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Comparative Study of the Qualitative Performance of Students at Technical Medical Institutes in the City of Kisangani in the Democratic Republic of Congo

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Abstract

Introduction: Scientific research in education is simply the application of the general rules of the scientific method to the field of education. This study aims to compare the qualitative performance of students at technical medical institutes in the city of Kisangani and analyse these issues to verify whether they are valid. ***Materials and methods:*** This was a descriptive cross-sectional study conducted at the Technical Medical Institute of the University of Kisangani (ITM – UNIKIS) and the Institute of Applied Medical Technology of the Higher Institute of Medical Technology of Kisangani (ITMA – ISTM/ KIS) from 1 March to 30 April 2023. A non-probabilistic convenience sample of 25 students was selected. Document analysis and questionnaires were used to collect data, while descriptive analysis was used to compare results. ***Results:*** Current course programmes, subject forecasts and course reference materials are available at ITM – UNIKIS, while at ITMA – ISTM/ KIS. At ITM – UNIKIS, all questions are valid, while at ITMA – ISTM/KIS, 50% do not comply with the curriculum and subject forecasts. The pass rate in pathology and nursing techniques was 66.3% at ITM – UNIKIS (MML=83.3% vs DDL=58.3%) and 53.5% at ITMA – ISTM/KIS (MML=52.9% vs DDL=29.4%). In nursing techniques, it was 65% at ITM UNIKIS (MML=97.6% vs DDL=50%) and 55.5% at ITMA – ISTM/KIS (MML=76.4% vs DDL=17.6%). ***Conclusion:*** The qualitative performance of learners in the competency-based programme is better than that of learners in the objective-based programme.

Keywords: Qualitative performance, learner, education, pedagogy, Kisangani.

I. INTRODUCTION

Scientific research in education is simply the application of the general rules of the scientific method to the field of education. Its main purpose is to develop and advance the sciences of education. As such, it addresses issues in education in general and concerns all age groups, from early childhood to adulthood. According to Vitamara (2023-2024), it uses a variety of methods and processes in the study of these different issues, depending on the nature of the work and the goal to be achieved.

Hence, vocational training is the foundation of a country's social and economic development. Tourneur and Vasamilet (1981, p.27) thus assert that the power of a nation is measured not only by its economic and industrial resources but also, and above all, by the value of its human resources in terms of quality and quantity. This dual qualitative and quantitative value has a considerable impact on a country's economic and industrial production.

In this regard, Badriyo (2000, p.1) goes on to say that 'if we want the education system to be adapted to the needs of our country and to serve its daughters and sons effectively, it is essential to know how to organise it and to continuously evaluate its beneficiaries, the learners'.

He adds that educational institutions are currently slowly but surely moving away from their

primary vocation, which is to train 'well-rounded individuals' capable of playing a noble role in society.

As a result, many educational, psychological and sociological researchers are constantly reflecting on the need for effective, high-quality and optimised teaching and learning.

These different aspects of the educational process allow us to reflect on the methods, techniques, aims and objectives that lead to directing and monitoring teaching during its application and measuring the effectiveness of training.

In the same vein, Vitamara (2024) argues that all training of individuals pursues specific objectives. To ensure that these objectives are achieved, education officials carry out assessments.

In addition, academic results play a noble role in qualitative performance. They mark the end of each cycle, i.e. they award a qualification to learners. However, in professional life, their value is sometimes questionable. This is why any so-called summative or certifying assessment aims to legitimise social selection and the relationship of subordination between teacher and student. Hence the seriousness on the part of both the assessed and the assessor.

Often, after the exam has been taken and the results announced, we hear comments such as: the exam was easy or difficult; the teacher does not mark the papers; the teacher asked a lot of questions; the marking is not done properly; the teacher only asked questions on one chapter; the questions are not relevant to the subject matter; one teacher gives almost the same marks; another does not give more than six out of ten points; one teacher asks very good questions.

