2002) holds that traditionally, many beginning teachers enter the classroom with only minimal opportunity to interact with students and more importantly, learn from master teachers. Mentoring can serve to augment the succession planning and professional development of schools. Mentors can model a culture of collaboration and collegiality in which best thinking occurs through collective judgment, which is considered to be the best way teachers teach (Hopkins-Thompson, 2000). According to Hopkins-Thompson, mentors should be teachers who are respected and administrators who are highly skilled in communicating, listening, analysing, providing feedback, and negotiating for improved instruction. Also, mentors have to be trustworthy and committed to the mentorship process. Lastly, mentors have to believe in personal and professional development, and be flexible at adjusting their expectations to align with those of their mentees.

Parsloe and Leedham (2009) regard mentoring as a less directive process than coaching, less performance driven and more of an equal relationship between colleagues where the professional development of the 'mentee' is the focus for both parties. In mentorship, the mentee is encouraged to feel more ownership of the process, contributing or even leading the setting of goals and achievement criteria. However, while it may be a more respectful and enabling relationship, for many early years practitioners, mentoring, especially where it is linked to the identification and fulfilling of training needs, is a process run by supervisors, so that while it may be a less overtly directive process, it remains one where they are

required to meet specific goals within specified timeframes and are held accountable if this does not happen. For many practitioners, mentoring remains a performance management tool (McMahon et al., 2016).

One final consideration that must be addressed in the mentoring process lies in which goals are being met. Where goals are management-led and organisational in nature, individuals should be encouraged to see a personal value in achieving them for mentoring to be effective. Where goals are individually led, then the setting will need to see some benefit from supporting these in terms of its own operation. This is the eternal paradox of professional development (Megginson, 2003) in any field persuading an individual to do what their employer wants/needs them to do and persuading an employer to support (financially or in terms of time and other practical measures) the achievement of goals that may seem to have more benefit for the employee than the organisation.

### Purpose of the Study

With the mediocre performance of secondary school Physics candidates in the Cameroon General Certificate of Education Examinations relative to their performances in other science subjects like Biology and Chemistry in recent years (2021-2023) serving as an indicator of ineffectiveness in the teaching of Physics, the researcher intends to investigate the role of mentoring and its influence on Physics teaching effectiveness in secondary schools in the South West Region of Cameroon in a bid to find ways to improve on teaching-learning effectiveness in Cameroon secondary schools. This effort is in the hope that improvements in teaching-learning effectiveness through mentoring will have a ripple effect on learners' success and the economic growth of Cameroon at large. Hopefully, contributions to knowledge derived from this study will be significant to the realisation of emergence of Cameroon by 2035.

### Objective of the Study

This study is undertaken to examine the extent to which mentoring influences the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon.

### Research Question

To what extent does mentoring influence the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon?

### Justification of the Study

The Cameroon education plan (2013-2020) reveals inadequacy in; the role of mentoring teachers and aspiring school leaders in the Cameroon curricula and training programmes, quality and availability of

textbooks, teaching and learning resources, just to mention but a few. However, much of Cameroon's resources (material, financial, and human) have been invested in the secondary education sector due to the increasing number of students at this level nationwide. Hence, as an instructional supervisory technique, mentoring should guarantee effectiveness in teaching and learning in secondary schools as a means to foster productivity and minimise resource wastage for teaching-learning effectiveness is purportedly contingent on the role of mentoring. Also, in line with the desire for Cameroon to experience emergence by 2035 as revealed in the Growth and Employment Strategy Paper (GESP) of 2009, qualified mentors are needed to guarantee effectiveness in the teaching of Physics which remains the backbone of developments in modern technology. Lastly, the influence of mentoring on Physics teaching effectiveness is investigated in this study in anticipation to find ways to improve on the effectiveness of the teaching of Physics in Cameroon secondary schools.

### Significance of the Study

This study may serve the following persons in our contemporary world: policy makers, educational administrators, teachers, students, and other researchers. Firstly, to policy makers, the findings of this study may inform the policy making process by outlining the importance of mentoring in supervising instruction to improve on the effectiveness of the teaching of Physics in secondary schools. Hence, recommendations that inform the policy implementation process may greatly serve in vitalising a new policy or revitalising an existing one. Secondly, the findings of this investigation may stimulate more meaningful training and development of mentors in secondary schools in Cameroon. Thirdly, teachers of educational administration could use this knowledge about mentoring to tailor their teachings more effectively to real-world needs.

To students, the findings of this study could be useful for enhancing commitment, individual and collective decision-making, improving communication, and enhancing the participation of students in innovative processes and change. Such may significantly improve the achievement of education goals. Other researchers may adopt the approach to this study in conducting similar studies in other areas where needs are identified. Also, this study may serve other researchers in getting relevant literature to conduct their research. In addition, the findings of this investigation may corroborate the findings/results made/obtained by other researchers in similar studies.

Lastly, administrators, managers, and educators must recognise that the sources of future technical managers and professionals are shifting and that special educational and training programmes will be required for updating and redirecting their tasks and capabilities. To this end, it is believed that the findings of this investigation will help in providing some of the knowledge needed to meet the needs of our ever-changing world.

### Scope of the Study

This study is limited to the South West Region, which is one of the ten (10) regions of Cameroon. Also, this study is limited to some internal supervisors of instruction (Principals), Physics teachers, and students of the form four class of some forty (40) secondary schools in the South West Region of Cameroon. The schools were chosen from Fako, Meme, Manyu and Kupe Muanenguba which are divisions in the Region. Lastly, this study employed a convergent parallel mixed methods design. This design consists in collecting both quantitative and qualitative data for analysis. For the quantitative part, this study used the cross-sectional survey and the simple correlation designs. On the other hand, for the qualitative part, this study used interviews and the study of pedagogic documents (the form four class council master sheets) to get more details about the role of mentoring and the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon.

### LITERATURE REVIEW

This section reviews literature that is related and relevant to the study under theoretical and empirical reviews.

#### Theoretical Review

The mentoring process was guided by the situational leadership model. This model was propounded by Hersey and Blanchard in 1969 and further developed by Hersey, Blanchard and Johnson in 2001. According to this model, a leader's task behaviour and relationship behaviour interact with subordinate maturity to significantly influence leadership effectiveness (Ebot-Ashu, 2020; Hersey & Blanchard, 1969; 1981; 1984). The task and relationship leadership behaviours are matched with the readiness levels of the mentees to form four main categories/phases which include; telling, selling, participating, and delegating. During the telling phase of the model, the leader/mentor gives instructions and closely supervises mentee (Hersey, 1985; Hersey & Blanchard, 1969; 1981; 1984). At the selling phase, the mentor continues to guide but engages mentee in dialogue. During the participation phase, the mentor shifts from a directive role to encouraging and

communicating. During the last phase, the mentor observes mentee the more, and provides opportunity for mentee to take responsibility and implement tasks. This model fosters growth in the mentor-mentee relationship and thus, can adequately serve in determining the appropriate mentoring technique in the supervision of instruction in different situations. Successful mentors should therefore be those who vary their mentorship styles based on the maturity of their mentees and the complexity of the task to be executed (Raza & Sikandar, 2018).

