



IJSRIS
journal
ISSN: 2820-7157

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RECEIVED
17 August 2026



ACCEPTED
09 September 2026



PUBLISHED
1 October 2026



Pages from:



October 2026



Volume 5



Number 5

102 to 112

Didactic transformation of the general nursing techniques course in the first year at the institut supérieur des techniques médicales in Lubumbashi: a mixed-methods study of teaching practices and learning conditions

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ABSTRACT

Background: The General Nursing Techniques (GNT) course forms an important foundation of nursing education, but its

delivery must integrate knowledge, technical skills and professional attitudes. This study aimed to analyse the teaching methodology of the GNT course in the first year of the Bachelor's degree programme at the Higher Institute of

Medical Techniques (ISTM) in Lubumbashi and to propose a suitable teaching framework.

Methods: A descriptive and analytical mixed-methods study was conducted involving 150 first-year students and 10 lecturers. Quantitative data were collected via a questionnaire and analysed using descriptive statistics and analysis of variance (ANOVA). Qualitative data were obtained from interviews with lecturers and direct observation of 10 sessions, using a checklist focusing in particular on preparation, methods, teaching materials, student participation, practical activities and assessment.

Results: The majority of students (86.7 per cent) considered practical demonstrations to be important or very important. However, 49.3 per cent felt that varied teaching methods were rarely or never used, and 50 per cent considered the teaching materials to be unsatisfactory or inadequate. Students mainly cited an insufficient number of practical sessions (32.7 per cent) and a lack of teaching materials (25.3 per cent). Sixty-four per cent felt they had a good or very good level of skills acquisition. The use of a variety of teaching methods was associated with a significant difference in learning scores ($F = 19.72$; $p < 0.001$), as were the availability of teaching materials ($F = 17.05$; $p < 0.001$) and active participation ($F = 21.13$; $p < 0.001$). Age and gender were not significantly associated with the indicators studied. Among teachers, lectures were reported by all (100 per cent), compared with 20 per cent for case studies/simulations. Observation confirmed that demonstrations were carried out in 70 per cent of sessions, but that teaching sheets were used in only 30 per cent of sessions and formative assessment was observed in 30 per cent.

Conclusion: The results point to the need for integrated, student-centred teaching, supervised practice, methodological diversification, structured teaching materials and skills assessment.

Keywords: teaching methodology; General Nursing Techniques; nursing education; active learning; professional competences; ISTM Lubumbashi.

1. Introduction

The quality of training for healthcare professionals is closely linked to the ability of training institutions to develop scientific knowledge, technical skills, professional attitudes and the ability to act safely in complex situations. In nursing education, this requirement is particularly important, as competence cannot be reduced to the memorisation of procedures: students must progressively integrate knowledge,

psychomotor skills, clinical reasoning, communication, ethics and patient safety principles (Frenk et al., 2010; World Health Organisation [WHO], 2021, 2022).

The General Nursing Techniques (GNT) course marks the start of this professional journey. It introduces first-year students to the fundamental principles of care, hygiene, infection prevention, patient positioning, vital signs, comfort care, basic technical procedures and professional conduct. The quality of teaching on this course therefore has implications for subsequent clinical learning, as students need opportunities to observe, practise, receive feedback, correct their mistakes and gradually develop their autonomy (Benner, 1984; Potter et al., 2021; Kozier et al., 2022).

Contemporary approaches to vocational training are increasingly focusing on active learning, simulation, case-study-based activities, supervised practice and competence-based assessment. Active learning is associated with improved student performance, whilst experiential learning emphasises the cycle linking practical experience, reflection, conceptualisation and active experimentation (Prince, 2004; Freeman et al., 2014; Kolb, 1984). Simulation also provides a controlled environment in which learners can practise technical and decision-making skills before being confronted with real clinical situations (Gaba, 2004; Jeffries, Rodgers, & Adamson, 2015).

