A Proposed Evaluation Technique for Computer Science Studies in Primary and Secondary Schools

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Abstract

Education in Nigeria is an instrument for effecting the development of its citizens in particular, and the nation in general. Operators of education at the primary and secondary levels need to constantly engage in such a process that systematically and objectively determine the relevance, effectiveness and impact of activities at these levels in the light of the stated objectives. The teaching process is not complete without one form of evaluation or the order, as it helps the teacher and other stakeholders in determining the effectiveness of their teaching-learning process. The paper proposes a revolutionary approach to the evaluation of students at both primary and secondary schools. The procedure being proposed takes on more the characteristics of a survey designed to assess not just the achievements of students, the course and the programme, but also the effectiveness of the teachers who form a major part of the whole education machinery.

Keywords

Evaluation; Regurgitation; Competition; Entrenchment; Summative; Teacher evaluation.

Introduction

In [1], the need for the introduction of computer science as a subject for study in our

(public) primary and secondary schools was well highlighted and presented. This paper is a further attempt to contribute to the entrenchment of computer science studies as an integral part of our primary and secondary school system.

Several scholars [2, 3, 4, 5] among others, have been engaged in work which does not only emphasize the need for a proper student evaluation, but also of the evaluation of teacher education as well.

As expressed in [6], education in Nigeria is an instrument for effecting the development of its citizens in particular, and the nation in general. It is believed that education fosters the worth and development of the individual, for each individual's sake, and for the general development of the society.

With the above premise as a basis, the National Policy on Education [7] quite clearly and without ambiguity, spells out the philosophy and objects that derives government's massive investments in education in general and at the primary and secondary levels in particular. At these levels of education, each programme, course, and unit and topic has its objectives that it hopes to achieve. Periodically assess what is being done in order to ascertain if these objectives are being met is needed. Such an assessment would assist the operators of education at these levels to decide whether their current approaches should be developed, improved upon or discarded altogether [8].

Operators of education at the primary and secondary levels need to constantly engage in such a process that systematically and objectively determine the relevance, effectiveness and impact of activities at these levels in the light of the stated objectives. Such a process is what is known as "Evaluation".

A substantial part of the evaluation technique presented in this paper, were first introduced in [9] for evaluating Social Studies. What we have done, is to expand them and adapt them towards the evaluation of Computer Science studies.

The Place of Evaluation in Education

A number of notable authors have variously defined evaluation in several different ways [4, 9, 10, 11, 12]. In [6], the evaluation was simply defined as the systematic process of gathering, selecting analyzing, and reporting valid information on the attainment of

educational goals and objectives in order to facilitate correct adjudication on the effectiveness of teaching method(s) or an educational programme. The symbiosis between teaching and evaluation in the process of education is well documented in [13]. No matter how good the teacher, no matter how gifted the pupil, no matter how effective the audio-visual aid, if no provision is made for a process by which the whole teacher-student interaction can be assessed, then the educational efforts may be seriously undermined.

Therefore, it is obvious that no teaching process is complete without one form of evaluation or the order, as it helps the teacher and other stakeholders in determining the effectiveness of their teaching-learning process. Evaluation is therefore used to collect information about a particular method of instruction, a single classroom lesson, and a complete course of study, teaching-learning environment, available facilities and the entire education system. Evaluation induced decisions, could lead to the continuation, termination or modification of these various components of educational programme or it may lead to the development and possible adoption of new programmes.

From these various definitions, we see that the major features of educational evaluation include the following:

- It is systematic
- It is a continuous process
- It involves educational goals and objectives
- Information is gathered, sorted, analyzed and reported
- It involves decision making
- It is judgmental.