### Empirical Review

At this level, the researcher reviewed literature according to the research objective of the study.

### The Role of Mentoring and its Influence on the Effectiveness of the Teaching of Physics in secondary schools in the South West Region of Cameroon

To begin with, in the light of the influence of mentoring on the effectiveness of teaching, Abdullah et al. (2020) conducted a research on “Perspectives on Mentoring Support during Teaching Practicum in Local and International Settings”, and published their findings in the International Journal of Leadership, Teaching and Educational Research. The aim of their study was to investigate the mentoring support given by the local and foreign mentors to English language teacher trainees during their teaching practicum. The practicum comprised two phases. In phase one, the trainees experienced a local teaching practicum for one month in Penang, Malaysia. In phase two, they went through an international teaching practicum in Indonesia for two months. The study was informed by Bandura’s 1999 social cognitive theory.

The research design was qualitative. The sample of the qualitative study comprised four respondents from Universiti Sains Malaysia, who voluntarily undertook the international teaching practicum in Jombang, Indonesia. The respondents were all females aged 24. The sampling techniques used in this study were purposive and criterion samplings. The study employed Siedman’s (2013) criteria to determine the sample size (sufficiency and saturation of information). The criteria were; the number of respondents must be representative of the total population and data must reach saturation. The data was collected from reflections and semi-structured interviews and the collected data was analysed using thematic analysis. To ascertain trustworthiness of the study, the six phases of analysis process proposed by Lincoln and Guba as cited in Nowell et al. (2017) were employed.

The findings suggest that in both phases, the mentors cumulatively provided cognitive, affective and, social

support. All types of support significantly augmented the teacher trainees’ competences as future teachers. For cognitive support, the mentees were taught how to plan lessons, pedagogic skills were taught to mentees, and mentees were taught classroom and time management, and assessment. A mentee reported being advised by a mentor in one occasion to reduce the number of objectives targeted for a single period lesson to enhance time management and lesson effectiveness.

Still based on the findings of Abdullah et al. (2020), for the affective support provided by the mentors; mentees confessed having been motivated and given sufficient care by mentors which made them like the practicum exercise. On the basis of social support, mentees enjoyed a collegial relationship with their mentors. As foreigners in Indonesia, the mentees appreciated the hospitality of their mentors which made them saw Indonesia as their second home. As a recommendation, the researchers urged the Ministry of Higher Learning of Malaysia to take heed and reassess the curriculum of teacher training providers at the local universities to cater for the needs of teacher education at all levels.

In this current study, the researcher used two hundred and sixty-five (265) respondents to collect data. This was in a bid to improve on the generalisability of the results of this study as opposed to that of the above reviewed study where research participants were relatively few. In the light of the sampling technique wherein the researchers in the aforementioned study used just the purposive and criterion sampling techniques, in this study, the researcher used the purposive, stratified, and simple random sampling techniques to determine the respondents for the investigation.

Again, while the researchers in the above reviewed study used just the qualitative design for their study, the researcher in this study adopted the mixed research methods wherein both qualitative and quantitative data were collected to get more information about the concepts under investigation. Lastly, while Abdullah et al. (2020) did use only females aged 24 as participant teacher trainees in their study, the researcher in this study used people of different ages, both male and female to mitigate the effects of possible biases such as gender, on the results obtained in this scientific endeavour.

Also, Okumu et al. (2019) published their research findings on the Influence of Mentoring on Teacher Effectiveness in Teaching in Government-aided Secondary Schools in the Acholi Sub-region, in the Journal of Education and Practice. The study investigated the extent to which mentoring services

improve on teachers' instructional processes in government-aided secondary schools. The research used cross sectional survey and mixed methods. Questionnaires and interviews were used to collect data.

Data was collected from 462 secondary school teachers and administrators and analysed using descriptive statistics and Chi-Square frequencies. Of the 48 schools, 42 were selected using Krejcie and Morgan (1970) table of sampling. Respondents were sampled using stratified random sampling and purposive sampling techniques. Self-report techniques were used that included structured questionnaire survey, interviews, and documentary analysis. The questionnaire was 5-point Likert scale rated as strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree. The results showed that: teachers used varieties of reference textbooks in preparing their lessons ( $M = 4.45$ ), however, they found out that up-to-date textbooks were not many in the school, teachers used instructional materials in the teaching-learning process ( $M = 4.28$ ) and teachers involved students in the learning process ( $M = 4.41$ ). According to their findings, teachers were not always willing to make schemes of work unless they were pressurized. Also, some teachers had forgotten lesson planning in their subject areas and did not use varieties of generic teaching methods.

The study concluded that mentoring influenced teacher effectiveness in government-aided secondary schools but teachers were not adequately interested in mentoring. That explains why teachers use poor methods of teaching and thus, poor performance among students. The study recommended that the Ministry of Education and Sports should be empowered to regularly organise appropriate training for teachers and school administrators to scale-up teachers' awareness and skills in mentoring to help improve on teachers' instructional processes in government-aided secondary schools. The current study used the same sampling techniques (stratified random sampling and purposive sampling techniques) to derive its sample size. Just like in the study conducted by Okumu et al. (2019), the findings of this current investigation revealed that some teachers have forgotten lesson planning in their subject areas.

Again, Ali et al. (2018) published a Review of Teacher Coaching and Mentoring Approach in the International Journal of Academic Research in Business and Social Sciences. The review was made in terms of the development of coaching and mentoring in the educational realm, underpinning concepts and implications for teachers' continuous

professional development. The aim of the review was to elucidate the competing notions and issues pertinent to the teacher coaching and mentoring approach. Library research on mainstream journals was carried out to find out recent reviews and meta-analyses of teacher coaching and/or mentoring, empirical studies and complemented by online research on the websites of leading coaching and professional development organisations as well as expert consultants, including researchers and authors of key studies. The review indicated gradual patterns of expansion of teacher coaching and mentoring approach that suit a wide range of educational purposes.

The review also revealed that teacher coaching and mentoring approach is proven to be a promising practice for teacher learning, teacher change and ultimate improvement in students' achievement. According to Ali et al. (2018), the outcome of the review has implications on future studies on teacher coaching and mentoring approach and the needs for more validations on the effectiveness of such approach to enhance teachers' skills, reflective practices and professional development as a whole. Although the approach adopted by Ali et al. differs from that adopted in this current investigation, the findings made in both studies agree in that mentoring influences students' achievement.

Lastly, Petrovska et al. (2018) conducted a research entitled "Mentoring in Teaching Profession" and published their findings in the International Journal of Cognitive Research in Science, Engineering and Education. The goal of the study was to explore what teachers think about mentoring novice teachers in teaching. In line with the stated goal, the researchers attempted answers to the following questions: Are there differences in teachers' views and opinions about the mentoring process regarding their work experience? Does mentoring as a process contribute to teachers' professional development? Are there differences in views and opinions of teachers for the mentoring process regarding their experience and involvement in the mentoring of novice teachers? The results obtained pointed to the weaknesses that the mentoring process in the Republic of Macedonia was facing. Statistically, significant differences at the level of 0.01 were observed in the question where teachers were asked to answer whether the way of mentoring novice teachers in your school contributes to the professional development of mentored teachers. The biggest differences were noted among the responses of teachers with 1-5 years' work experience who believed that mentoring process implemented in their school does not contribute to their professional development.

