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Supervision of Science Teaching in Secondary Schools in Rivers State – A Rethink and Application of Scientific Supervision Model (Stoner, Freeman & Gilbert 2007)

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

The paper examined the current practice of schools' supervision in Rivers State as applied to science teaching/learning. Based on the nature of science teaching which involves experimentation, demonstration, fieldtrip, guided inquiring, use of process skills and laboratory methods. The use of Personnel Supervision Model (PSM) is inadequate, exclusively for science teachers for lack of integration of supervision with respect to areas of specialization; inability to probe teacher creativity, use of process skills and verification of products of science hence supervisors should differentiate supervision strategy between the social and management science subjects from that of pure sciences. It is suggested that the Scientific Supervision Model [1] be used to assess teaching and learning of science in order to inject adequate behavioral change among supervisees and anchor science supervision specialty-specific. The Model offers probe of instructional methods, processes

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and management of personnel in science. Supervisors for science teaching should be trained on the proposed Scientific Supervision Model (SSM) modified for Science Supervision in Secondary Schools.

Keywords: Supervision; science; model; supervisee; specialization.

1. INTRODUCTION

An important component of the essential model for making education viable proposed by Nnabuo [2] is the administration/personnel control by way of utilizing the monitoring device to achieve control of personnel. A practicing School supervisor apply administrative theories to systematically organize ideas to reality. The focus of management theory X and Y of human management in organization is comparative and based on expectation. Theory Y by implication has some levels of optimism that a teacher whose primary objective is to impact knowledge on learners and certify by evaluation that there are cogent evidences of behavioural change in the learner, has the ability to work effectively while theory X maintain that the functionality of an individual in a social system is a product of transaction between the personal and institutional factors. The bargain of institutional factors should motivate (not depress) on the curiosity to perform – This means creating an enabling environment for teacher commitment on the job, such as supply of teaching materials, spacious classrooms, school climate and conduciveness for instruction and improvement on the curriculum [3].

What has periodic negative influence on the outcomes of attaining school goals is the attitude of teachers and non-provision of school needs. This has adversely affected teacher's qualitative and quantitative instructional delivery. Teachers attitude that negates improvement in their productivity levels include absenteeism, irresponsibility towards content-delivery, poor application of teaching methods and lack of interest. Most teachers who pose loss of interest in their career, point at lack of adequate motivation over prolonged owing of teachers allowances and implementation of promotions, neglect of teacher professional development, often checks are placed on teachers of high academic repute to know if they have effectively done their jobs through supervision. The ministry of education through her subordinate units sees this duty as sacrosanct [4,5]. The drive has increased in recent times to victimize or maybe correct teacher misdemeanor, hinged on absenteeism or Gnosticism than the technicality of job performance and knowledge importation either lacking professionalism to detect whether the imparted knowledge is holistic by teachers ineptitude and inadequate pedagogical content knowledge.

Ngwenya [6] developed a clinical school based model of supervision which was pragmatic and development oriented. The purpose of this model is to closely assess teachers' engagement and practices hinged on control, compliance, predictability and accountability. The school – based supervision model is mainly aimed at facilitating effective and efficient teaching and learning, the internal and external supervision of teachers are tailored to ensure teacher compliance with the curriculum (scheme of work), evaluation methods, school hygiene and morality questions. The supervisors more often ensure evidences of teaching and learning, teaching capability of using the provided technical assistance in teaching in terms of teaching methods and use of instructional materials, where there is need, it ensures training of in-service teachers through mentoring, provided by the more experienced in service. School – based supervision is expected to involve staff development and harnessing of the quality and quantity of the potentials which lies in teachers [7].

1.1 Science Education and Supervision in Secondary Schools

Idoko [8] defined science education as that aspect of education that is concerned with sharing science content and processes. The content of science is verse. They are theories, laws and principles, to interrelated or interdisciplinary concepts while the science process skills as highlighted by Onwioduokit, [9]. Involves observation, identifying and describing problems, categorization / classification, hypothesizing, experimenting, interpreting the experimental results, making conclusions and drawing inferences among others Process of science teaching/learning involves use of

instructional materials, conceptual knowledge impartation and emulation adopting teaching methods and strategies. Supervision in science will not be adjudged adequate if students and teachers are not probed in their use of the science process skills in the classroom/laboratory in such a manner that conforms to policy and ethics.