From a didactic perspective, the central issue is not simply the quantity of content conveyed, but the way in which professional knowledge is transformed into teachable knowledge. Chevallard's theory of didactic transposition emphasises the transformations through which knowledge becomes a subject for teaching. In professional healthcare education, this transformation requires the selection and sequencing of content, appropriate learning situations, suitable resources and assessment strategies that measure meaningful performance (Chevallard, 1985). The competence-based approach complements this perspective by emphasising the learner's ability to apply knowledge, skills and attitudes in relevant situations (Perrenoud, 1998; Tardif, 2006).

The need for such a transformation is particularly relevant in educational contexts characterised by limited resources. The source study identified persistent concerns regarding the teaching of TGS at ISTM Lubumbashi, notably the lack of practical activities, limited teaching resources, the continued use of transmissive methods, and difficulties in linking theoretical content to practice. The study therefore examined how current teaching practices influence the quality of

teaching and the acquisition of professional skills, as well as which elements could be reorganised to improve the course.

The objective of this article is to present the empirical findings of the study in an internationally recognised IMRAD format and to examine the extent to which teaching methods, instructional resources and active student participation are associated with learning outcomes. The article also uses the convergence of student, teacher and observational data to formulate a context-sensitive pedagogical framework for GNT teaching at ISTM Lubumbashi.

2. Methods

2.1. Type, approach and framework of the study

A descriptive and analytical mixed-methods study was conducted at the Institut Supérieur des Techniques Médicales (ISTM) in Lubumbashi, in the province of Haut-Katanga, in the Democratic Republic of the Congo. The quantitative component described students' perceptions and examined the statistical relationships between selected pedagogical factors and learning indicators. The qualitative component explored the experiences and perceptions of teachers, whilst direct observation was used to document teaching practices during actual lessons. The methodological framework followed the mixed-methods design presented in the underlying DEA thesis.

2.2. Participants and sampling

The quantitative sample consisted of **150 first-year undergraduate students** enrolled at the ISTM in Lubumbashi and taking the TGS course. Ten lecturers involved in teaching this course participated in the qualitative component. The thesis describes a **reasoned non-probabilistic sampling** approach, with participants selected on the basis of their direct experience of the course. The inclusion criteria applied to first-year students who were duly enrolled and had taken or were taking the TGS course, lecturers who were teaching or had taught this course, and participants who had voluntarily agreed to take part.

2.3. Data collection

Data from students were collected using a **structured questionnaire** covering teaching methods, course organisation, practical demonstrations, teaching resources, student participation, perceived acquisition of skills, learning difficulties and overall satisfaction. Data from lecturers was collected through **interviews** focusing on lesson preparation, teaching methods, difficulties encountered, available resources and suggestions for improvement. **Direct**

observation was carried out during 10 teaching sessions using a checklist covering lesson preparation, organisation of content, teaching methods, teaching materials, student engagement, practical activities and assessment.

2.4. Data analysis

Quantitative data were summarised using **frequencies, percentages and mean scores for learning outcomes or satisfaction**. An **analysis of variance (ANOVA)** was used to examine differences in results according to gender, age, the variety of teaching methods, the availability of teaching resources and the level of student participation. Statistical significance was interpreted at **the 5 per cent threshold**. Qualitative data from interviews with teachers were organised using **thematic analysis**. The results from students, teachers and observations were then compared to identify points of agreement and disagreement, in line with a **triangulation** approach.

2.5. Ethical considerations

The underlying study reports that anonymity, confidentiality, voluntary participation, informed consent and respect for participants' dignity were taken into account. No ethics committee approval number is reported in the source thesis. For submission to a journal, the authors should include a formal reference to institutional ethical approval, if available, prior to submission.

2.6. Methodological limitations

The interpretation of the results must take into account several limitations inherent in the source study: the research was conducted at a single institution; the sample of students was selected using purposive sampling; several results were based on self-reported perceptions; and the observational component covered 10 sessions. The study design therefore allows for the identification of associations and a contextual interpretation, but does not allow for the establishment of causal effects of a specific educational intervention. Furthermore, the proposed educational programme was developed on the basis of the results, but was not experimentally evaluated within the framework of the reported study.