On the other hand, older teachers (with work experience of 16-25 years) said mentoring partly contributes to their professional development. The findings of this current study reveal that mentoring is not a culture of all secondary schools in Cameroon. Some teachers reported that they do not have mentors. This report was confirmed by some Cameroon secondary school Principals in the South West Region who during an interview, told the researcher that they do not assign mentors to teachers. Findings from the analysis of the quantitative data of this study revealed that the extent to which mentoring influences the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon is 5.2%. Petrovska et al. (2018) argued that although mentoring as a process is regulated by law, in practice there are still inconsistencies in its realisation, both from the aspect of the approach and from the aspect of effectiveness. They recommended that in addition to mentoring; schools should try to offer other forms of support to novice teachers and try to support the teaching profession through a continuous investment (staff and financial).

This literature review has presented the theoretical and empirical reviews used in this investigation. In other words, the theory that informs the mentoring process and related studies conducted and documented by researchers in Africa and other continents have been reviewed to make known the findings and recommendations of those other researchers. Lastly, a résumé of this section is presented to make clear its essence in the write-up.

## RESEARCH METHODOLOGY

This section presents the methodology used for this study and is organized under the following sub headings; research design, area of the study, population of the study, sample and sampling techniques, the instruments used to collect data, validity and reliability of the instruments, administration of the instruments, procedure for data analysis, and ethical considerations.

### Research Design

Generally, the research design of a study is determined by the research question(s) it seeks to answer (Oliver, 2004). This study adopted the convergent parallel mixed methods design. That is both quantitative and qualitative data were collected, analysed separately, and the results were compared to see if the findings confirm or disconfirm each other. Based on the categorisation of quantitative designs by Amin (2005), the quantitative designs employed in this study are the cross-sectional survey and the correlation designs. Even though both designs are descriptive in nature, based on the number of contacts

(one) with the participants of the study and the suitability in finding out the prevalence of a problem by taking a cross-section of the population at one time, the cross-sectional (one-shot or status studies) survey is found to be appropriate for this investigation (Babbie, 1989).

The researcher made use of an interview guide which is characterised by open-ended questions to minimise the limitation in relying only on questionnaire data for analysis. The appropriateness of the cross-sectional survey for this study is based on the fact that with a survey, data can be collected from many subjects especially via the use of questionnaires (Owens, 2002; Amin, 2005). Concepts of correlation studies such as correlation coefficients are employed in data analysis in this investigation. However, in doing so, it is borne in mind that the choice of an appropriate correlation coefficient depends on the nature of the variables (that is, whether they are continuous or not) and also on the subsequent analysis to which the coefficient will be subjected (Nworgu, 1991). Again, the careful study of pedagogic documents such as the form four science class council master sheets (which show students' performance in Physics) served as potential sources of data to evaluate the effectiveness of the teaching of Physics. Lastly, interviews were conducted with some internal instructional supervisors (Principals) of schools which constituted the sample to get more data for this investigation.

### Area of the Study

The area of study considered for this investigation is the South West Region (SWR) of Cameroon. The SWR of Cameroon is found between latitude  $41.16^{\circ}$  N and longitude  $9.23^{\circ}$  E. It has a total surface area of  $25,410 \text{ km}^2$ . As of 2015, the SWR had a total population of about 1,553,320 inhabitants and a population density of about 61 inhabitants/ $\text{km}^2$ . In 2022, the total population of the SWR dropped to about 1,503,000 inhabitants and the population density equally dropped to about 34 inhabitants/ $\text{km}^2$  consequently. The SWR of Cameroon is made up of six (06) divisions namely; Fako, Meme, Manyu, Kupe Muanenguba, Lebiale, and Ndian with Limbe, Kumba, Mamfe, Bangem, Menji, and Mundemba being their respective headquarters. The total number of sub divisions in the SWR is thirty-one (31). The SWR is notable for having the first English-speaking University in Cameroon (University of Buea). It is considered one of the best regions to visit for touristic purposes. The Bimbia Slave Trade Center remains a major attraction to tourists in the SWR. Also, the Korup National Park whose headquarters are located in Mundemba is another major touristic site in the region. Limbe is a popular tourist resort notably for

its fine beaches. All these tourism assets enable local councils generate income from which education benefits either in cash or in kind. Buea, a former political (administrative) capital of Cameroon during the German colonial rule is currently the administrative headquarter of the South West Region.

From the timid beginnings of the Saint Joseph's College at Bonjongo - Buea, in 1937 which was later moved to Sasse - Buea, in 1939 by the Mill Hill Missionaries, secondary education has expanded and remains a major phase of formal education in the SWR. Today, secondary schools are created in all the subdivisions in the region (Draft Document of the Sector Wide Approach to education in Cameroon, 2006). Thus, secondary education is today part of life of most if not all families in the SWR as parents for the most part endeavour to fulfil their responsibility in educating their children even during challenging moments nowadays.

### Population of the Study

The population of the study comprised Principals, Vice Principals, and Physics teachers of secondary schools in the SWR of Cameroon. There are 372 secondary schools in the SWR of Cameroon. Of this total number, only 114 secondary schools in which Physics is taught were operational for the 2022/2023 academic year. The target population was 646 (i.e., a total of 114 Principals, 279 Vice Principals and 253 Physics teachers). The statistics were provided by the service of School Map, in collaboration with the Science Inspectorate of the Regional Delegation of Secondary Education (RDSE) for the South West Region, Buea. The accessible population comprised all Physics teachers and Principals (internal instructional supervisors) of the forty secondary schools from which the sample size was derived. Since each of the forty schools has just one Principal and only one internal instructional supervisor was required per school, the equality in number of Principals per school makes unnecessary its tabulation especially for the fact that at the time of data collection, all the forty schools had Principals. Thus, the total number of accessible Principals was forty (40). Excluding the total number of form four Physics students, the accessible population is 189 (40 Principals + 149 Physics teachers).

### Sample Size

The sample for this investigation was derived from the accessible population of the study. The sample for the survey comprised fifty (50) form four Physics teachers and two hundred (200) form four Physics students selected from the forty secondary schools in the South West Region of Cameroon. These teachers and students constituted the respondents for the

questionnaires developed to collect quantitative data. A sample size of 250 respondents for the survey satisfies the Krejcie and Morgan size estimation for the finite population when standard (normal) deviation from the mean is set at 95 % confidence level. For the qualitative part of the study, fifteen (15) internal supervisors of instruction from the forty schools constituted the sample for the investigation. This sample was judged to be sufficiently representative of the total population for a design that intends to get an in-depth knowledge of the situation on the ground. The above fifteen internal supervisors of instruction are those that participated in the interview designed for the study. Equally, this sample was chosen with a foreknowledge of the subsequent analysis to which the data obtained through this qualitative design would be subjected.

### Sampling Procedures/Techniques

In a bid to have a more accessible population, the South West Region was chosen for the investigation. Thereafter, the simple random sampling technique was used to select four divisions in the region. In this random selection, all the six divisions of the region were each written on a small paper piece and all the paper pieces were twisted, shuffled, and thrown on a table surface.

