

Kolawole's Problem Solving (KPS) Method as a Tool for Quality Teaching and Evaluation in Open and Distance Education

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Abstract

The focus of this paper is on the problem of appropriate teaching in the open/distance education and the need to practically employ effective evaluative tools for improving the academic achievement of learners involved in these modes of education. This paper introduced KPS method that was formulated on the basis of well stated assumptions as a viable tool at this period of economic recession for checkmating possible challenges capable of being encountered, so as to maximize the opportunities available in open/distance education. The e-module was designed in various packages using the 5-steps of KPS. The teaching/evaluative verbs for each of the ability levels in the packages were coded into the following passwords i.e. 'D,I²,R³,E,C²,T², D,E,V,E,C³,Q²,U,I,T², S³,C³,R,I,P,T³, A,P,P,R,A,I,S.E²'. Experimenting by juxtaposing KPS with that of the conventional method on 120 selected learners in a quasi-experimental design yielded an empirical data that shows KPS method as a better teaching/evaluative tool than the conventional method. The paper recommends that KPS method should be incorporated into the curriculum of the nation's open/distance educational system as one of the veritable teaching/evaluative tool for improving the academic achievement of all categories of learners.

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Introduction

Development and sustainability of nations' technological, scientific and economic breakthroughs is absolutely impossible without adequate investment in human capacity development is obviously the bedrock of increased productivity and economic development of such nation. This is possibly the reason why most developed nations often greatly invest in the intellectual capacity of their citizenry in order to astronomically improve their economy. As a result of advanced nations' awareness of the indispensable role of education in fostering nations' development, a tangible portion of their financial resources is often devoted to the provision of quality teaching and learning, both at the conventional educational (formal classroom) level and the non-conventional educational (open & distance) level.

The current sophisticated world operates on decisions. Decisions are regularly being made at the local, national and international levels, having to do with people, individuals and groups. The role of measurement procedures in educational process is basically to provide valid data/information upon which reasonable decisions can be made. Evaluation involves making decisions on how well learners have learned a given content or how far the objectives earlier set have been qualitatively achieved. Data obtained from measurement procedures are often used for assessment. Moreover, evaluation is a major activity in the teaching-learning process without which the process becomes vague, meaningless and invalid. It is carried out for determination of worth only.

Consequently, it is the domain of assessment to obtain correct data, organize and convert such measurement data (obtained on specified variables) into interpretable form. Evaluation, therefore, encompasses both tests and measurement to obtain information that could thereafter be used for making decisions about students, curricula, programmes, instructional strategies and educational policies. Evaluation involves the addition of value judgement to the determination of worth of the obtained data. It is the quantitative (measurement), qualitative (non-measurement) or both descriptions of samples behaviour plus viable judgement. It is clear that there is likelihood of continuous production of poorly performing learners whenever appropriate assessment is not being carried out and reported because of the tendency of educators to unknowingly use ineffective and wrong procedures continually.

There is need for valid teaching and evaluation in open and distance education for the outcome of this kind of non-conventional educational to be realistic, reasonable and acceptable globally. Distance education is a mode of delivering education and instruction, often on an individual basis, to learners who are not physically present in a traditional classroom setting. Distance learning provides access to learning when the source of information and learners are separated by time and distance or both. Open education is a wider concept in comparison with distance education because it encompasses all forms of education and training (Komba, Komba, & Sekondo, 2006). This system of education can be defined as one in which the restrictions placed on learners are under constant review for removal whenever possible. Here, openness is considered paramount with regards to learners' intake, participation, progress, achievement and completion. Possible barriers include the student's economic circumstances socio-cultural factors, academic qualifications instructional methodologies.



The benefit of open and distance education in comparison with conventional educational include their potential for expanding, access to education, flexibility reduction of the huge cost of education, etc. However, for these two non-conventional types of education to function maximally, there is dire need for introduction of an empirically-proven assessment/evaluation technique through which instructions communicated to learners could be appropriately and evaluated.