3. Results

3.1. Characteristics of the student sample

Variable	n	%
Male	62	41.3
Female	88	58.7
Total	150	100

Female students accounted for 58.7 per cent of the sample. In terms of age, 46 students (30.7 per cent) were aged 18–20, 72 (48.0 per cent) were aged 21–23, and 32 (21.3 per cent) were aged 24 or over. The sample was therefore predominantly young and female.

Age group	N	%
18–20 years	46	30.7
21–23 years	72	48.0
24 years and over	32	21.3
Total	150	100

3.2. Students' perceptions of teaching and learning conditions

Indicator	Category	n	%
Organisation of the course	Very satisfactory	28	18.7
	Satisfactory	65	43.3
	Somewhat unsatisfactory	43	28.7
	Unsatisfactory	14	9.3

Diversification of teaching methods	Always	22	14.7
	Often	54	36.0
	Rarely	56	37.3
	Never	18	12.0
Practical demonstrations	Very important	79	52.7
	Important	51	34.0
	Low	17	11.3
	No contribution	3	2.0
Teaching resources	Very satisfactory	18	12.0
	Satisfactory	57	38.0
	Somewhat unsatisfactory	52	34.7
	Inadequate	23	15.3

Overall, 62.0 per cent of students rated the organisation of the course as satisfactory or very satisfactory. Diverse teaching methods were reported to be used always or often by 50.7 per cent, whilst 49.3 per cent reported that they were used rarely or not at all. Practical demonstrations were considered important or very important by 86.7 per cent of students. Half of the respondents rated the availability of teaching resources as satisfactory or very satisfactory, whilst the other half considered them to be rather unsatisfactory or inadequate.

Student participation	n	%
Very active	31	20.7
Active	69	46.0
Low	39	26.0
Very low	11	7.3
Total	150	100
Perceived acquisition of skills	n	%
Very good	25	16.7
Good	71	47.3
Average	43	28.7
Low	11	7.3
Total	150	100

Two-thirds of students (66.7 per cent) described their participation as active or very active. Similarly, 64.0 per cent rated their acquisition of skills as good or very good, whilst 36.0 per cent reported an average or low level.

Main learning difficulty	n	%
Lack of practical activities	49	32.7
Lack of teaching materials	38	25.3
Difficulty understanding concepts	29	19.3
Large volume of content	21	14.0
Other difficulties	13	8.7

Total	150	100
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The most frequently reported difficulty was the lack of practical work (32.7 per cent), followed by a lack of teaching materials (25.3 per cent) and difficulty in understanding the concepts (19.3 per cent).

Overall satisfaction	n	%
Very satisfied	24	16.0
Satisfied	70	46.7
Somewhat satisfied	43	28.7
Dissatisfied	13	8.6
Total	150	100

Overall, 62.7 per cent of students were satisfied or very satisfied with the teaching of TGS, whilst 37.3 per cent reported low satisfaction or dissatisfaction.

3.3. Relationships between pedagogical factors and learning indicators

Comparison	Statistical	p-value	Interpretation
Gender and satisfaction	F = 0.018	> 0.05 (0.894)	Not significant
Age and skill acquisition	F = 1.48	> 0.05 (0.231)	Not significant
Diversification of teaching methods and learning scores	F = 19.72	< 0.001	Significant
Teaching resources and learning performance	F = 17.05	< 0.001	Significant

Active participation and overall learning score	F = 21.13	< 0.001	Significant
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Gender was not significantly associated with satisfaction ($F = 0.018$; $p = 0.894$), and age was not significantly associated with skills acquisition ($F = 1.48$; $p = 0.231$). In contrast, the pedagogical variables showed statistically significant differences. Students exposed to a variety of teaching methods achieved an average learning score of 16.1/20 when these methods were always used, compared with 12.4/20 when they were never used. The average scores were 16.2/20 amongst students who reported very satisfactory teaching resources, compared with 12.9/20 amongst those who reported insufficient resources. Students who participated very actively had an average score of 16.3/20, compared with 12.5/20 for those who participated very little.