These observations lead us to believe that the organisation, administration, composition and marking of exam papers suffer from the insensitivity, incompetence and underqualification of many of those responsible for the teaching by objectives process. In other words, learners' failures are not only a function of the assessment tools used, but also of factors related to the student and the teacher's personality.

In this regard, Kabamba (1990, p.6) points out that the causes of academic failure and success in Africa are as numerous as they are varied. Current literature refers to the very high number of students and the underqualification of some teaching staff.

It is with this in mind and in an effort to make our modest contribution to the scientific world that we conducted a comparative study of the qualitative performance of students at the Technical Medical Institutes of the City of Kisangani. Specifically, the aim was to:

- Compare the qualitative performance of students at the Technical Medical Institutes in the city of Kisangani;
- Analyse these questions to verify whether they are valid.

II. MATERIALS ET METHODS

Study setting

This study was conducted at the Technical Medical Institute of the University of Kisangani and the Technical Medical Institute of the Higher Institute of Medical Techniques of Kisangani in the city of Kisangani.

Study population

Our study population consisted of final-year students at the Technical Medical Institutes in the city of Kisangani.

Type and period of study

This was a descriptive cross-sectional study covering the period from 1 March to 30 April 2023.

Sample

For our investigation, we selected 25 students from the Institute of Medical Technology of the Higher Institute of Medical Technology in Kisangani and the Institute of Medical Technology at the University of Kisangani.

Sampling

For the selection of learners, this study used non-probabilistic convenience sampling. These were students who were available and accessible to respond to the survey.

Data collection techniques

To collect data, this study used document analysis and questionnaires.

The document analysis consisted of visiting the Health Sciences Education Coordination Office to consult the 2023 nursing study programme manual -2024 nursing curriculum manual and the reference manuals to formulate the questions that were immediately administered to final-year students in the two branches covered by our study, namely nursing techniques and human medical pathologies.

Ten questions were developed for final-year students at two medical technical institutes, namely the Medical Technical Institute of the University of Kisangani (ITM – UNIKIS) and the Medical Technical Institute of the Higher Institute of Medical Techniques of Kisangani (ITMA - ISTM/KIS).

Data analysis

In addition to descriptive analysis based on tables and percentage calculations, this study also used student performance calculations, including academic

performance, the minimum mastery level (MML) and the desired mastery level (DML). The following formulas were used:

Academic performance

Rdt = $\frac{M}{MAX} x100$

Key: Rdt: Performance

M: Mean

MAX: Maximum score

MML= $\frac{\text{Number of students who passed with at least 50\%}}{\text{Total number of students in the category considered}} x\ 100$

DML= $\frac{\text{Number of students who passed with at least 70\%}}{\text{Total number of students in the category considered}} x100$

Ethical considerations

Before going into the field, we obtained research authorisation from the Higher Institute of Medical Technology in Kisangani and approval from the provincial health division head of Tshopo. This certificate was endorsed by the Academic Secretary General of the Higher Institute of Medical Techniques in Kisangani (ISTM KIS) and that of the University of Kisangani (UNIKIS). Participation in the study was voluntary, and anonymity was guaranteed from data collection through analysis to the dissemination of results.

III. RESULTS

First, we checked the educational documents available at the school administration office and the validity of the questions included in our ten-question survey. Second, we assessed performance, the minimum mastery level (MML) and the desired mastery level (DML).

3.1. Maintenance of teaching documents

The teaching documents kept at the school administration office are listed in the following table.

Table 1: Teaching documents kept at ITM UNIKIS and ITMA – ISTM - KIS

Institution Document	IMT-UNIKIS		ITMA/ISTM-KIS	
	Existing	Non-existent	Existing	Non-existent
Current course programme	Yes	-	Yes	-
Subject forecast	Yes (4)	-	Yes (2)	2
Reference frameworks	Yes(4)	-	Yes (1)	3

Looking at this table, we can see that the three aforementioned documents are present at ITM-UNIKIS, while at ITMA-ISTM/KIS, some forecasts and reference documents are missing.