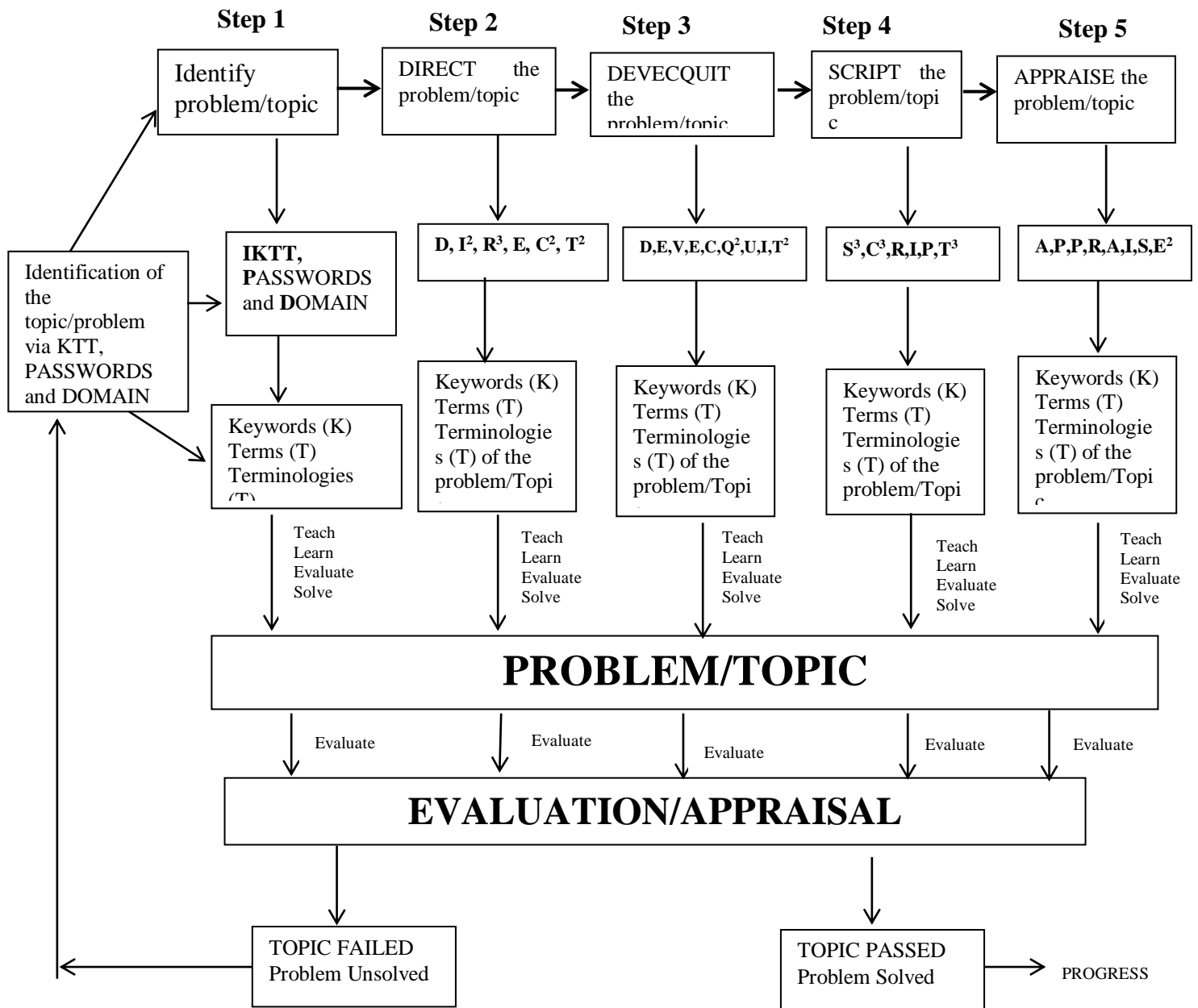
The unimaginable dwindling performance of learners in academic programmes in Nigeria has become an issue of great concern to stakeholders in the educational sector in recent times. It is obvious that the continuous poor performance of learners in examination is an indicator of the diseased (or unhealthy) status of the education of learners; it makes sense to seek lasting solution to the problem. It is unfortunate the most brilliant teachers having great mastery of their subject's matter while teaching couldn't properly link such with appropriate evaluation process. In other words, even though Nigeria is blessed with qualified teacher having great mastery of their subject's contents and sometimes appropriate instructional methodology, yet many of these teachers often find it extremely difficult to construct appropriate standardize tests.

Several strategies have been advocated for improvement of teaching and evaluation in this problematic segment of the globe, yet the problem has remained largely unsolved. Consequent upon the aforementioned the development of a proactive problem-solving method capable of being adopted for the complete overhauling of the system seems necessary. In response to this, Kolawole Problem Solving method KPSM, {which had been internationally published and globally certified for usage by leading education experts across the globe} was postulated.