These results identify the learning environment, rather than basic demographic characteristics, as the main factors associated with variation in the learning indicators measured in this study.

3.4. Teachers' perspectives

Teaching experience	n	%
<5 years	2	20
5–10 years	3	30
>10 years	5	50
Total	10	100
Lesson preparation	n	%
Systematic, with structured objectives and content	4	40
Regular, without a detailed teaching guide	5	50
Occasional	1	10
Total	10	100

Nine out of ten teachers (90 per cent) reported preparing their lessons regularly, but only four (40 per cent) reported systematic preparation incorporating learning objectives, methods, learning activities and assessment.

Teaching method cited	n	% of teachers
Lecture	10	100
Practical demonstration	8	80
Q&A	6	60
Supervised practical work	5	50
Case study/simulation	2	20

Lectures remained the most common teaching method among the teachers surveyed, whilst simulations or case-based learning were reported by only 20 per cent.

Difficulties reported by teachers	n	%
Insufficient demonstration equipment	8	80
High staff numbers	7	70
Insufficient time for practical activities	6	60
Mixed ability of students	5	50
Lack of standardised teaching resources	5	50

Resource constraints were significant. Eight teachers (80 per cent) identified a shortage of demonstration equipment, seven (70 per cent) cited large student groups, and six (60 per cent) reported insufficient time for practical work.

Proposed improvements	n	%
Develop a teaching guide for the course	9	90
Increase the number of practical sessions	8	80
Develop visual and digital resources	7	70
Provide pedagogical training for teachers	6	60
Reorganising practical groups	5	50

3.5. Direct observation of teaching practices

Observation criterion	Yes n (%)	Partially n (%)	No n (%)
Lesson objectives stated	4 (40)	3 (30)	3 (30)
Progressively organised content	6 (60)	3 (30)	1 (10)
Teaching sheet used	3 (30)	2 (20)	5 (50)
Diverse teaching methods	4 (40)	4 (40)	2 (20)
Practical demonstration carried out	7 (70)	2 (20)	1 (10)
Active student participation	5 (50)	3 (30)	2 (20)
Visual aids used	4 (40)	3 (30)	3 (30)
Care equipment available	3 (30)	5 (50)	2 (20)
Formative assessment at the end of the session	3 (30)	4 (40)	3 (30)

Direct observation showed that practical demonstrations were present in 70 per cent of the sessions. However, teaching guides were used in only 30 per cent of the sessions, a variety of teaching methods were fully observed in 40 per cent, and formative assessment was observed in 30 per cent. With

regard to overall teaching quality, six of the ten sessions (60 per cent) were rated as satisfactory or very satisfactory, whilst four (40 per cent) were rated as average or poor.

Organisation of practical activities	Sessions	%
Students carried out the technical procedures themselves	3	30
The students mainly observed the teacher's demonstration	5	50
No practical activities	2	20
Total	10	100

In half of the sessions observed, students were primarily in an observational role, whilst they carried out the technical procedures themselves in only 30 per cent of the sessions. This finding is consistent with the students' reported need for more practical work.

3.6. Triangulation of results

Dimension	Students	Teachers	Observation
Practical activities	86.7% consider demonstrations to be important/very important	80 per cent recognise their importance	Used in 70 per cent of sessions
Diversification of teaching methods	49.3 per cent report that they are rarely/never used	Simulations/case studies reported by 20 per cent	Fully observed in 40 per cent of sessions
Teaching resources	50 per cent consider them poor/inadequate	60 per cent consider them poor/inadequate	Equipment fully available in 30 per cent of sessions
Student participation	66.7 per cent report active/very active participation	Teachers report that they encourage participation	Active participation observed in 50 per cent of sessions

Need for a teaching approach	Need identified through perceptions	90 per cent support the development of a teaching guide	Need confirmed by the shortcomings observed
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The three data sources converged on four priorities: strengthening practical activities, improving teaching resources, diversifying teaching methods and structuring learning sessions in a more systematic way. This convergence supports the development of an integrated teaching framework rather than an isolated change to the course content.