Thereafter, the stratified sampling technique (the case where stratified sample size is proportionate to the stratum size) which is a type of probability sampling procedure was employed to select the school types and the sample size from each stratum/category of school (public, confessional (mixed and single-sex), and lay private schools). Again, the simple random sampling technique was used to select the schools to generate the sample for this study.

Also, the purposive (or judgmental) sampling which is a type of non-probability sampling technique was used to select the principals (base on availability and volition to participate in the interview) and to replace the Physics teachers who were not willing to participate in the research, and consequently their students. Furthermore, systematic sampling (another type of probability sampling) was employed to select the four form four Physics students per teacher who constituted respondents for the research. This was done by asking students who demonstrated volition to participate in the research to count by calling their numbers from one to the possible maximum.

It is worth mentioning that the randomisation (simple random sampling) employed at different levels to derive the sample for this study was an attempt to minimise the effects of extraneous variables/covariates on teaching effectiveness of Physics (the dependent/criterion variable) in this

scientific endeavour. More to it, the probabilistic (simple random) sampling and the non-probabilistic (purposive) sampling used at different stages in this study constitute an attempt to employ methodological triangulation, intended to use the strengths of each method to overcome the deficiencies of the exclusive reliance on one method (technique) of sampling.

### **Data Collection Instruments**

For the quantitative part of the study, in a bid to obtain information from as many subjects as possible, a structured questionnaire of eighteen (18) items was developed to serve a total of fifty (50) form four Physics teachers. Also, another structured questionnaire of ten (10) items was developed to serve a total of two hundred (200) form four Physics students. So, the total number of copies of the questionnaires administered was two hundred and fifty (250).

To collect data for the qualitative part of the study, an interview guide of four (04) items with follow up questions for probing was developed for interviews with some Principals of the sampled schools. In addition, the 2022/2023 academic year form four class council master sheets/booklets of schools whose principals were interviewed were consulted to get details of students' performance in Physics.

### **Questionnaires (for form four Physics teachers and students)**

The questionnaire items are grouped into two main sections. The first section (section I) is concerned with personal data such as gender and age. Thus, section I comprised two items for teachers and students designed to provide demographic data from which the gender proportions of questionnaire respondents were determined (55.2% males and 44.8% females, calculated from sample frame work). Section II for teachers' questionnaire contains closed-ended items related to the research question. For the students' questionnaire, section II has ten closed-ended items all based on the effectiveness of the teaching of Physics. The questionnaires are the Likert-type constructed by the researcher. They consist in statements about what is to be measured and a set of graduated response options which enabled respondents indicate their degree of agreement or disagreement with the statements in the light of their school life.

### **The Interview Guide (for Principals)**

The interview guide is divided into two sections (A and B). Each section contains two main questions and some other probing questions that seek for in-depth knowledge about the role of mentoring and the effectiveness of the teaching of Physics in secondary schools.

### **Administration of Research Instruments**

The researcher used the Direct Delivery Technique (DDT) also described as face-to-face technique (Owens, 2002) for data collection. This method warranted the researcher to conduct the interviews and distribute the questionnaires to the respondents personally. That was done in the hope that the approach will yield a high return rate of questionnaires and interview data will be reliable to some extent since the researcher got the data directly from the interviewees. Also, the researcher made use of the internet to administer questionnaires to the few teachers and students in Manyu and Kupe Muanenguba divisions who participated in the study.

### **Questionnaires**

In Fako and Meme divisions, the researcher moved from one school to the other and administered questionnaires to both teachers and students. This approach enabled the researcher to have a 100 % return rate of questionnaires in the schools that constituted the sample in Fako and Meme divisions. Also, it is worth mentioning that in all the schools that the researcher visited, the questionnaire for students was administered by the researcher in the absence of the Physics teachers. This was a strategy adopted by the researcher to eliminate teachers' influence on students' responses. In Manyu and Kupe Muanenguba divisions, questionnaires were sent electronically via phone. Questionnaire for teachers were sent directly to the teachers. Contrarily, questionnaire for students of the teachers in Manyu and Kupe Muanenguba divisions who participated in the study were sent to teachers of other departments in the schools, with whom the researcher negotiated to serve in printing and administering the questionnaire to the students in the absence of their Physics teachers. This technique was employed by the researcher in an effort to prevent Physics teachers from administering questionnaire that seeks to know the opinions of their students about their effectiveness (for the presence of the Physics teacher may likely influence the responses of their students). Otherwise, the responses of the students may influence their teacher's behaviour thereafter, if not immediately.

### **Interview**

Logically for interviews, only school Principals whose form four Physics teacher (s) and students participated in the study were interviewed. For the purpose of reliability and constrained by inaccessibility and unavailability, the researcher conducted interviews only with some instructional supervisors in Fako and Meme divisions. Again, with the intention to get an in-depth understanding of the role of mentoring and its influence on the



effectiveness of the teaching of Physics in the secondary schools that constituted the sample, fifteen (15) Principals were judged to be sufficient for interviews.

Lastly, still for the qualitative part of the investigation, the researcher studied the form four science class pedagogic documents (students' progress report booklets/class council master sheets) for the 2022/2023 school year of the schools whose principals were interviewed. The findings derived from the study of pedagogic documents were expected to complement or support the findings on teaching-learning effectiveness in our contemporary secondary schools obtained from interview data and the analysis of the questionnaires. However, contrasting results were revealed in some aspects.

### **Validation of Instruments**

Validation underscores the process of establishing certainty about the validity and reliability of the research instruments (questionnaires and interview guide). Validity refers to the extent to which the instruments serve the purpose for which they are designed. In other words, validity refers to the appropriateness of the instruments. The validation of the research instruments is in two categories (or phases). Which include, face validity and content validity.

### **Questionnaires**

For this study, the questionnaires were first presented to some colleagues, and then to the thesis supervisors for approval of legibility of contents of the questionnaires and also for endorsement of the general presentation of questionnaire items and the guides provided to respondents. This exercise was meant to serve for face validity of the questionnaires. In addition, the researcher also presented the questionnaires to some other lecturers of the Department of Education for face validity before taking them to the field. For content validity, the supervisors and some lecturers spared several precious minutes of theirs to scan through the items of the questionnaires, making judgments on whether the items span the entire content area intended in the study or what content area needed inclusion if at all left out. Some corrections and modifications were made on the questionnaires which were effected before the questionnaires were administered in schools.

### **Interview**

For the qualitative approach to this investigation, to ensure validity, triangulation of data sources was done by the researcher. That is themes were established based on converging different sources of data. For example, data from interviews and class

council master sheets. Also, the use of external auditors (distinct from peer debriefers) to review the entire project/research is a measure adopted in an effort to ensure the validity of the qualitative approach to this study.

### **Reliability of Instruments**

Reliability is dependability or trustworthiness and in the context of a measuring instrument, it is the degree to which the instrument consistently measures whatever it is measuring. An instrument is reliable, if it produces the same results whenever it is repeatedly used to measure traits or concepts from the same respondents even by other researchers (Amin, 2005). Reliability shows the degree of internal consistency of the instrument and its stability over time.