Kolawole's Problem Solving (KPS) method by its peculiar design takes care of the possible teaching and learning problem. The most unique feature of KPS method is that while the teacher can use it for teaching and evaluating the students, (Kolawole, Oladosu & Ajetunmobi, 2013), the learner can also simultaneously use it for learning and evaluating himself (or herself) as shown in figure 1



Figure 1: General Theoretical Framework of Kolawole’s Problem Solving (KPS) Model



THE BASICS OF KPS METHOD

Step 1: ‘IKTT’ the Problem/Topic:

Here the assessor/evaluator should adequately make effort to identify all relevant keywords, terms and terminologies (KTT) associated with the problem/topic upon which questions would be formulated. In evaluating the learners evaluative verbs including identify, mention, etc. of relevant keywords/terms and terminologies (KTT) that are tangential to problem/topic should therefore, be used.



Step 2: 'DIRECT' the Problem/Topic via {D,I²,R³,E,C²,T²}:

In teaching and evaluating students at this ability level, the verbs that can be used include: **Define, Identify, Indicate Recognise, Relate Regulate, Enumerate, Categorize, Classify and Solve** all Identified Keywords (K), Terms (T), Terminologies (T) [IKTT] of the problem/topic or equivalent verbs or synonyms of the problem/topic

Step 3: 'DEVECQUIT' the Problem/Topic via {D,E,V,E,C³,Q²,U,I,T²}:

The verbs to be used for teaching and evaluating students at this level include: **Discuss, Explain, Verify, Expatriate, Criticize, Compose, Compare Query, Understand, Inquire, Transform** all Identified Keywords (K), Terms (T), Terminologies (T) [IKTT] of the problem/topic or equivalent verbs or synonyms of the problem/topic

Step 4: 'SCRIPT' out the Problem/Topic via {S³,C³,R,I,P, T³}:

The verbs for teaching and evaluating students at this level include: **Solve, Simplify, Sketch, Calculate, Compute, Construct, Read, Interpret, Plot, Tabulate and Transform** all Identified Keywords (K), Terms (T), Terminologies (T) [IKTT] of the problem/topic or equivalent verbs or synonyms of the problem/topic.

Step 5: 'APPRAISE' the topic via {A,P,P,R,A,I,S,E²}:

The evaluative verbs for evaluating students' ability at this level include: **Apply, Preview, Predict, Review, Assess, Induce, Summarize, Estimate and Examine** all Identified Keywords (K), Terms (T), Terminologies (T) [IKTT] of the problem/topic or equivalent verbs or synonyms of the problem/topic

Application of KPS method as a tool of Teaching and Evaluation in Open and Distance Education

- 1) Teaching: Teaching (formal academic instruction) under the guidance of teachers have been reputed to be the major tool for shaping the minds of learners worldwide. Since education experts have agreed that excellent performance of learners mainly depends on the effectiveness and appropriateness of the teaching method in the classroom settings there is a dire need to find a suitable replacement for the hitherto used traditional/conventional method that had been empirically proven to be ineffective. KPS method was found suitable for teaching all kinds of formal schools subjects. It is unfortunate that teachers (in schools) often teach without adequately identifying and explaining relevant keywords, terms and terminologies contained in the topic. Furthermore, they failed in translating and interpreting these keywords, etc. Also, they failed in the application of the topic to solve problems and synchronizing teaching, learning and evaluation.

KPS method compensates for the aforementioned anomalies by ensuring that no teacher using KPS method would teach any topic without adequately identifying and explaining the meaning of relevant keywords, terms and terminologies that are tangential to the topic, as well as applying the topic appropriately in solving both the familiar and unfamiliar problems. Since in the open/distance education the teaching – learning process is often carried out using a combination of both the conventional/traditional method and e-method, KPS method is made applicable to both i.e. Going via the conventional method or e-method, each of the modules may have 3 or more packages/topics as the course content for a contact session will be divided into four modules. Each of the packages/topics as a sub-unit of the module would be developed and used for the provision of appropriate instructions on any concerned topic.