4. Discussion

The main finding of this study is that pedagogical variables were more strongly associated with learning indicators than the demographic characteristics examined. Students exposed to more diverse teaching methods, better teaching resources and higher levels of active participation achieved significantly higher learning scores. This trend is consistent with the literature on active learning, which shows that students benefit when they engage cognitively and behaviourally in the learning process rather than remaining passive recipients of information (Prince, 2004; Freeman et al., 2014).

The emphasis placed on practical demonstrations is particularly relevant to nursing education. In this study, 86.7 per cent of students considered demonstrations to be important or very important, whilst observation confirmed that demonstrations were carried out in 70 per cent of sessions. However, in half of the sessions observed, the students mainly watched the teacher perform the procedure. This distinction is pedagogically significant: demonstrations can facilitate understanding, but competence requires repeated practice, feedback, correction and progressive autonomy. This finding is consistent with experiential learning, in which hands-on experience and active experimentation are essential components of learning (Kolb, 1984), as well as with competence-based nursing education, which emphasises gradual exposure to professional situations (Benner, 1984).

The limited use of simulation and case-based methods is another significant finding. Although all tutors reported using lectures and 80 per cent reported using practical demonstrations, only 20 per cent mentioned case studies or simulation. This indicates a teaching model that remains largely transmission-oriented, despite the professional nature of the TGS. Simulation has been proposed as a safe environment for practice, decision-making, repetition, teamwork, feedback and debriefing before students enter real

clinical settings (Gaba, 2004; Jeffries, 2012; Jeffries et al., 2015).

Teaching resources were also significantly linked to learning performance. Students who reported very satisfactory resources had an average score of 16.2/20, compared with 12.9/20 for those reporting insufficient resources. Teachers independently described a lack of demonstration equipment as their most common difficulty (80 per cent), and direct observation showed that equipment was fully available in only 30 per cent of sessions. The agreement between the data sources reinforces the interpretation that the availability of resources is not merely a student perception, but an observable condition affecting the learning environment.

Student participation showed the highest F-statistic among the three teaching methods compared ($F = 21.13$; $p < 0.001$). Students who participated very actively achieved an average score of 16.3 out of 20, compared with 12.5 out of 20 for those who participated very little. This finding is consistent with socioconstructivist perspectives, which emphasise interaction and guided participation, as well as with active learning approaches that position learners as participants in the construction of knowledge (Vygotsky, 1978; Freeman et al., 2014). It must nevertheless be interpreted as an association rather than as evidence that participation alone led to higher performance, given the observational nature of the study design.

The absence of statistically significant differences by gender and age suggests that the pedagogical difficulties identified in this study should not be attributed to these characteristics. Satisfaction scores were almost identical across genders (3.69 for men and 3.70 for women; $p = 0.894$), whilst age was not significantly associated with skills acquisition ($p = 0.231$). The practical implication is that improvement efforts should focus on the learning environment, teaching strategies, resources and supervision rather than demographic categories.

The triangulation of student reports, teacher interviews and observation is a major strength of the study. Students reported a lack of practical work and resources; teachers described shortages of equipment, large class sizes, limited practical time and a need for structured teaching tools; observation confirmed the limited use of teaching guides, the incomplete diversification of methods and the inadequacy of formative assessment. Such convergence enhances the credibility of the interpretation, as the same pedagogical bottlenecks emerge across independent sources (Denzin, 1978).

