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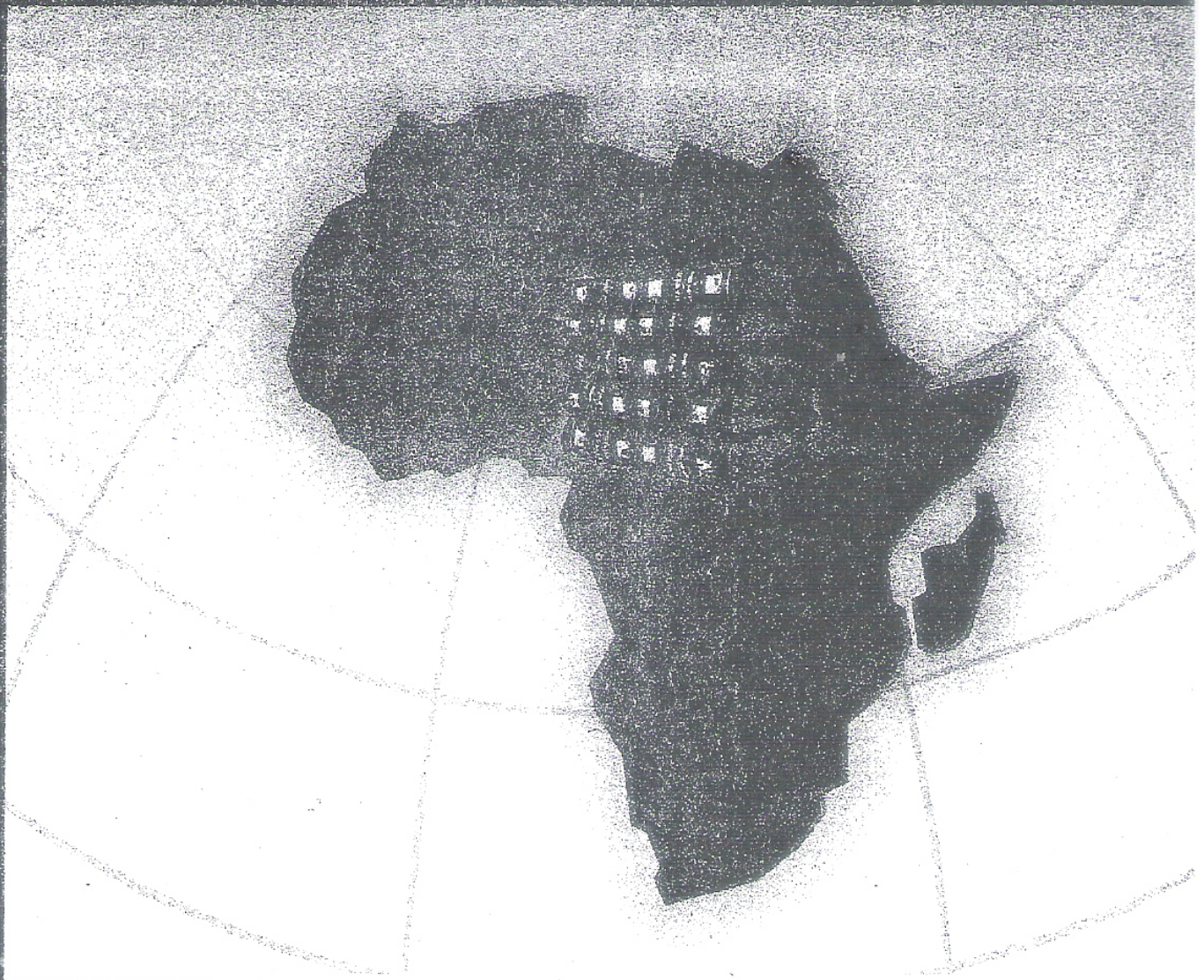
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Marginal grades of non-graduate mathematics professionals and its implications for the school system