3.2. Validity of questions

This study analysed the validity of each question in relation to the programme and subject forecasts at each school.

Table 2: Overall validity of questions

Institutes	Programme		forecast	
	Question	Validity	Question	Validity
ITM-UNIKIS	1	+	1	+
	2	+	2	+
	3	+	3	+
	4	+	4	+
	5	+	5	+
	6	+	6	+
	7	+	7	+
	8	+	8	+
	9	+	9	+
	10	+	10	+
% of validity		100%		100%
ITMA/ISTM-KIS	1	+	1	+
	2	+	2	+
	3	+	3	+
	4	+	4	+
	5	+	5	+
	6	+	6	-
	7	+	7	-
	8	+	8	-
	9	+	9	-
	10	+	10	-
% of validity		100%		50%

Legend: +: Valid; -: Invalid

This table shows that at ITM-UNIKIS, all questions (100%) are valid, i.e. they comply with the programme and expectations, while at ITMA-ISTM-KIS, 5 out of 10 questions (50%) do not comply with the programme and expectations.

3.3. Student performance indicators

To calculate student performance indicators (MML = Minimal Mastery Level and DML = Desired Mastery Level), two tests were administered, each containing ten questions in two subjects (Pathology and Nursing Techniques).

Table 3: Results of the pathology and nursing techniques tests at ITM UNIKIS and ITMA – ISTM - KIS

Points awarded by branch Institutes	Number of students	Pathology	Nursing technique
		Points / 20	Points / 20
ITM-UNIKIS	1	14	16
	2	15	13
	3	18	15
	4	16	15
	5	9	11
	6	8	15
	7	11	16
	8	12	16
	9	15	10
	10	17	9
	11	10	10
	12	14	11
ITMA/ISTM-KIS	1	15	9
	2	7	14
	3	7	10
	4	9	9
	5	8	10
	6	11	14
	7	18	17
	8	13	13
	9	5	10
	10	14	9
	11	16	10
	12	14	7
	13	6	12
	14	8	10
	15	12	11
	16	10	11
	17	9	13

Academic performance at IMT-UNIKIS

- In pathology
- Rdt: 13.25/20 x 100 = 66.25%
- In nursing techniques
- Rdt = 13/20 x 100 = 65%
- **Academic performance at ITMA-ISTM-KIS**
- In pathology
- Rdt = 10.7/20 x 100 = 53.5%
- In nursing techniques
- Rdt = 11.1/20 x 100 = 55.5%

The academic performance in pathology and nursing techniques at both institutes is presented in the table below:

Table 4: Performance in pathology and nursing techniques

Institution Branch	IMT-UNIKIS (%)	ITMA/ISTM-KIS (%)
Pathology	66.3	53.5
Nursing techniques	65.0	55.5
Total	**65.6**	**54.5**

A careful reading of this table shows that the pass rate in pathology is 66.3% at ITM-UNIKIS and 53.5% at ITMA-ISTM/KIS, while in nursing techniques, it is 65% at ITM-UNIKIS and 55.5% at ITMA-KIS.

Calculation of MML and DML

- Calculation of MML at ITM-UNIKIS in pathology
- MML = 10/12 x 100 = 83.3%

- Calculation of MML at ITM-UNIKIS in nursing techniques
- MML = 11/12 x 100 = 97.6%
- Calculation of MML at ITMA-ISTM/KIS in pathology
- MML = 9/17 x 100 = 52.9%
- Calculation of MML at ITMA-ISTM/KIS in nursing techniques
- MML = 13/17 x 100 = 76.4%

The MMLs in pathology and nursing techniques at both institutes are shown in the table below:

Table 5: MML in pathology and nursing techniques

Institution Branch	IMT-UNIKIS (%)	ITMA/ISTM-KIS (%)
Pathology	83.3	52.9
Nursing techniques	97.6	76.4
Total	**90.4**	**64.6**

This table shows that the MML in pathology is 83.3% at ITM-UNIKIS and 52.9% at ITMA-ISTM/KIS, while in nursing techniques it is 97.6% at ITM-UNIKIS and 76.4% at ITMA-ISTM/KIS.