Evaluation in education, usually involves four major steps:

- Classification of objectives
- Getting evidence on changes
- Summarizing and interpreting the evidence gathered
- Use of information for judgment and decision making

Types of Evaluation

In the educational system, evaluation is usually carried out at two major levels, namely:

- Student level

- Programme level

No place is provided at all for the evaluation of teacher effectiveness by those who are in the best position to do so (the students and fellow teachers). To correct this anomaly, it was proposed in [14] that for a proper evaluation to be seen to have been conducted, it must be carried out at the following levels:

- Student

- Teacher

- Programme

Evaluation at the level of students is targeted at ascertaining how well they are gaining both knowledge and skills in the programme. It is not purposed to afford the students an opportunity to display their ability to regurgitate ideas learnt in class. The evaluation proposed in this paper is summative in nature. It involves asking the students what they have learnt and this self evaluation would give each student the opportunity to describe what he/she has actually learnt in an open-ended way. It is based on the fact that students often learn different things and at different rates, even though they have been exposed to the same lesson. Evaluation at the teacher level, is based on the fact that if a teachers should be faced with the realization that their continued employment and promotion would partly be based on the evaluation of their performance by their students (who remain anonymous), and colleagues, then they would be forced to give their best in class. Three forms are presented, for the formal gathering of information on teacher performance. Each is meant to be completed by individuals who bring different perspectives to the class; the teacher of the lesson, the students receiving the lesson and colleagues of the teacher. On the other hand, evaluation at the programme level aims at determining whether or not a programme has been well implemented and if its objectives are being attained. This evaluation takes on more the characteristics of a survey designed to assess achievements of programme objectives, not classroom objectives and is designed to sample learner's understanding and ability across groups and geographical areas, to guide curriculum improvement. Cognitive knowledge, skills, capabilities and learner's attitudes in line with programme objectives, are assessed in this evaluation.

Proposed Evaluation Techniques

Ordinarily, there are different techniques that are employed in educational evaluation. They include:

- Written test

- Observation

- Interview

- Questionnaires

Some of these techniques focus on the cognitive, affective and psychomotor domains of the individuals involved while others focus on the teaching and learning conditions, materials and processes.

However, in this paper, it is our aim to discourage regurgitation and "cramming" rather we are more interested in knowing what the learners have actually learned and understood. We are also of the believe, that competition and rivalry amongst learners in a class (while a healthy dose of them is stimulating), is one of the main reasons behind the present "pass by all means" mentality that has lead to the exam malpractice pandemic that is threatening the very soul of our education system in Nigeria. Therefore, as the course is a practical oriented course we are more interested in acquired skills and knowledge that can be demonstrated by learners. For this reasons, the evaluation techniques being proposed, are:

(i)   Observation

(ii)   Questionnaire

However, where it is deemed necessary, written test could also be administered, to compliment the proposed techniques. When preparing such a test however, care must be taken to ensure that only questions that require learners to use higher level thought processes in presenting their response, are presented to learners.

The proposed evaluation plan and instruments are given below.

Table 1. Evaluation Plan

(a)**Who/What to evaluate**	(b)**For what purpose?**	(c)**Using which criteria?**	(d)**Whose opinion to solicit**	(e)**What means to use**	(f)**Who will administer?**	(g)**When will it be done?**	(h)**Form of reporting**	(i)**Who to report to.**
Course	Improvement of units	Unit and lesson objectives	Students	Opinion questionnaires	Computer Science teachers in the school as a group	At the end of each unit	Written summary of responses	Computer Science teachers
Programme	Improvement of curricula	Programme (Curricula) objectives	Students in randomly selected schools	Survey using multiple choice questions	Programme planner(s) or programme operator(s)	End of every academic calendar	Percentile responses to each items by participating students	Planner(s), Operator(s), Teacher(s)
Teacher	Improvement of instruction	Teacher education	Students	Questionnaire	Programme operator(s)	End of each term	Written comments	Teacher/Principal
			Colleagues	Class observation	Teachers working together	At least thrice each term	Written comments	Teacher/Principal
			Teacher	Questionnaire	Respective teachers	At the end of each lesson	None	None
			Principal/Head Teacher	Class observation	Principal/Head Teacher	Once each academic year	Written report	Teacher
Students	To ascertain if curricula objectives are being met	Unit and lesson objectives	Students	Short answer questions and Practical sessions	Each teacher in his/her own class(es)	At the end of term, unit or lesson	Certificate issued on completion of studies	Student and Parent

STUDENT SELF-EVALUATION AND FEEDBACK FORM

Name:…………………………………

Class:……………………..