### **Questionnaires**

To ascertain internal consistency, the split-half reliability procedure was used for pilot testing. The questionnaires were administered once to the appropriate respondents and then, the items were split into two halves (odd number items and even number items). Since split-half reliability procedures require only a single administration of the instruments, certain sources of errors of measurement such as differences in testing (responding to questionnaire) conditions were eliminated.

### **Interview**

For the qualitative approach to this study, to guarantee some degree of reliability, the researcher constantly compared interview data and data obtained from study of documents with given codes to ensure there was no drift in the definition of codes (no shift in the meaning of codes). Also, the researcher negotiated with data analysts who cross-checked the codes for inter-coder agreement. Lastly, the supervisors of this project/research also engaged in thorough cross-checks of codes for inter-coder agreement.

### **Methods of Data Analysis**

#### **Quantitative Data (Questionnaires)**

Both descriptive and inferential statistics were used in this study. Descriptive statistics was used to describe data while inferential statistics was used to analyse data collected from the field using questionnaires, in order to verify formulated hypotheses. The predesigned epidata version data base which has an in-built consistency and validation checks was used to enter the data. Data gathered from questionnaire copies were segmented into meaningful analytical units and coded. These codes were generated directly from data examination. The procedure was repeated for all returned questionnaire copies and the responses were then analysed using percentages.

Percentages were calculated with the use of the formula:

### Percentage (%)

$$= \frac{\text{Total number of particular response}}{\text{Sample size}} \times \frac{100}{1}$$

For inferential statistics, the Pearson's Product Moment Correlation, Multiple Linear Regression, and ANOVA were used for the analysis. Correlation is the statistical technique for establishing the extent of relationship or association between two or more variables. When changes in one variable are associated with changes in another variable, the two variables are said to be related, dependent, or correlated. The extent of association, relationship, or correlation between two variables is usually expressed as a coefficient called correlation coefficient.

### Analysis of Qualitative Data (Interviews and Documents)

For analysis of qualitative data, the thematic approach was adopted. Data was reviewed repeatedly and continually coded. A list of major ideas that surfaced were chronicled. Taped interviews were transcribed verbatim. Field notes and diary entries were regularly reviewed. Data were classified, organised categorically and chronologically. Thematically, the data obtained from study of documents and interviews were segmented and presented in prose (word verbatim).

Particularly for interview transcription, alphabetical codes were assigned to the fifteen secondary schools (O-A) as descriptors for where the interviews were conducted. Interviewees were not referred to using their real names but were assigned codes derived from their role in the interview. For example, PSA was the code for Principal of School A (school number 1) just as PSO was the code for Principal of School O (school number 15). Furthermore, the code was extended with the second part of the code identifying the relevant part of the interview transcript from which the code was derived. Hence, transcript PSEUt101 refers to Principal of School E, utterance number 101. Analogously, transcript PSJUtt202 refers to Principal of School J, utterance number 202 in the interview transcript (Ebot-Ashu, 2014).

### Ethical Considerations

For this investigation, the researcher collected a letter of authorisation from the Head of the Department of Educational Foundations and Administration, Faculty of Education, University of Buea, granting permission to use academic institutions' facilities for research

purposes only. The authorisation letter was duplicated and used to obtain data from the South West Regional Delegation of Secondary Education. The same letter was multiplied and used in different secondary schools to get permission from school heads to collect data with the use of the developed research instruments.

### Quantitative part of the study

A letter was written by the researcher to questionnaire respondents, soliciting their help in completing the questionnaires. This was an effort made by the researcher to guarantee informed consent. In addition, where the respondents expressed doubts, they were given clarifications by the researcher on the purpose of the study and the data collection instrument. Again, the guides on the questionnaires gave respondents some clarifications.

In a bid to ensure confidentiality and anonymity, respondents' names were not required on the questionnaires, but age groups and gender were required. Though form four Physics teachers and students were persuaded to participate in completing the questionnaires, they still reserved the right to decide whether to participate or not. Hence, freedom of choice was ensured.

### Qualitative part of the study

Essentially, for the qualitative approach to this study, it is worth noting that the needs, values, and desires of participants (respondents) were respected. To ensure that, in addition to being articulated in writing, the research objective was articulated verbally to foster understanding by the participants. Principals were persuaded by the researcher to participate in the interview. Also, the participants were informed about all data collection devices and activities. Hence, freedom of choice was ensured.

Again, verbatim transcriptions, written interpretations, and reports were made available to the informants (participants). More also, the informants' rights, interests, and wishes were considered first when choices were being made regarding reporting the data. Lastly, the final decision regarding informant anonymity remained the right of the informants. The research findings are presented in the next section.

### PRESENTATION OF FINDINGS

This section presents the findings of the study on "The Role of Mentoring and its influence on the Effectiveness of the Teaching of Physics in Secondary Schools in the South West Region of Cameroon". The findings are presented based on the research question and hypothesis tested through inferential statistics.

**Research Question: To what extent does Mentoring influence the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon?**

### Research Hypothesis

**Ho<sub>1</sub>:** Mentoring does not significantly influence the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon.

**Ha<sub>1</sub>:** Mentoring significantly influences the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon.

The findings presented in table 1 below show the numbers and corresponding percentages of form four Physics teachers who responded to questionnaire items on mentoring in secondary schools in the SWR of Cameroon.

**Table 1 Distribution of Respondents according to Items on Mentoring**

Items	Stretched				Collapsed	
	SA	A	D	SD	SA/A	D/SD
I have a more experienced colleague as a mentor.	22 44%	14 28%	12 24%	2 4%	36 72%	14 28%
My mentor guides me on how to manage time allocated for a lesson.	7 14%	24 48%	19 38%	0 0%	31 62%	19 38%
My mentor guides me on how to set exams.	13 26%	15 30%	22 44%	0 0%	28 56%	22 44%
My mentor does not provide me with feedback on my performance.	1 2%	20 40%	26 52%	3 6%	21 42%	29 58%
My mentor guides me on how to acquire needed resources for teaching.	11 22%	19 38%	19 38%	1 2%	30 60%	20 40%
My mentor never considers my opinion in making decisions concerning teaching.	1 2%	9 18%	22 44%	18 36%	10 20%	40 80%
My mentor helps me in selecting appropriate teaching methods.	4 8%	23 46%	21 42%	2 4%	27 54%	23 46%
My mentor communicates care for my professional development.	7 14%	25 50%	18 36%	0 0%	32 64%	18 36%
<b>Multiple response set (MRS)</b>	<b>66</b>	<b>149</b>	<b>159</b>	<b>26</b>	<b>215</b>	<b>185</b>
	17%	37%	40%	6%	54%	46%

**Source:** Field Survey, 2023

The findings reveal that majority of the respondents (72%) affirmed that they have more experienced colleagues as mentors whereas 28% of the respondents disagreed with the statement. With majority (72%) respondents agreeing with the statement, it implies that experienced Physics teachers in most schools act as mentors to young and newly recruited Physics teachers for career growth and teaching effectiveness.