- Calculation of DML at ITM-UNIKIS in pathology
- DML = 7/12 x 100 = 58.3%
- Calculation of DML at ITM-UNIKIS in nursing techniques
- DML = 6/12 x 100 = 50%
- Calculation of DML at ITMA-ISTM/KIS in pathology
- DML = 5/17 x 100 = 29.4%
- Calculation of DML at ITMA-ISTM/KIS in nursing techniques
- DML = 3/17 x 100 = 17.6%

The DMLs in pathology and nursing techniques at both institutes are specified in the table below:

Institution Branch	IMT-UNIKIS (%)	ITMA/ISTM-KIS (%)
Pathology	58.3	29.4
Nursing techniques	50.0	17.6
Total	**54.1**	**23.3**

This table shows that the DML in pathology is 58.3% at ITM-UNIKIS and 29.4% at ITMA-ISTM/KIS, while in nursing techniques, it is 50% at ITM-UNIKIS and 17.6% at ITMA-ISTM/KIS.

IV. DISCUSSION

4.1. Maintenance of educational documents

This study showed that the current course programmes, subject forecasts and course reference materials are available at the Technical Medical Institute of the University of Kisangani, while at the Technical Medical Institute of the Higher Institute of Medical Techniques in Kisangani, some forecasts and reference materials are missing.

In this regard, it should be noted that the maintenance of educational documents is a pillar of teaching quality and educational management, ensuring both learning monitoring and compliance with institutional requirements (Landu, 2012).

4.2. Validity of questions

In this regard, it was observed that at the Technical Medical Institute of the University of Kisangani, all questions (i.e. 100%) are valid, i.e. they comply with the curriculum and subject requirements. However, at the Technical Medical Institute of the Higher Institute of Medical Techniques in Kisangani, five out of ten questions (i.e. 50%) do not comply with the curriculum and subject requirements.

It should be noted that the validity of questions refers to the degree of adequacy between what one wishes to assess and what the question actually measures. A question is considered valid if it accurately measures the targeted skill, knowledge or attitude without being influenced by irrelevant external factors. It is therefore essential to ensure the quality and fairness of assessments and requires special attention during the design, review and administration of assessment tools.

4.3. Student performance indicators

In terms of academic performance, it was found that the pass rate in pathology is 66.25% at the Technical Medical Institute of the University of Kisangani and 53.5% at the Technical Medical Institute of the Higher Institute of Medical Techniques in Kisangani. In contrast, in nursing techniques, it is 65% at the Technical Medical Institute of the University of Kisangani and 55.5% at the Technical Medical Institute of the Higher Institute of Medical Techniques in Kisangani.

The literature states that academic performance refers to the results obtained by students in their learning, generally measured by grades, assessments or achievements. Performance indicators based on academic performance make it possible to analyse and quantify these results in order to better understand progress, difficulties and the effectiveness of teaching methods.

These performance indicators based on academic performance are essential tools for measuring, analysing and improving student learning. They must be used in a combined and contextualised manner, integrating qualitative approaches for a comprehensive understanding of academic performance.

With regard to the MML, it should be noted that the MML in pathology is 83.3% at the Technical Medical Institute of the University of Kisangani and 52.9% at the Technical Medical Institute of the Higher Institute of Medical Techniques of Kisangani, while in nursing techniques, it is 97.6% at the Technical Medical Institute of the University of Kisangani and 76.4% at the Technical Medical Institute of the Higher Institute of Medical Techniques in Kisangani.