Instruction: Complete each sentence stem (A, B, C, D) three times.

AS A RESULT OF MY PARTICIPATION IN THIS COURSE, UNIT OR LESSON:

(A)　　I HAVE LERANED THAT: (Knowledge)

　　(i)

　　(ii)

　　(iii)

(B)　　I HAVE LEARNED TO: (Skill)

　　(i)

　　(ii)

　　(iii)

(C)　　I HAVE COME TO BELIEVE THAT: (Attitudes)

(i)

(ii)

(iii)

(D)   I AM COMMITTED TO: (Action)

(i)

(ii)

(iii)

Teacher: It is expected that skills claimed by student would be verified during practical sessions.

_____

TEACHER'S SELF-EVALUATION FORM

Teacher (Mr/Mrs/Miss/Dr./Prof):

…………………………………………

Instructions: After completing a lesson, respond in writing to following questions. This will help develop insight into your teaching effectiveness. Review the lesson plan, colleague and student's evaluations that were completed, in order to fully evaluate the lesson. If possible, have the lesson recorded on video or audio tape. Answer questions 1 and 2 before watching or listening to the recording.

(i)   HOW DID YOU FEEL ABOUT YOURSELF AS YOU WERE TEACHING?

(ii)   HOW DO YOU FEEL ABOUT WHAT YOU DID (YOUR TEACHING STRATEGY OR METHODS) AS YOU WERE TEACHING?

Before responding to the next questions, consider the following actions of yours: eye contact; voice level and tone; articulation; reliance on notes; self confidence and enthusiasm; your understanding of the subject matter and the questions asked; were they recall questions or thought-provoking questions?

(iii)   WHAT ACTIONS OF YOURS (VERBAL OR NON-VERBAL) HELPED STUDENTS BECOME INVOLVED AND INTERESTED IN PARTICIPATING IN THE LESSON?

(iv)   WHAT ACTIONS OF YOURS (VERBAL OR NON-VERBAL) MAY HAVE BLOCKED OR INHIBITED PARTICIPATION? PERHAPS IT WAS SOMETHING YOU DID NOT DO.

(v)   OVERALL, WHAT DID YOU ACCOMPLISH THAT YOU FEEL GOOD ABOUT?

(vi)   WHAT DO YOU FEEL YOU WOULD LIKE TO WORK ON FOR FUTURE LESSONS?

(vii)   SUMMARISE AND COMMENT ON THE EVALUATIONS MADE OF YOUR LESSONS BY YOUR COLLEAGUE AND STUDENTS.

(viii) THINK BACK TO HOW YOU FELT WHILE TEACHING. DID YOUR STUDENTS' AND COLLEAGUE'S EVALUATIONS, THE VIDEO/AUDIO RECORDING REINFORCE YOUR FEELINGS? DID YOU DISCOVER SOME NEW THINGS? IF YES DESCRIBE THEM.

STUDENT EVALUATION OF TEACHER'S PERFORMANCE FORM

Class: ……………

Teacher Being Evaluated:

………………………………………………….

Instruction: Please, tick the column that best describes your evaluation of your teacher's handling of the subject.