Also, majority of the respondents (62%) affirmed that their mentors guide them on how to manage time allocated for a lesson while 38% of the respondents disagreed with that. Likewise, most of the respondents (56%) affirmed that their mentors guide them on how to set exams while 44% of the respondents disagreed with the statement. With majority (62% and 56%) agreeing with these statements, it shows that mentoring plays a vital role in guiding neophytes for them to be effective. On the contrast, majority of the respondents (58%) disagreed with the statement that their mentors do not provide them with feedback on their performance while 42% of the respondents agreed with that.

Furthermore, majority of the respondents (60%) affirmed that their mentors guide them on how to acquire needed resources for teaching while 40% disagreed with that statement. Contrarily, majority of the respondents (80%) disagreed that their mentors never consider their opinion in making decisions concerning teaching while only a few respondents (20%) agreed that their mentors never take their opinions into consideration. With respect to the statement that their mentors help them in selecting appropriate teaching methods, majority of the respondents (54%) affirmed while (46%) of the respondents disagreed with that statement.

Also, majority of the respondents (64%) affirmed that their mentors communicate care for their professional development. Whereas, 36% disagreed with the statement. Generally, based on the respondents' responses to items on mentoring, majority of the respondents (54%) agreed that mentoring contributes/influences the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon whereas 46% disagreed with that.

**Testing of research hypothesis 1**

**Ho<sub>1</sub>:** Mentoring does not significantly influence the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon.

**Ha<sub>1</sub>:** Mentoring significantly influences the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon.

The independent variable in this hypothesis is mentoring while the dependent variable is effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon. The scores of the independent variable were gotten from the responses recorded from the eight items of the four-point Likert scale questionnaire that measured the influence of mentoring. The scores of the dependent variable were gotten from the responses recorded from the students' ten-item questionnaire that measured the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon. The statistical analysis technique used to test this hypothesis was the Pearson Product Moment Correlation analysis.

The results of the analysis are presented in table 2 below. The results reveal that the calculated  $\Gamma_{xy}$  - value of 0.228 is lower than the critical  $\Gamma_{xy}$  - value of 0.288 at 5% (0.05) level of significance with 48 degrees of freedom. Also, the p-value of 0.112 is higher than 0.05. With the result of this analysis, the researcher failed to reject the null hypothesis and concluded that mentoring does not significantly influence the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon. Note that as a rule, the null hypothesis is rejected if the probability value is less than or equal to 5% (p-value  $\leq$  5%) at 5% level of significance. On the contrary, the null hypothesis is not rejected if the probability value is greater than 5% (p-value  $>$  5%), at 5% level of significance.

**Table 2 The Correlation of Mentoring and Effectiveness of the Teaching of Physics in Secondary Schools in the South West Region of Cameroon**

Variables	$\sum X$	$\sum X^2$	$\sum XY$	$\Gamma_{xy}$	p-value
	$\sum Y$	$\sum Y^2$			
Monitoring (X)	1131	26625	35574	<b>0.228</b>	<b>0.112</b>
Effectiveness in teaching of Physics in secondary schools(Y)	1566	49484			
N= 50; *p < 0.05; df(n-2) = 48; critical $\Gamma_{xy}$ = 0.288 *Correlation is significant at the 0.05 level (2-tailed).					

Since according to the results, mentoring does not significantly influence the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon, a further exploration of the correlation coefficient was made which revealed that the  $\Gamma_{xy} = 0.228$  is positive. This indicates that as mentoring improves in secondary schools, the effectiveness of the teaching of Physics in secondary schools will improve. The extent to which mentoring influences the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon is found to be 5.2%.

### **Qualitative analysis of how Mentoring influences the Effectiveness of the Teaching of Physics in secondary schools in the South West Region of Cameroon**

In an effort to have an in-depth knowledge on the role of mentoring in secondary schools in the South West Region of Cameroon, fifteen (15) Principals were interviewed on the same topic. In response to item 1 on the interview guide (see Appendix F), eight (08) Principals admitted that they assign mentors to less experienced Physics teachers (see Appendix F, PSAUtt3-PSHUtt10). One Principal said they assign mentors to less experienced teachers and in addition, they supervise instruction (PSIUtt11). Another Principal admitted to only supervising instruction (PSJUtt12). Uniquely, a Principal reported that they do not assign mentors to teachers but they supervise instruction. "I don't assign mentors but I supervise instruction" (PSKUtt13). The rest of the Principals categorically stated that they do not assign mentors to less experienced teachers (PSLUtt14-PSOUtt17).

Normally, Principals should use certain criteria in appointing mentors. When the Principals who admitted to appointing mentors to less experienced teachers were asked to state the chief criterion they used in appointing mentors (see item 2 on the interview guide), they responded as follows: "Output and longevity in service", "Experience", "Longevity in service", "I use teaching experience", "Longevity", "Experience and output of teachers", "Experience and longevity of teachers", "Experience", and "Being a GCE examiner" (PSAUtt19-PSIUtt27). From their responses, it is obvious that most Principals use the experience of teachers in the teaching profession as chief criterion in appointing mentors. In some secondary schools in Cameroon, Principals believe

that teachers who mark the GCE examinations have some knowledge and technical skills in teaching that most non-GCE examiners would not have. In that regard, the GCE marking experience is used by some Principals in appointing mentors to teachers. However, some Principals do not share in that belief. Rather, they use a teacher's performance (output) and/or longevity in service as the lead criterion in appointing mentors to teachers in the various departments in secondary schools.

Just appointing a teacher to be a mentor to another is fundamentally not sufficient for appointments do not guarantee task execution especially in the secondary school milieu in Cameroon where HOD's who in most cases serve as mentors to less experienced teachers at the level of their departments are not compensated commensurately. On this premise, Principals are expected to do some follow-ups to ensure that mentors mentor their mentees (MMM). To investigate mentoring, item 3 on the interview guide was coined to serve in probing. In response to this item, all the Principals who admitted to appointing mentors affirmed that they do follow-ups to ensure that mentors perform the supervisory tasks assigned them (PSAUtt29-PSIUtt37).

Again, in order to probe even more into the role of mentoring in secondary schools, Principals were asked to explain how such follow-ups are done (see item 4 on the interview guide). In response to this item, the Principals gave the following responses: "Regular meetings with supervisors (heads of departments)", "One-on-one talks with mentors and later with mentees", "One-on-one interactions with mentors", "By evaluating mentee's performance to judge the mentor", "Through regular meetings with mentors and mentees", "Evaluation checks and investigation", "By evaluating the performance of the teachers", "Through team work and other pedagogic tools" and, "By evaluating the effectiveness of mentees" (PSAUtt39-PSIUtt47).

Summarily, from the interviews, it was realised that Principals use meetings with mentors, meetings with mentees, evaluation of mentee's performance as a teacher, and investigations among other things to evaluate the effectiveness of mentorship in their schools. They then use these findings to follow up mentors to perform their tasks as supposed. Hence, while some Principals do not appoint mentors, others do not only appoint, they follow up mentors to ensure that they perform their duties. This qualitative findings support the quantitative results derived from teachers' questionnaire which indicate that while a majority of the teachers admitted that they have mentors, a few of the teachers reported that they do not have mentors. It can therefore be said that in corroborating the quantitative results, the qualitative findings reveal more details on how Principals implement mentoring in secondary schools in the South West Region of Cameroon.