By

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Abstract

The study was conducted to examine various marginal grades in quantities and qualities of mathematics professionals in some colleges of education from 1990 to 2000. As an "Expost-facto" research study which comprised of three research questions, samples consisted of six colleges of education that run Mathematics education in the south western part of Nigeria. Developed instrument for the study was "Inventory of non-graduate mathematics professionals in the colleges with reliability coefficient of 0.88, used to collect the data. Subjects selected and used for the study included thirty academic staff through purposive sampling techniques. Data analysis was done via the use of simple frequent count, percentages, and matrix representation of short

and long term of identified marginal grades professionals. Findings revealed that perennial dismal performance of students in Mathematics might be traced to the identified marginal grades mathematics professionals produced by the affected colleges totalled 460 passes and 522 failures into the nation educational system over a decade, when in real sense a good teacher is synonymous to a candle that consumes itself to light the way for others. The short and long terms implications of the findings were discussed and recommendation suggested as panacea to the actualization of nation education goal of "self-reliance".

Introduction

The future of any nation is in the classroom, future with potentials for good or bad that transform into future president, great writers of next decades and the so-called ordinary people that will make the decisions for the entire populace. As a result, school subjects and teachers at any level of educational system play a premium role towards the advancement of such a nation. In particular is the teacher who is responsible to educate, inspire to challenge, make comfort and reassure confidence in students. The influence of teacher is quite incalculable as each student that leaves the classroom changes in some ways by what he/she does with each student having the power to change the world. Hence, teacher has the power to change the whole world via the interaction in the classroom. This is why teaching is described as cultivating a garden where no one that has nothing to do with it should ever attempt to gather the flowers.

School subjects comprised of sciences, arts and social sciences with sub sectors of Mathematics, English language, Physics, Chemistry just to mention a few; and each of these subjects has varying objectives towards the actualization of nation education's philosophy of self-reliance. Mathematics is often placed in high position due to its influence in the nation development, and that was why it is made compulsory for students to register and pass at the primary and secondary levels of education; and as a prerequisite to major courses in the higher institutions of learning. To substantiate its importance, centre for dissemination of Mathematical knowledge was established in Abuja and it was called National Mathematics Centre(NMC, Abuja) presently under Professor Sam Ale to complement the efforts of various institutions' bid towards making the teaching and learning of the subject exciting and justifying the huge expenditure relative to other school's

subjects. Moreover, the establishment of different colleges of education by the government is a pointer to the exotic position which teacher education programme is accorded, as these institutions were saddled with the primary responsibility of producing professional non-graduate teachers, mathematics professionals inclusive, for the lower level of Nigerian educational system. In spite of the above-mentioned different research studies had indicated different reasons to have contributed to the perennial dismal performance of students in Mathematics, and these range from academic and professional qualification of mathematics teachers(Yee,1990; Gage, 1994; Salami, 2000), effectiveness of mathematics teachers on the job (Duyilemi, 1997; Wharton, Pressley and Hampston, 1998), teachers' experience(Badmus, 1997; Olaoye, 2004), knowledge of subject-matter (Onocha and Okpala, 1995; Olaoye, 1998), relevant and adequate instructional facilities(Odeyemi, 1995; Akinlua and Popoola, 1999) and perseverance of some topics considered difficult(Oyedeji, 1996) just to mention a few. In support of these claims Odubunmi, (2006) presented the state of students' performance in some science subjects, Mathematics inclusive, to be on retrogressive as corroborated in the table 1 below:

Table 1: Performance of students in percentages of SSCE/WASCE Mathematics from 1991 to 2004

Years	1991	1992	1993	1994	1995	1996	1997
% of Credit pass	11.10	21.69	10.93	16.50	16.50	10.00	07.60
Years	1998	1999	2000	2001	2002	2003	2004
% of Credit pass	11.15	18.25	32.81	36.55	31.56	36.91	34.52

Source: WAEC Annual reports in adapted Odubunmi, (2006)

A critical analysis of the above Table 1 obviously indicates that students' percentages with credit pass are extremely low in Mathematics despite the high premium placed on it. It is therefore not a doubtful fact that marginal grades mathematics professionals of the colleges of education do not add to the prevailing dismal performance of students in Mathematics as these so-called professionals lay the Mathematical foundation of students from primary schools to the junior secondary schools as National Policy on Education (2001) enunciated Nigeria

Certificate in Education (NCE) as minimum entry into teaching profession. As a result, the study tried to examine these blind spots as they could likely be some of the factors towards the downward trends of students' performance in Mathematics.