S/No		(1) Poor	(2) Fair	(3) Average	(4) Good	(5) Excellent
1	**Knowledge of Subject** (Are you convinced that your lecturer has a thorough knowledge and understanding of the subject?)					
2	**Clarity of presentation** (Are ideas presented at a level which you can understand?)					
3	**Fairness** (Does this teacher treat all students fairly and equally?)					
4	**Control** (Is the classroom orderly but also relaxed and friendly?)					
5	**Attitude towards students** (Do you feel this teacher is concerned about each students in the class?)					
6	**Success in stimulating interest** (Were students actively involved in the class?)					
7	**Enthusiasm** (Does this teacher show interest in the subject and enjoy teaching it?)					
8	**Attitude towards students' ideas** (Does this teacher have respect for things you have to say in class?)					
9	**Punctuality** (Does this teacher come to class as soon as it is time for the lesson?)					
10	**Encouragement of students' participation** (Does this teacher encourage you to raise ask questions and express ideas in class?)					
11	**Sense of humour** (Does this teacher share amusing stories and laughs at his/her own mistakes?)					
12	**Assignments** (Are his/her assignments challenging without being too long?)					
13	**Appearance** (Is this teacher's grooming and dressing in good taste?)					
14	**Openness** (Is this teacher able to see things from your point of view?)					
15	**Self control** (Does this teacher become angry when little problems arise in class?)					
16	**Consideration of others** (Is this teacher patient, understanding, considerate and patient?)					
17	**Course objectives** (Were the objectives relevant to your needs?)					
18	**Instructional activities** (Were the class activities appropriate for achieving course objectives)					
19	**Evaluation** (Was evaluation appropriate, consistent and fair?)					
20	**Course purpose** (Has this course helped you to become a more effective person?)					
21	**Effectiveness** (What is your overall evaluation of this teacher's effectiveness in this subject)					

LIST THOSE THINGS YOU FEEL THIS TEACHER NEEDS TO IMPROVE UPON

LIST THISE THINGS YOU LIKE ABOUT THE WAY THIS TEACHER HANDLES THIS SUBJECT

COLLEAGUES' OBSERVATION FORM

Teacher observed:………………………………….

Observer: …………………………………………..

Instruction: In the spaces provided, present your observations by describing specific actions of the teacher during the lesson. Reserve your judgment(s) for item (7).

(i)   DESCRIBE HOW THE PURPOSE OF THE LESSONS WAS MADE KNOWN TO THE STUDENTS

(ii)   DESCRIBE HOW TEACHER AROUSE STUDENTS' INTEREST

(iii)   WHAT DID THE TEACHER DO TO SHOW RESPECT FOR THE STUDENTS

(iv)   DID THE TEACHER MAKE ADEQUATE USE OF AUDIO-VISUAL AND OTHER RESOURCES?

(v)   OUTLINE THE SEQUENCE OF MAJOR ACTIVITIES THAT OCCURRED

(vi)   WHAT OTHER ACTIONS HAVE YOU SEEN THAT YOU FEEL NEEDS MENTIONING?

(vii)   REVIEW WHAT YOU HAVE OBSERVED. EXPRESS YOUR OPINION ON THE LESSON

(viii)   OFFER SUGGESTIONS THAT YOU FEEL COULD IMPROVE TEACHER'S EFFECTIVENESS

PROGRAMME EVALUATION FORM

Instruction: Please tick the option of your choice

1. Do you like the course? Yes   No

2. The course is easily understood

    (a) Strongly agree   (b) Agree   (c) Disagree

3. The course is interesting

    (a) Strongly agree   (b) Agree   (c) Disagree

4. How would you compare the course to other subjects?

    (a) Easy   (b) Difficult   (c) Can't decide

5. How do you feel whenever you are in a computer science class?

    (a) Excited   (b) Indifferent   (c)   Bored

6. What is your opinion about the introduction of computer science studies?

    (a) Good idea   (b) Not necessary   (c) A bad idea

7. How would you rate yourself with regards to the computer before now?

    (a) Literate   (b) Semi-literate   (c) Illiterate

8. Would you consider computer science as a profession?

    (a) Yes   (b) Don't know   (c) No

9. In your opinion, is your school well equipped and well staffed for this course?

    (a) Well equipped, not well staffed   (b) Well staffed, not well equipped

    (c) Not well staffed, not well equipped

10. Who provided the computers?

    (a) Government (b) PTA   (c) Non-Governmental Organization (NGO)

11. How often do you go on excursions?

    (a) Often   (b) Rarely   (c) Never

12. What useful suggestions do you have towards the improvement of the programme?

Conclusion

This paper has been an attempt at contributing to the overall success of computer education in particular, though the technique could easily be adapted to other subjects as well. We believe in evaluation, students should not be exposed to competition, but rather be able to demonstrate knowledge and abilities. We discourage the allocation of positions in class.

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