**Table 3 Summary of Findings from Analysis of Questionnaire Data**

Hypothesis	Statistical Tool	Findings
<b>Hypothesis</b> H <sub>01</sub> : Mentoring does not significantly influence the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon.	Pearson Product Moment Correlation	Mentoring does not significantly influence the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon. ( $\Gamma_{xy} = 0.228 < 0.288, p = 0.112 > 0.05$ ). An improvement in mentoring in secondary schools will improve the effectiveness of the teaching of Physics in secondary schools in the South West Region. The null hypothesis was accepted and the alternative hypothesis rejected.

The summary of findings made from the analysis of interview data are presented in table 4 below.

**Table 4 Summary of Findings from Analysis of Interview Data**

SN	Findings
1.	Some secondary school Principals use meetings with mentors and mentees to promote mentorship that helps build teachers' confidence, improve their teaching, and help teachers improve their effectiveness and efficiency in guiding learners' achievements in the school milieu. However, some Principals do not assign mentors to teachers.

This section has presented both quantitative and qualitative findings. The quantitative findings are presented with brief descriptions for clarification. The presentation of qualitative findings succeeds the presentation of quantitative findings to ease comprehension. Also, a summary of findings is tabulated (table 3) for the research hypothesis and statistical tool used in testing the hypothesis for the quantitative part of the study.

For the qualitative part, qualitative data is presented in prose with respect to the research question guiding the study. This presentation is dominated by information directly obtained from the interviews conducted by the

researcher. Table 4 summarizes the findings obtained from analysis of the interview data. However, the finding made from the study of form four science students' class council master sheets of the schools whose Principals were interviewed reveal a less than 50% success in Physics on the average. This finding is in dissonance with the findings made from the analyses of questionnaire and interview data on the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon.

## **DISCUSSION, CONCLUSION AND RECOMMENDATIONS**

This section presents the discussion, conclusion, and recommendations. In this section, findings are discussed based on literature cited in other sections in this write-up. Conclusion is drawn from outcomes of the findings based on the research objectives which are transformed into research questions, and recommendations are made from the findings based on research objectives. Again, in this section, the novelty in this research work is revealed, suggestions for further research are made, and limitations of the study are stated. The discussion begins with the overall research question from which the research hypothesis was developed.

### **Research Question: To what extent does Mentoring influence the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon?**

From the analysis of the eight items of the questionnaire for teachers together with the positive coefficient for mentoring, it is revealed that improvements in mentoring of secondary school Physics teachers will lead to improvements in the effectiveness of the teaching of Physics in secondary schools, all things being equal. In other words, mentoring influences the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon positively. This conclusion stems from the positive coefficient for mentoring, which is in accordance with a priori expectation. Hence, better ways of mentoring would result in improvements in teaching effectiveness in secondary schools all things being equal (Abdullah et al., 2020; Seidman, 2013; Norwell et al., 2017). However, by testing the research hypothesis, the results of this investigation reveal that mentoring does not significantly influence the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon.

With respect to the research question, it was realised that the extent to which mentoring influences the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon is 0.052. This implies that if mentoring improves in secondary schools by one unit, the effectiveness of the teaching of Physics in secondary schools would improve by 0.052 units. This finding is in agreement with the findings made by Abdullah et al. (2020) which hold that all types of support provided to teacher trainees through mentoring significantly augmented the teacher trainee's competences as future teachers (Okumu et al., 2019; Ali et al., 2018; Petrovska et al., 2018). In that light, an improvement in mentoring is found to improve on teacher/teaching effectiveness, all things being equal (Feiman-Nemsa, 1998; Norman & Feiman-Nemsa, 2005; Smith, 2002).

On a general note, mentoring of secondary school Physics teachers is reported to be effective in the South West Region of Cameroon. For the most part, secondary school Physics teachers have more experienced colleagues for mentors, the mentors guide the teachers on how to manage time allocated for a lesson, mentors guide teachers on how to set exams, mentors provide mentees with feedback on their performance, mentors guide mentees on how to acquire needed resources for teaching, mentors consider opinions of mentees in making decisions concerning teaching, mentors help mentees in selecting appropriate teaching methods, and mentors communicate care for mentees' professional development (Murray and Mazur, 2009; Abdullah et al., 2020; Seidman, 2013; Norwell et al., 2017). However, 14 respondents said they do not have more experienced colleagues as mentors. 21 respondents said their mentors do not provide them with feedback on their performance. Also, 10 respondents said their mentors never consider their opinions in making decisions concerning teaching.

Again, based on the findings made by Abdullah et al. (2020), for the affective support provided by the mentors; mentees confessed having been motivated and given sufficient care by mentors which made them like the practicum exercise (Seidman, 2013; Norwell et al., 2017; Hopkins-Thompson, 2000). On the basis of social support, mentees enjoyed a collegial relationship with their mentors (Parsloe & Leedham, 2009). Similarly, the findings of this investigation reveal that secondary school Physics teachers in the South West Region of Cameroon enjoy care for professional development from their mentors, they are guided by mentors on how to manage time allocated for a lesson, and how to set exams among other things. However, unlike the small sample size study conducted by Abdullah et al. in 2020 in which the respondents were only four females aged 24, this study comprised fifty secondary school Physics teachers, two hundred Physics students, and fifteen supervisors of instruction (Principals) of various ages and gender who were all respondents in this study. Hence, the results of this study are more generalisable than those of the small sample size study published in 2020.

Also, Okumu et al. (2019) published their research on the Influence of Mentoring on Teacher Effectiveness in Teaching in Government-aided Secondary Schools in the Acholi Sub-region, in the Journal of Education and Practice. The sample size was derived using the Krejcie and Morgan (1970) table of sampling. Questionnaire, interviews and documentary analysis were employed to collect data. Similarly, this study has used the same instruments to get the sample size and collect data for this investigation. According to Okumu et al., teachers were not always willing to make schemes of work unless they were pressurized. Also, they found out that some teachers had forgotten lesson planning in their subject areas and did not use several teaching methods. The reports of some secondary school Principals in the South West Region of Cameroon in this current study reveal that the lesson plans of some secondary school Physics teachers are poor. Such teachers have certainly not known how to plan their lessons. Otherwise, this report simply confirms the assertion made by Okumu et al. that some teachers had forgotten lesson planning in their subject areas.

According to McMahon et al. (2016), mentoring is usually undertaken by a more experienced member of staff from the setting, who is able to guide and offer support to a less experienced member. In their opinion, to maximize goal achievement in the mentoring process, accurate records and a commitment to action from both the mentor and the mentee is essential (Sullivan & Glanz, 2000). Unfortunately, 21 of the secondary school Physics teachers in the South West Region of Cameroon said their mentors do not provide them with feedback on their performance. This is an indication of poor commitment on the side of mentors in helping their mentees. Hence, such mentors need to work on this weakness to guarantee a good level of success in mentorship.

Failure by some mentors to provide feedback to mentees can have varying levels of consequences on the mentees depending on the category of mentee a mentor is mentoring. Based on the postulates of the situational leadership model, the mentor/supervisor should be able to adjust their mentorship/supervisory approach to nurture growth and development in the mentee/supervisee, circumstances notwithstanding (Hersey & Banchard, 1981). Thus, a mentor should bear in mind that the consequences of not providing feedback to a beginning teacher may differ from the consequences of the same action on a mid-career or a veteran teacher. Hence, mentors must do their utmost to know their mentees and contribute significantly to their professional growth and development within the shortest time interval provided (Hersey, 1997).