Teacher supervision in the science does not differ from the routine, personnel-based supervision in common practice, whereby supervisors make candid submission of recital or report materials, such as lesson notes, diaries, students note book and the copies of the curriculum or scheme of work. The supervisee hurriedly puts some of these documents update for more citing, in fear of threat and demotion unceremoniously of teachers [10]. This is grossly inadequate and not encouraging in this era of science knowledge explosion and contemporary interventions in improving teaching and learning of science. The advocacy for a specialized science supervision should allow for comparison of teachers concepts delivery with curriculum provisions, to avoid selective teaching/learning; provision of teachers' log book showing experimentation versus concepts, defined teacher-student activities in order to expel indolence among learners who now would do science rather than rote. It would arouse creativity amongst learners due to their active participation in learning and practice of scientific attitude and methods especially in the stages of experimentation, observation, hypothesizing, differencing and predicting required for the making of a scientist.

1.2 Supervision and Science Instruction

The traditional supervision method over the years seeks to improve the engagement of teachers and responsiveness, towards classroom instruction. It is against this background that several models of supervision are developed. The science teaching in schools involves teaching with experimentation especially for subject as Physics, Chemistry, and Biology. The traditional supervision model lacked integration of supervision according to the areas of specialization [11]. If in the course of supervision, and the area of specialization is not followed, then the supervision done will not be effective and thorough. The author's idea was strongly influenced by the Scientific Supervision Model propounded by Taylor amongst other educational Psychologist Stoner, Freeman and Gilbert [1]. Teachers have different specialty, it is disturbing to use same standard across professions. Supervision of teachers in Science should involve:

1. Teacher competencies in concept delivery,
2. Contextual evidences of teacher performance, goal attainment, in science.
3. Teacher use of experimentation and process skills.
4. Teacher successful accomplishment of important and meaningful work as component of school effectiveness [7].
5. Teacher use of process skills and conversance in problem solving and experimentation as lead methods of science instruction.

The criticism on the traditional supervision system practiced amongst school supervisors in the research area is their total reliance on the Informal Supervision Model (ISM) which has created a slow, routine and ineffective school based supervision. The model explains that in the practice of supervision, supervisors meet casually with teachers in a group or individual to discuss work-related issues without encroaching on their levels of professionalism and privacy [12], more so using the yardstick proposal to measure their competencies.

The generalization of the method of supervision across subject areas leave supervisors using strict adherence with their bureaucratic procedures and accountability over the years [13] hence there should be a need to develop a Science Supervision Package (SSP) which delineates supervision of social and business studies from those of the pure sciences. Furthermore, contemporary supervisors have been criticized for lack of thoroughness, lack of regularity and quality, judgmental, incompetent, tending to hostility and irresponsibility to questions in the teaching of concepts in science vis-à-vis, the goals of science education [14]. The researcher for see that the process of science teaching should meet the expectation of learners and other observers in terms of teacher, professionalism, content knowledge, readiness to evaluation of students/learner then supervision, as detailed in Table 1.

Table 1 and the proposed scientific supervision science model is based on cognitive – behavioral techniques in which teacher/supervisee interact with supervisors. This person–centered supervision allow the supervisor to collaborate

and provide an environment in which the supervisee can be open to his/her experience [15].

1.3 Benefits of Application of the Proposed Scientific Supervision Model (SSM)

The benefits of SSM are enormous but anchored on effective curriculum implementation through activity learning involving learner and, supervisee, leaving satisfactory supervision. It improves learning of science by experimentation and process learning skills; it rejuvenates teacher interest in creativity and exploratory knowledge research and makes science instruction, worthwhile. It agrees with Martins (2010), view that supervisors and teachers must work cooperatively to find out how valid the progress made in course of instruction with respect to school goals are maintained. The advantage, of overseeing performance of supervisee under control of management, as to measure intensiveness of instruction and policy. A suggestion to modify the Science Supervision Model for effective science teachers' supervision in secondary schools is shown in Fig. 1.

Table 1. Expectancy of effective science teaching on supervision

1. Teacher professionalism (TP)	1. Do you have a teaching professional certificate? 2. Do you attend regular workshops and seminars in science education? 3. Do you retain membership of professional organization in education? 4. Do you receive any support to develop professionally? 5. Do you have the preparedness to teach the content?
2. Teacher content knowledge (TCK)	6. Do you see the need to adopt teaching methods adequate to deliver the concepts? 7. Do you have the enabling environment in terms of acquisition of exploratory knowledge of the content? 8. Do you discover misconceptions and content of the concepts? 9. Do you have understanding/application of concepts built-in during teaching and learning (adoption of strategies) 10. Can the concept before discussed experimentally?
3. Student evaluation (SE)	1. Do students have the capacity to learn? 2. Do you invoke students' interest and responsive attitude towards learning using appropriate teaching strategies? 3. Do you evaluate students' responses? 4. Do students experimentally prove concepts, by active participation in practical/field works?
4. Supervision	5. Do I have the necessity for supervision in terms of entries? 6. Do I have evidences of teaching/learning? 7. Do the class have support of the presentable claims? 8. Do internal supervision, show assiduousness and use of materials?