Conceptual framework

The concept "blind spot" is a relative word which has both literal and figurative meanings. Literarily, according to Hornby (1984), it is an adjective to describe a situation where one lacks the power to see or pretend not to see something; while in figurative sense, it refers to inability to recognize, understand or sympathize with something. Blind spot could be described as a situation whereby the conceived authority in education do not or fail to recognize and understand the perennial dismal performance of students in Mathematics relatively to the qualities and quantities of mathematics professionals being turned out by the established colleges of education for the lower level of Nigerian educational system. Blind spot could mean the deception, something intended to hide the reality, one that cannot easily be seen to have contributed to the ugly situation being experienced. For this study, the blind spot simply means problematic issues not attended to or yet to be addressed. In fact it refers to influence of all the marginal grades mathematics professionals that have been produced into the Nigerian Educational system as one bad teacher is capable of polluting millions of minds for the next generation, which might be difficult for thousands of professionally trained teachers to correct.

Statement of the problem

The study was conducted to examine the number and percentages of marginal grades mathematics professionals produced in some colleges of education from 1990/91 to 1999/2000 sessions, with a view to determine the short and long terms effects on the school and nation educational systems. Specifically, the study sought answers to the following research questions as they influence the scope and practices in education.

Research Questions

RQ.: What were the quantities and percentages of marginal grades mathematics professionals produced in the selected colleges of education from 1990 to 2000 session?

RQ.: What percentages of those mathematics professionals graduated with marginal grades?

RQ.: What are the short and long term influences of these marginal qualified professionals in the school system?

Methodology
Research Design

The design for the study was "Expost facto" research design where the researcher neither controlled the independent variables nor manipulates to suite any purpose; instead researcher watches the influence of independent variable on the dependent ones. For this study the independent variable was the academic qualifications of the marginal grades mathematics professionals and the anticipated students' performance in Mathematics based on the acclaimed qualifications.

Population

The population to the study included all the accredited colleges of education that run Mathematics education in the south western part of Nigeria. These included all the six colleges of education in the south western part of Nigeria that were either federal or state owned.

Sample and sampling techniques

Sample to the study comprised of all mathematics lecturers in the affected colleges as shown in table 2 below but due to the readiness of some of the affected staff and the mandatory five man personnel required to man the programme in Mathematics education thirty staff were selected based on their qualifications which researcher considered to be purposive to attain the objective of the study.

Table 2: Frequency and qualifications of academic staff in the affected colleges of education

Qualifications	B.Sc	B.Ed	B.Sc/Ed	M.Sc	M.Ed	Ph.D	Total
Frequencies	09	02	09	03	15	05	43
Selected ones	02	02	06	03	15	03	30

Instrument

An inventory of non-graduate mathematics professionals in the colleges was developed and used to solicit for information from the affected colleges. Part A comprised of the respondent's bio data while part B comprised of the numbers of mathematics non-graduate professionals, grades at the graduation and their correspond sessions.

Validation of instrument

An inventory of mathematics professionals in the colleges of education was designed for the lecturers of the affected staff to complete, features the numbers and qualifications of the professional from 1990 to 2000. This instrument was trial tested on some selected staff numbering five of another college of education that was not part of the main colleges of education selected for the study. Meanwhile, a two week interval representation of the same instrument was carried out in order to correct the ambiguous and unstructured languages that were discovered.

Reliability of instrument

The instrument was subjected to Pearson moment correlation which was found to be 0.88, which the researcher considered high for the study.

Administration of instrument

The instrument was administered to the academic staff of the institutions concerned through their Heads of Department, and directly to the Directors of academic planning of each colleges of education.

Procedure for data collection

Data collection was done via the procedure of its administration in order to ensure the accurate and speedy collection of the data.

Data scoring and analysis

Data scoring was based on the approved minimum standard of the National Commission for Colleges of Education (1998) as shown in table 3 under findings and discussions.