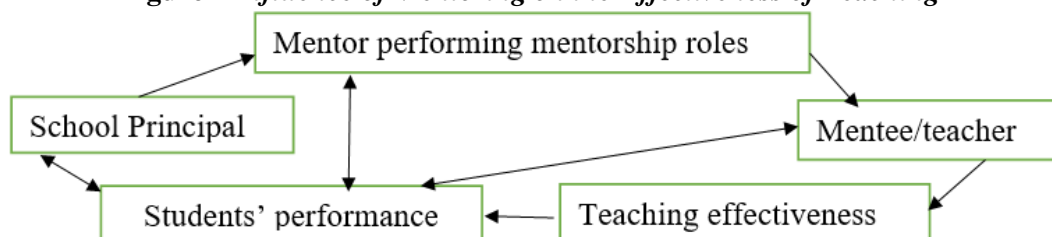
### Conclusion and Contributions to Knowledge/Literature

Here, research findings are concluded based on the research objectives. A conceptual diagram is developed for the overall research question coined from the research objective.

### The extent to which mentoring influences the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon

Figure 1 below illustrates how mentoring is initiated and how it influences the effectiveness of the teaching process in the secondary school milieu. The figure depicts the school head/Principal as the local authority responsible for appointing mentors. Mentors have specific roles to play in enhancing the professional development of mentees. In doing so, they serve as models/leaders to their mentees and so, they are expected to study their mentees' level of professional development (beginner, mid-career, or veteran teachers) and apply the appropriate supervisory style (telling or directive, participatory or collaborative, and delegating or non-directive style) in the mentor-mentee relationship in a bid to promote professional growth (Hersey & Blanchard, 1988).

**Figure 1 Influence of Mentoring on the Effectiveness of Teaching**



Source: Researcher's Conception

Figure 1 above illustrates the influence of mentoring on the effectiveness of teaching in secondary schools. The single-headed arrows indicate performance direction. For example, the school Principal appoints mentor who performs mentorship roles on mentee. The mentee teaches and their teaching methods

determine teaching effectiveness. Also, teaching effectiveness determines students' performance. On the other hand, the double-headed arrows indicate flow of feedback. For example, students' performance would provide the Principal, the mentor, and the mentee with feedback on the effectiveness of

teaching. The feedback would determine what actions are required to improve on the chain of relationships to improve on students' performance which is a reflection of the attainment of education goals and objectives.

With most secondary school Physics teachers having more experienced colleagues as mentors, and mentors performing mentorship roles such as; guiding the teachers on how to manage time allocated for a lesson, guiding teachers on how to set exams, providing mentees with feedback on their performance, guiding mentees on how to acquire needed resources for teaching, considering opinions of mentees in making decisions concerning teaching, helping mentees in selecting appropriate teaching methods, and communicating care for mentees' professional development, one can conclude that mentoring is effective in secondary schools in the South West Region of Cameroon especially for the subject Physics. According to the findings of this investigation, mentoring influences the effectiveness of the teaching of Physics in secondary schools in the South West Region of Cameroon positively. This conclusion stems from the positive coefficient for mentoring which is in accordance with a priori expectation. Hence, better ways of mentoring would result in improvements in teaching effectiveness in secondary schools all things being equal.

### Recommendations

Based on the objective of this study and the findings made from the analysis of the data gathered from the field, the following recommendations are made:

Interviews reveal that some secondary school Principals in the South West Region of Cameroon do not appoint/assign mentors to teachers. This was confirmed by questionnaire data obtained from teachers. Such Principals rather make efforts to supervise instruction and mentor the teachers they can. Given the large number of secondary school teachers in every single school especially in semi-urban and urban centres, the supervision task is generally huge for a single person. Also, given that secondary school heads just like other school personnel would in most cases be experts only in certain subjects, Principals, V.P's (Deans of study), and HOD's should always appoint/assign mentors to teachers in a bid to assist them in the supervision of the teaching-learning process to achieve the goals of education. In addition, Principals should organise follow-up meetings with mentors and mentees in different occasions but on regular basis, to evaluate how well mentors are performing their roles in mentoring mentees.

### Limitations of the Study

The conclusions derived from the findings of this investigation may fall short of generalisability or applicability to all Cameroon secondary schools as well as to other schools in or out of Cameroon due to the following:

- A. The sample was not representative enough because of the small population used owing to the challenges encountered in accessing some schools and meeting with school Principals and teachers during the process of data collection. To overcome this limitation, the researcher used mobile telephones and social media platforms (WhatsApp groups) to contact teachers in far places like Bangem and Mamfe. Also, Principals who were not available or not willing to participate in the research were replaced with other Principals of participating schools who were willing to be interviewed.
- B. Bias was minimised but could not have been totally eliminated in the data provided because, even though confidentiality was ensured in the data collection process and the respondents were told that the purpose of the research was purely academic, some might still have provided responses in favour of their schools. To surmount this challenge, various instruments were employed in collecting data so that the effect of the weakness of one instrument on the reliability of the data collected would be mitigated by the strength of another.
- C. The purposive (or judgmental) sampling technique was employed in selecting Principals for interviews with unavailability serving as a criterion for replacement. This technique to an extent, reduces the reliability of the research findings. However, its effect on the reliability of the research findings was mitigated by the randomisation employed in the selection of students who participated in the research.
- D. The exclusion of other instruments (observation guides and checklists) for data collection in this investigation makes the findings less exhaustive to an extent. However, the methodological approach (mixed methods) which embraced the use of questionnaires, interview guide, and the study of academic documents to obtain data for this investigation gave this study a profound depth. For example, while the analysis of questionnaire data and interview reports reveal that the teaching of Physics in secondary schools in the South West Region of Cameroon is effective, results of the analysis of data derived from the study of pedagogic documents question



the effectiveness implied thereof as teaching effectiveness should imply learning effectiveness which is reflected in students' achievement, all things being equal.

### Suggestions for Further Research

The following investigations could be carried out to identify other ways to improve on the effectiveness of the teaching of Physics in Cameroon secondary schools and universities.

1. The effectiveness of the teaching of Physics in Cameroon secondary schools and its impact on students' career choices.
2. State University Physics teaching effectiveness and its contributions towards emergence of Cameroon.

### Summary

This study has presented an introduction to the investigation, statement of the problem, purpose of the study, the objective of the study and the research question, justification of the study, significance of the study, and scope of the study. Relevant literature has been reviewed and research methodology discussed in details. Findings have been presented and discussion was guided by literature cited in this study. Discussion was based on the research hypothesis. In addition, conclusion and contributions to knowledge were made based on the findings and guided by the objectives of the study.

Also, two feasible recommendations that can be implemented within a short period of time have been made based on research findings and objective of the study. Again, as a contribution to literature, a model has been proposed for studying the influence of mentoring on the effectiveness of the teaching and learning of Physics as a way to improve on students' achievement. Furthermore, limitations of the study have been stated and suggestions for further research made.

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