The 1st slide/unit of each package/topic will be used for identification of relevant keywords, terms and terminologies (IKTT). The 2nd slide/unit of the package/topic will DIRECT the problem, the 3rd slide/unit of the package/topic will DEVECQUIT the



problem, the 4th slide/unit of the package/topic will SCRIPT out the problem while the 5th slide/unit of the package/topic will APPRAISE the problem. This same procedure will be adopted if the course lecture is in book writing. The students will be examined at the end of each package and also at the end of each module (i.e. each module may be programme to run for one month or more). At the end of the contact session (i.e. after covering all the modules), a revision will be done combining all the modules treated, whereby the revision follows the 5steps of KPS. The aforementioned detail is illustrated in a tabular form as follows:

Table 1: E-method/Conventional Method (incorporating KPS method)

M O D U L E	Package/ Topic 1	1st slide/unit	2nd slide/unit	3rd slide/unit	4th slide/unit	5th slide/unit
	Password	IKTT	D,I²,R³,E,C²,T₂	D,E,V,E,C³,Q²,U,I,T²	S³,C³,R,I,P,T³	A,P,P,R,A,I,S .E²
	Behaviour Objective Involved	To elicit identification of relevant keywords, terms and terminologies	To DIRECT the keywords, terms and terminologies of the problem or topic	To DEVECQUIT the keywords, terms and terminologies of the problem or topic	To SCRIPT out the keywords, terms and terminologies of the problem or topic	To APPRAISE the keywords, terms and terminologies of the problem or topic
	Package/ Topic 2	1st slide/unit	2nd slide/unit	3rd slide/unit	4th slide/unit	5th slide/unit
	Password	IKTT	D,I²,R³,E,C²,T₂	D,E,V,E,C³,Q²,U,I,T²	S³,C³,R,I,P,T³	A,P,P,R,A,I,S .E²
	Behaviour Objective Involved	To elicit identification of relevant keywords, terms and terminologies	To DIRECT the keywords, terms and terminologies of the problem or topic	To DEVECQUIT the keywords, terms and terminologies of the problem or topic	To SCRIPT out the keywords, terms and terminologies of the problem or topic	To APPRAISE the keywords, terms and terminologies of the problem or topic
	• • Package/ Topic n					

- 2) Evaluation: Even though the nation's open and distance education programmes are blessed with countless highly qualified, hardworking and proficient instructors, yet instructions/materials from these instructors (via both the print-media, electronic-media or even face-to-face contact) have not been able to produce acceptable level of performance in various subjects for most learners in external examinations because most of these materials lack the ability to properly connects teaching and appropriate evaluation (which ought to be the case in every normal educational setting). It is unfortunate that while the tests conducted locally by teachers (i.e. Teacher-made Tests) often have poor psychometric properties (i.e. not valid, reliable or dependable), standardized tests (or examinations) designed and conducted by external examining bodies are always having adequate psychometric properties (i.e. valid, reliable and dependable). KPS method is a viable tool for correcting these anomalies (i.e. invalidity, unreliability and undependability) associated with the earlier mentioned 'Teacher-made Test' in as much as the set of distinct passwords used for teaching and learning i.e.

IKTT, D,I²,R³,E,C²,T², D,E,V,E,C³,Q²,U,I,T², S³,C³,R,I,P,T³, and A,P,P,R,A,I,S.E² is to be equally used in the test construction, as well as assessing and evaluating the students. Consequently, the probability of performing excellently by most learners is enhanced.

In order to correctly apply KPS method to Test Blueprint construction, a 2-way grid mapping subject's content with ability levels, in which the test construction allocates appropriate number of items/questions into each cell of KPS method Ability Levels which sequentially employs the password 'D,I²,R³,E,C²,T², D,E,V,E,C³,Q²,U,I,T², S³,C³,R,I,P,T³, A,P,P,R,A,I,S.E²' in formulating the tests (Kolawole, 2013a; 2013b, Kolawole, 2010).

Table 2: KPS Method Test-blueprint Evaluation Model

SUBJECT CONTENT	COGNITIVE LEVELS				
	'D,I ² ,R ³ ,E,C ² ,T ² ' Identified Keywords (K), Terms (T), Terminologies (T) [IKTT] of the problem/topic	'D,E,V,E,C ³ ,Q ² ,U,I,T ² ' Identified Keywords (K), Terms (T), Terminologies (T) [IKTT] of the problem/topic	'S ³ ,C ³ ,R,I,P,T ³ ' Identified Keywords (K), Terms (T), Terminologies (T) [IKTT] of the problem/topic	A,P,P,R,A,I,S.E ² Identified Keywords (K), Terms (T), Terminologies (T) [IKTT] of the problem/topic	Total
Topic 1					
Topic 2					
Topic 3					
Topic 4					
.					
.					
.					
Total					Total