From a didactic perspective, these findings support a shift from a content-centred model towards a coherent teaching

system. The concept of didactic transposition implies that professional knowledge must be selected, sequenced, adapted and transformed into teachable situations (Chevallard, 1985). For TGS, this means organising each technical procedure around explicit competences, prerequisites, a demonstration, guided practice, independent practice, feedback, reflection and criteria-based assessment. This approach is also consistent with competence-based education, in which knowledge is applied in meaningful contexts rather than assessed solely through the recall of knowledge (Perrenoud, 1998; Tardif, 2006).

The proposed programme should therefore include a modular organisation of content; structured teaching sheets; standardised procedural guides; demonstrations followed by practical work carried out by students; small-group practice where possible; simulation and case-study-based activities; visual and digital resources; and formative assessment using explicit criteria. These elements are directly supported by the study's findings and by the priorities expressed by the teachers themselves, notably the request for a teaching guide (90 per cent), more practical sessions (80 per cent) and visual or digital resources (70 per cent).

5. Conclusion

This mixed-methods study shows that the pedagogical organisation of the General Nursing Techniques course at ISTM Lubumbashi has both strengths and significant room for improvement. Students appreciate the practical demonstrations and report generally favourable levels of participation and satisfaction, but a significant proportion identify a lack of practical work, limited resources and an inadequate variety of teaching methods. Statistical analyses reveal significant differences in learning outcomes depending on the variety of teaching methods, the availability of teaching resources and the level of active participation, whilst gender and age were not significantly associated with the outcomes studied.

Interviews with teachers and direct observation reinforce these findings by documenting the continued reliance on lectures, the limited use of simulation and case-based learning, the incomplete use of structured teaching guides, and formative assessment that is insufficiently systematic. The convergence of these three sources supports an integrated pedagogical transformation rather than a mere revision of content. In this context, a learner-centred, competence-based model—combining structured content, practical demonstration, supervised practice, simulation, appropriate teaching resources and formative assessment—represents the most coherent direction emerging from the study.

Future research should prospectively evaluate the proposed approach, preferably using a controlled or quasi-experimental design involving objective assessments of skills, in order to determine whether the identified pedagogical changes produce measurable improvements in technical performance and transfer to clinical practice.

6. Practical implications

- Develop and implement a standardised teaching guide for the TGS course.
- Increase the proportion and frequency of supervised practical sessions and reduce situations in which students remain solely as observers.
- Use a structured sequence for technical skills: objectives and prerequisites → demonstration → student-guided practice → correction and feedback → independent practice → skills assessment.
- Diversify teaching strategies by combining interactive lectures, demonstrations, simulation, case studies, peer learning and problem-solving activities.
- Produce teaching resources tailored to the context, including procedure sheets, visual aids, videos where possible, and skills assessment checklists.
- Strengthen teachers' pedagogical development in the areas of a competence-based approach, simulation, formative assessment and active learning.
- Reorganise practical groups where possible to increase opportunities for individual hands-on practice and feedback.

7. Declarations

Authors' contribution statement

The author, **MBAYA KABONGO Bijoux**, is the lead author of this study. I was involved in the design and direction of the study, data collection, analysis and interpretation of the results, as well as the drafting and revision of the manuscript. I take responsibility for the integrity of the scientific content presented in this article and approve the final version for publication.

Ethical statement

The study was conducted in accordance with the ethical principles applicable to research involving human

participants. Participation was voluntary and participants were informed of the study's objective. Anonymity, the confidentiality of the information collected and respect for participants' rights were guaranteed.

Declaration of Consent

Informed consent was obtained from participants prior to their participation in the study. Participants were informed that they could withdraw from the study at any time without any consequences.

Funding statement

This study did not receive any specific funding from a public or private body or from a non-profit organisation.

Declaration of Conflict of Interest

The author declares **that they have no conflicts of interest** that may have influenced the study design, data collection or analysis, interpretation of results or drafting of the manuscript.

Data availability

The data used in this study were obtained from the survey conducted as part of the DEA dissertation. They may be made available by the corresponding author, subject to compliance with ethical requirements, participant confidentiality and applicable institutional provisions.

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