Findings and discussions

Table 3: Criterion Referenced Scores of NCE Teacher Education

Scores Interval	70-100	60-69	50-59	45-49	40-44	0-39
Letter Grade	A	B	C	D	E	F
Points	5.00	4.00	3.00	2.00	1.00	0.00
Level of Pass	Distinction	Credit	Upper Merit	Lower Merit	Pass	Failure
% in Equivalent	70%	60%	50%	45%	40%	39%

Source: NCCE Manual (1998)

Table 3 described the classification of non-graduate professional mathematics as qualified ones by the controlling body set up to man the academic and curricula activities of the nation's colleges of education. These products are expected on graduation to provide comprehensive technical know-how via their different course structures among students of primary and junior secondary school levels adequate:

(i)   Content knowledge in the areas of mathematics with all the objectives for the teaching and learning of Mathematics at the primary and junior secondary school levels

(ii)   General pedagogical knowledge with special reference to those broad principles of classroom management and organization that seem to transcend the subject matter

(iii)   Pedagogical content knowledge such that amalgamate the content and pedagogy that are uniquely the province of teachers, and their own special form of professional understanding (Adebayo, 1998)

(iv)   Knowledge of learners and their characteristics in order to foster learning that leads to the nation education's goal.

(v)   Knowledge of educational contexts which ranges from the working of the group or classroom to the governance and financing of school district to the clarity of the communities and culture where they might find themselves in future.

(vi)   Knowledge of educational ends, purposes and values with their philosophical and historical grounds.

All the aforementioned areas constitute the criteria for the award of the final qualifications that emanated from different Mathematics and education courses designed for the teachers to-be in the colleges of education Nigeria. The overall satisfaction of examiners' requirement by these NCE student's teachers in those courses determined their grades, and at the same time determines what is produced into nation education

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system. In this study the marginal grades mathematics professionals are shown on the right tail end of the table 3 classified as pass and failure respectively.

Table 4: Final qualifications of mathematics professionals from 1990/91 to 1999/2000 in colleges used

S/N	Sessions	Distinctions	Credits	Upper merit	Lower merit	Pass	Failure	Total
1	90/91	36	61	52	38	31	84	302
2	91/92	20	52	83	77	56	63	351
3	92/93	34	104	92	84	66	26	406
4	93/94	24	103	53	63	60	38	341
5	94/95	21	70	66	61	44	35	297
6	95/96	09	88	138	95	39	36	405
7	96/97	21	76	78	81	47	60	363
8	97/98	22	72	112	96	30	52	384
9	98/99	18	64	67	62	41	56	308
10	99/00	04	51	58	43	46	72	274
Total	10	209	741	799	700	460	522	3431

Source: Academic offices of the colleges of education in the south western part of Nigeria.

Table 4 describes the numbers of non-graduate mathematics professionals from 1990 to 2000. In 1990 where a total of 302 students graduated from the six colleges of education, there were 31 passes and 84 failures and these numbers represent marginal grades in the tenet of teaching profession since they could not be ascertained to have got adequate or simple knowledge of what teaching is all about as corroborated by their final qualification which is not a one man making, rather it is a cumulative of their academic standard from the inception to the end. These marginal grades mathematics professionals are those with pass with worst ones as failure, which could not be justified to a certain level that understand the tenet of teaching profession and practice as excellent as those classified as lower merits to the distinctions. The thrust of the matter is that those set of students/graduates might still parade themselves as non-graduate professional mathematics teachers, imparting obsolete knowledge into the young ones. It might be argued that these so-called marginal grades mathematics professionals might not be appointed to teach at the public schools due to the screening exercise by the ministry officials at the point of entry, yet the private establishment is a serious angle where in most cases they are often appointed due the private establishment search for cheap labour and profit oriented drive. By United Nation Education, Scientific and