To correctly apply KPS method to item-writing for assessment/evaluation purposes, the item-writer identifies all relevant keywords, terms and terminologies associated with the concerned topic (or group of topic), subject matter and/or problem under investigation; and thereafter 'D,I²,R³,E,C²,T², D,E,V,E,C³,Q²,U,I,T², S³,C³,R,I,P,T³, and A,P,P,R,A,I,S.E²' the aforementioned appropriately

Statement of the Problem

The problem necessitating this paper is poor performance of Open and Distance education learners in public examinations, which is believed by many to be associated with the use of invalid and unreliable teaching and evaluative tool by their instructors prior to such examinations. To proffer realistic solution to the aforementioned problem, the development of a highly effective problem-solving method's and evaluative tool such as KPS method's is inevitable in as much as experiences have shown that appropriate use of well-constructed teaching plan and test blueprint underlying this device often enhances high content validity of the concerned test. Unfortunately most Nigerian teachers always construct their testing instruments without previously constructing a reasonable Test's Blueprint. However, since Test's Blueprint is a two-way grid that maps behaviour objectives with the contents, any test constructed without such Blueprint is in reality unreliable and invalid or not useful for the purpose for which it is designed. However, KPS method is by its peculiar design deliberately equipped for simplifying the art of 'test construction' greatly for all the test's constructors. There is need, therefore, to determine the degree of effectiveness (or otherwise) of KPS method as teaching and evaluative tool on learners' performance.

Purpose of the Study

The purpose of the study was to examine the difference between the mean performance of learners taught and evaluated using the conventional method and KPS method

H₀1: There is no significant difference between the mean performance of learners taught and evaluated using the conventional method and KPS method.

Methodology

This study employed quasi experimental design. The sample used comprises 120 selected learners from Ekiti State, who were selected using multistage sampling procedure. The instrument used was titled 'Mathematics Achievement Test' (MAT) having a validity coefficient of 0.78 and a reliability coefficient of 0.82. The experimental group was adequately taught specific topics for 12 weeks using KPS teaching and evaluative method (i.e. in modules and packages) while the conventional group was taught same topics using conventional method and evaluated by conventional (or traditional) evaluative tool. Pre-test was administered prior to treatment and post-test immediately after treatment.

Results

Hypothesis 1: There is no significant difference between the mean performance of learners taught and evaluated using the conventional method and KPS method.

Table 3: t-test analysis of the performance of learners taught and evaluated using the conventional and KPS methods

Group	N	Mean	SD	df	t _{cal}	t _{table}	Result
Conventional (Control)	60	44.93	13.96	118	16.76	1.66	*
KPS (Experimental)	60	74.25	9.165				

*(mean result significant at 0.05 level)

As shown in Table 3, the comparison of students' performance in the conventional and KPS method group revealed that the t value, t_{cal} (16.76) is greater than the t_{table} (1.66), implying that significant difference exists between students' performance in the two groups. Consequently, the null hypothesis 1 is rejected. As such, KPS method is more effective than the conventional method.

Discussion

The outcome of this study succinctly revealed that KPS method is more effective than the conventional method in improving learner's performance in school's subjects. The possible reason advocated for this high effectiveness of KPS method is simply its inherent ability to always appropriately connect (or link) teaching, learning and evaluation in one integral whole, since the same distinct 'passwords' used for teaching learners are equally used in the construction of the tests that are to be used for regularly assessing and consequently evaluating the learners. As such the probability of excellent performance by most learners is greatly enhanced.

Conclusion

A total overhauling of the nation's educational system is a necessity for transforming Nigeria into one of the 20 leading economy of the world in as much as education is the pivot upon which the development of every nation's depends. To ensure that this is possible within the shortest possible time frame, steps should be taken to identify an effective teaching and evaluative tool capable of being used for reduction of the astronomical failures, non-coping and dropout rates of learners in open/distance education in the nation. This paper is an eye-opener for widening the horizon of open/distance education managers to the fact that KPS is an effective teaching and evaluative tools for encouraging, developing and sustaining excellent performance of learners in the open/distance education.

Recommendations

On the basis of the outcome of the study presented in this paper, it is clear that the KPS method is more effective than the conventional method. As such it is recommended that KPS method should be formally introduced into the nations' open and distance education to improve

learners' performance therein. Moreover, conferences, seminars and workshops on practical applicability of KPS method should be held regularly for the nation's open/distance educators, instructors & learners in order to improve learners' performance in the different school's subjects

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