The minimum proficiency threshold is a fundamental benchmark that defines the minimum level expected to validate a skill or learning, combining specific requirements, tolerance for error, and rigorous methods of establishment, with values generally ranging from 60-70% success depending on the context.

A minimum threshold set at 60% means that the student must obtain at least 60% correct answers to validate the skill or subject (SRDP, 2025).

For the common core of knowledge and skills, the thresholds for validating skills are generally between 70% and 80% correct answers, depending on the level and subject. In some systems, levels of acquisition are defined (e.g. not acquired, in the process of being acquired, acquired) with intermediate thresholds to guide formative assessment (Miconnet, 2015).

With regard to the DML, this study revealed that the DML in pathology is 58.3% at the Technical Medical Institute of the University of Kisangani and 29.4% at the Technical Medical Institute of the Higher Institute of Medical Techniques of Kisangani, while in nursing techniques, it is 50% at the Technical Medical Institute of the University of Kisangani and 17.6% at the Technical Medical Institute of the Higher Institute of Medical Techniques in Kisangani.

According to Miconnet and Vourc'h (2015), the desired level of mastery is a target level above the minimum threshold, set at around 70-80% success according to common core assessments, determined by expert consensus and based on statistical analyses. It represents the goal towards which education strives to ensure effective and lasting mastery of skills among students.

V. CONCLUSION

This study aims to compare the qualitative performance of students at technical medical institutes in the city of Kisangani and to analyse the questions on the certification exams in order to verify their validity.

Our analysis yielded the following main results:

- All questions formulated by teachers at the technical medical institute of the University of Kisangani are valid (100%), while those formulated by teachers at the technical medical institute of the Higher Institute of Medical Techniques in Kisangani are 50% valid
- Student performance in pathology (66.25% at the Technical Medical Institute of the University of Kisangani compared to 53.5% at the Technical Medical Institute of the Higher Institute of Medical Techniques in Kisangani). Meanwhile, performance in nursing techniques is 65% at the Technical Medical Institute of the University of Kisangani, compared to 55.5% at the Technical Medical Institute of the Higher Institute of Medical Techniques in Kisangani.
- The MML in pathology is 83.3% at the Technical Medical Institute of the University of Kisangani, compared to 52.9% at the Technical Medical Institute of the Higher Institute of Medical Techniques in Kisangani. However, the MML in Nursing Techniques is 97.6% at the Technical Medical Institute of the University of Kisangani, compared to 76.4% at the Technical Medical Institute of the Higher Institute of Medical Techniques in Kisangani.
- The DML in Pathology is 58.3% at the Technical Medical Institute of the University of Kisangani, compared to 29.4% at the Technical Medical Institute of the Higher Institute of Medical Techniques in Kisangani. On the other hand, the DML in Nursing Techniques is 50% at the Technical Medical Institute of the University of Kisangani, compared to 17.6% at the Technical Medical Institute of the Higher Institute of Medical Techniques in Kisangani.

Based on these results, we maintain that students at the Technical Medical Institute of the University of Kisangani who are following the new programme are performing better than students at the Technical Medical Institute of the Higher Institute of Medical Techniques in Kisangani who are following the old programme. The exam questions are 100% valid at the Technical Medical Institute of the University of Kisangani and 50% valid at the Technical Medical Institute of the Higher Institute of Medical Techniques in Kisangani.

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Contributions and responsibilities of the authors:

All authors attest to their compliance with the criteria of the International Committee of Medical

Journal Editors regarding their contribution to the article. All authors contributed to the conduct of this research and the writing of the manuscript. They have all read and approved the final version: **Bithumitho Piracel Espérance:** conceptualisation, methodology and original writing; **Kaisala Komba César and Avia Watu Antoine David**: survey; **Bofele Ngama Tonton:** data preservation; **Bosilelo Boboliki Bouclé:** preparation of the original draft; **Kuda Mbuya Héritier**: analysis of results; **Ependja Towaka Antoine**: supervision, writing and editing.

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