Cultural Organization (UNESCO)'s standard of 1:25 pupils in a classroom one could imagine the total number of pupils which 84 self acclaimed professionals' teachers with inadequacies would have spoilt. This would amount to 2100 pupils in a session. The above analysis goes for the marginal grades professional mathematics teachers in the region of pass numbered 31 that could turn out minimum pupils of 775 in a session though theirs might not be as serious as that of 84 self acclaimed professionals' teachers with inadequacies. In fact, this analysis goes a long way for the subsequent sessions where such passes and failure rates were observed. For the whole ten sessions it was observed that the affected colleges had produced a total of 460 mild and 522 marginal grades professional mathematics teachers into the school system in particular, and the nation educational system in general. The inference that could be made here is that 11500 and 13050 pupils could have been produced into the nation education system by these 460 passes and 522 failures marginal grades mathematics professionals respectively. This estimate does not take cognizance of overpopulation of classroom which often occurred in Mathematics that every pupil has to register and pass. By the rule of classroom interaction, according to Olaoye and Akinsola (2007), which foster learning among the pupils, multiplier effect of polluted knowledge dissemination would have climaxed into perennial dismal performance of students in Mathematics at the advanced stage in life

Table 5: Matrix percentage of qualifications of mathematics professionals from 1990/91 to 99/2000

S/N	Sessions	Distinctions	Credits	Upper merit	Lower merit	Pass	Failure	Total
1	90/91	(12) (17)	(20) (08)	(17) (07)	(13) (05)	(10) (07)	(28) (16)	(100) (09)
2	91/92	(05) (10)	(15) (07)	(24) (10)	(22) (11)	(16) (12)	(18) (12)	(100) (10)
3	92/93	(08) (16)	(26) (14)	(23) (12)	(21) (12)	(16) (14)	(06) (05)	(100) (12)
4	93/94	(07) (11)	(30) (14)	(16) (07)	(18) (09)	(18) (13)	(11) (07)	(100) (10)
5	94/95	(07) (10)	(24) (09)	(22) (08)	(20) (08)	(15) (09)	(12) (07)	(100) (08)
6	95/96	(02) (04)	(22) (12)	(34) (17)	(23) (14)	(10) (08)	(09) (07)	(100) (12)
7	96/97	(06) (10)	(21) (10)	(21) (10)	(22) (12)	(13) (10)	(17) (11)	(100) (11)
8	97/98	(06) (11)	(19) (10)	(29) (14)	(25) (14)	(08) (07)	(13) (10)	(100) (11)
9	98/99	(06) (09)	(21) (09)	(22) (08)	(20) (09)	(13) (10)	(18) (11)	(100) (09)
10	99/00	(01) (02)	(19) (07)	(21) (07)	(16) (06)	(17) (10)	(26) (14)	(100) (08)
Total	10	(07) (100)	(22) (100)	(23) (100)	(20) (100)	(13) (100)	(15) (100)	(100) (100)

Table 5 shows the short and long terms implications in terms of percentages of the produced marginal grades professional mathematics teachers into the nation education system. The short term refers to the seasonal percentages of the two self acclaimed professionals' teachers with inadequacies as nobody could actually pin them down to a specific area of their quack knowledge dissemination. For instance in the 1990/91 session alone 10% and 28% of the colleges' products were marginal grades achievers; and the contact made by these set of people to the young ones is a pointer to the persistent worsening situations in the nations education practices. It should be pointed out that the havoc caused by a dismissed security operatives who were allowed to go freely with their arms and ammunitions might not be as enormous as these marginal grades mathematics teachers in terms of their daily contact with the pupils that may transform into future president, great writers of next decades and the so-called ordinary people that will make the decisions for the entire populace. Unlike a dismissed security operative that could be easily arrested after committing one or more glaring offence, the quack teachers might be difficult to pin down due to generation they handle and the large numbers of young minds the wrong knowledge are being imparted to them for twenty children of like ages cannot play simultaneously for a complete twenty years. The same analysis occurs in the subsequent sessions of the decade of the colleges' preparation of mathematics teachers. One dishearten features observed was that in most cases the percentages is greater than 5%, which make one to imagine the extent of damages which 5% of total teachers produced could cause to be inestimable, thereby leading to proliferation of quack learners that eventually search for examination paper ahead of examination period, or better still engage in one form of examination malpractice. While the horizontal arrays of numbers refer to the short term effect of these marginal grades teachers on the nation education the vertical arrays of numbers refer to the long term effect. In 1990/91 session again, the long term effect of these marginal grades teachers on the nation education system as far as those colleges were concerned stood at 7% and 16%, respectively, for the period of ten years as against the 28% of the short term effect. The overall estimates of these two marginal grades achievers at the end of ten sessions were 13% and 15% for the self acclaimed professionals' teachers with inadequacies in