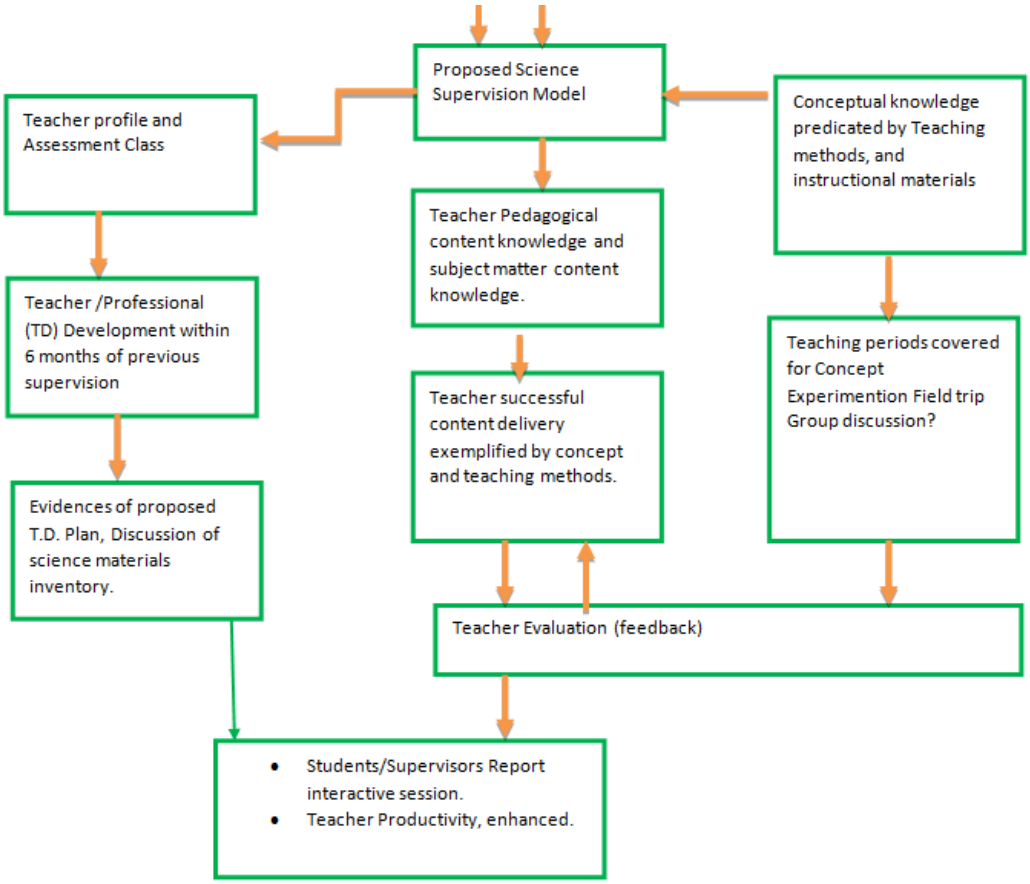

Fig. 1. Proposed Science Supervision Model (Adopted: Stoner, Freeman & Gilbert, 2007)

1.4 Blue Print Science Teachers Performance Guide via Supervision

The essence of a model is to provide testable operational frame work and guide to identify elements, ideas and priorities to achieve a goal. The blue print of Science teachers' performance is deductive, and measures the aptitude, commitment and practice for supervisors to actually carryout meaningful supervision in the science.

2. CONCLUSION

The Personnel-Supervision Model adopted in secondary schools in the research area lacked integration of supervision based on areas of supervisee's specialization hence it has become difficult to evaluate teachers effective teaching/learning in the Science. The Science teaching methods are complemented by experimentation, field study and project methods vis-à-vis specific learning objectives and content. Any supervision that does not pry into what the teacher does in the content and processes of science is deemed inadequate hence the advocacy for adoption n of the Scientific Supervision Model (SSM) for secondary school supervision. The model according to Stoner, Freeman & Gilbert [1] is subject specific, allow supervisors to interact with materials, man and results of experimentation in science concepts delivery and assess the extent of progress of scientific discourse at the secondary school level.

3. RECOMMENDATIONS

The following recommendations are made:

1. Supervision in schools should be subject area specific that is science/arts, divides in secondary schools.
2. The Scientific Supervision Model (SSM), should be adopted in secondary schools for science teachers. It improves readiness and content knowledge, use of science process skills and active participation of students/learners in the learning process.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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