Mathematics. In both cases, in the long term analysis, the percentages of damages to the generation of soft and fragile minded pupils are more than 5% which one would have regarded as tolerance level in a research study in education and behavioural sciences. It must be fully realised; as noted by Hill (1990), that one bad teacher is more dangerous than one bad surgeon because a surgeon can hurt a person at a time while a bad teacher would hurt human generations. This is to corroborate the finding of Olaoye (2007) that mathematics teachers' instructional modes play a vital role towards students' understanding basic skills in Mathematics. In contrast, one could imagine the kind of Mathematical skills those set of identified quacks could impart on the pupils. Definitely the nation education is at a cross road unless urgent and drastic steps are taken.

Conclusion and recommendations

It is quite interesting to observe that different scholars have not relented efforts in finding solution to perennial dismal performance of students in Mathematics yet it pertinent to know that no educational system can rise above the qualities of its teachers (NPE, 2001). As a result the solution to the identified problem seems to be unending unless urgent step is taken to address the issue of marginal grades mathematics teachers mentioned. In fact, it is incalculable error to have failed teachers as these would have multiplier effect on the young generations. Failed teachers are more inimical to the advancement of the society nowadays that teachers are the instruments of knowledge dissemination. What kind of knowledge does a society expect from identified marginally qualified mathematics teachers? This is a million rhetorical questions! Meanwhile, those teachers identified to have graduated in deficient way ought to have undergone refreshed courses that would improved them a bit even if they could not compete favourably with others, and practice within a closed monitored sector by constituted education authority rather than leaving them alone and parade themselves as non-graduate professional mathematics teachers since the havoc has been caused. On the alternative, students' admission into teaching profession should not be used as stepping stones for those that have been rejected either because of the cut off point in some courses of their first choice or under the guise of leaving home on the part of students. Apart from that education programme could be turned into postgraduate only whereby students must have had their first degree in Mathematics content areas and, later

be exposed to pedagogy at the postgraduate level. This is a thought for the National Council on Education (NCE) and Teacher Registration Council (TRC) to emulate the principle of professional bodies like Medical Association of Nigeria, Professional Accounting body such as Institute of Chartered Accountant of Nigeria (ICAN), and Legal body like Law school and Nigerian Bar Association (NBA) just to mention a few; that rarely allow the non-certified members to practice. The 'Glory' of teaching profession is calling on all and sundry to allow it rise. Government at different levels through the ministries of education under evaluation and monitoring sections and various education stakeholders, including the highest body like Nigeria Academy of Education should be vigilant everyday lest we lose the fragile opportunity to improve tomorrow, and take this as serious matter before the noble profession is totally committed to an untimely grave. By taking a bold step at the right time, the unborn generation will definitely pray for those of us that champion the cause to put teaching on a sound footing. Meanwhile, similar studies are suggested to be carried out in other geographical zones to ascertain the numbers of marginally grades professional mathematics teachers produced for the nation by other colleges of education as the one conducted was restricted to one geographical zone out of six that made up entire Nigeria. Furthermore, an extrapolative study should be conducted in other subject areas of the colleges' curricula so as address squarely the incessant problems in the nation's education system. This would make the existence of the appropriate relevant and established body like National Commission for Colleges of Education (NCCE) to be more responsive to the prevailing problem of teacher education in the 21ˢᵗ century, otherwise, according to Nwaboku (2006) 'Teacher, the answer is blowing in the wind'. By this manner, the rehabilitation of the identified poorly qualified mathematics teachers is imperative in the nation education system and as one of the measures that could be used to save the entire nation education system from total disintegrations.

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