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# Proximity Industrial Materials, Tasks Constructions and Learners Intelligence Development in Sciences of Education to the Environment in Primary Schools of Far North Region of Cameroon

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**Abstract**
Cameroon primary schools since some years ago are facing on one hand a loud shortage of instructional material and on the other hand a surge of pedagogic approaches. This situation has leaded us to question ourselves on the influence of the use of proximity instructional material in relation to the building of tasks on the development of pupils' intelligence. In guise of Methodology, a questionnaire was administered to 357 primary school teachers of the Far North Region of Cameroon. Data collected are analysed through mixed and statistical methods, and hypotheses tasted by Chi two. Results have shown that proximity instructional material and the building of tasks facilitate the development of learners' intelligence.
**Keywords:** proximity instructional material, task, intelligence.

## 1. Introduction

The aim of this work is to show that the use of proximity instructional material and the building of tasks in the teaching-learning process of sciences and the Education of the Environment contribute to the development of learners' intelligence.

By "Proximity Instructional material" we mean, the group of tools, current objects of the immediate environment that can be used in the teaching-learning processes of Sciences and Education to the environment. In effect, the current debate on the use of proximity instructional material in the teaching and learning process has proposed numerous reflections and proposals. No pedagogic seminar takes place within the framework of continuous training of teachers, no recycling workshop where one does not insist on its use in the primary school. Its use is evident in the putting in practise of the said active learning methods which has an objective to render the learner sufficiently active all through the lesson.The learner is as such called to discover through experiment and to interiorise stereotyped mechanisms. Meanwhile there is no experiment without material and this, not only should be adapted to the lesson, but especially coming from the teacher's immediate environment.

While, quantitative expansion and the qualitative improvement of educative systems of developing countries have been accompanied by a rapid growth of needs in materials and didactic equipments; but to a greater extent the materials and equipments currently used in developing countries are no more adapted to needs and to the socio-economic environment. In numerous cases, these materials are imported from industrialised countries and in a general way their conception comes from foreign educational models. They are conceived for learners of developing countries and do not always suit Cameroon children for the contents and set objectives are different and do not exactly respond to educative programs and to national reality.

Due to reason of persistent economic crisis, education financing has taken a seal in the wing. The prolonged installation of the latter, couple with the devaluation of the CFA franc in 1994, multiple structional adjustment programs, has considerably reduce the efforts of states to equip our schools with adequate didactic material. The general emprovishment of the population, with an accentuated degree in the rural area, and the importance in the cost of importations in the material and other educative equipments have rendered these materials inaccessible for the schools. These school establishments, particularly those of the primary, especially in the rural area are almost devoid of didactic materials. This ascertainment was made during our multiple passages in primary schools,supported by some interviews with class teachers and school officials. This material, when it comes to exist, is of an approximate quality and reduces in great majority from schools that we have visited to a few counters, to blackboard and to the teachers (text) book. The problem is posed with acridity in the teaching of sciences, where an almost complete absence of pedagogic tools is not noticed. Here we mean, a grievous situation, a real challenge for the teacher, to correctly teach sciences with nothing.

Meanwhile a sufficiently large agreement exists amongst specialists as regards the importance of the role that science can or must play in the context of education at the levels, and on the necessity to give the children the possibility to develop their innate curiosity, the use of their senses action and reflexion capacities, in a coherent manner, in interaction with their social and natural environment. But the situation is not also clear as soon as it comes to goal settings and specific objectives to attain and it is even less as concerns the adequate manner to render these objectives to a group activities which will contribute in an efficient and adequate manner

to the acquisition of scientific concepts by the children, some attitudes and technical competencies that they will need. To learn sciences, work therefore as a scientist, and the work place of a scientist is the laboratory and the field. The work of the scientist requires equipments. Concrete scientifical activities of learners requires experiments and manipulations; also demand a minimum of scientific equipments. These equipments are indispensable, for in their absence, the teaching of sciences is nothing but a formulation of solely bookish or oral knowledge, whose educational value is almost invalid.

To this effect, to palliate these pedagogic tools insufficiency in school establishments of most developing countries, UNESCO, in one of his educative missions, proposes the use of local material from origin. To UNESCO (2000), a change of mentality seems necessary. In effect to this organization:

‹‹ *The fact to consider that all local product is not competitive as regards imported product is not valid in the domain of education for the exploitation of local resources is a trump and a departure for the reinforcement of endogenous capacity in terms of conception, the fabrication of didactic materials but competitive in relation to foreign products* ››.

The pedagogical advantages of this solution are that these materials correspond better to the experiments of the learner and better respond to his own needs and that of his country. They also enable the learner to approach the study of sciences by personal experiment. To this effect, since the 80's, UNESCO has organised workshop-seminars in developing countries on the manufacturing and utilization of material, of current objects and local manufacturing appliances in the teaching of sciences.

In Eastern Africa, schools orientate at the level of primary towards teachings which learn on borrowed materials in areas where learners live. What justifies these activities, is an ideology of the concrete significance of the link of things to the individual, for more authentic scientifical attitudes can be created thanks to borrowed examples to real life and its problems. The United Nations Fund for childhood (1988) has equally followed the steps of UNESCO, by supporting in series manufacturing projects of less costly didactic materials. For example the case of Sri Lanka which possesses a unit of mounting and production of scientific materials where up to now imported from England at high costs. Scientific appliances for elementary teaching are actually manufactured in India, in the frame work of a vast Indian project of reform of school programs of all the country, supported by many international organizations. Madagascar processes some organs of conception, manufacturing, production, diffusion and maintainance of didactic materials and educative equipments. All these examples interpret the importance that the institutions of United Nation Systems, followed by developing countries give to the utilization of local origin materials as didactic tools.

In Cameroon since some years ago, some efforts although timid; are been made for the furnishing of schools in locally made didactic materials. To this intention the Cameroonian public authorities through MINEDUB have instituted by law N° 163/B1/1464/MINEDUB/CAB of 14th February 2004 a national day of promotion of didactic made from local recovered materials. However, this initiative impinges to certain gravities especially linked to the less favourable socio-cultural and environment, to the incapability of most of the teachers observed the conception and manufacturing of this type of material; especially with the advent of new pedagogic approaches whose didactic procedures are demanding. From where the almost inexistence of this type of adequate material in our schools. In effect, the situation in our schools is far from being envied, as concerns their equipments in didactic materials where all is most often summarized to a few obsolete didactic materials, at the teacher's lectern and at the blackboard. It is therefore convenient heeding to the present educational policy which tilts more and more to adapt teaching to local realities, to envisage a local situation in view to support the enormous needs of our schools in didactic materials. Immersing knowledge ‹‹ *more so, their roots in the middle of life, and Cameroonian culture will serve as instruments to study some situations offering in the environment and find them an answer or a solution*›› (IPAR, 1972:13)

The teacher is as such called to draw upon the necessary materials from the learners' immediate environment for his teachings. These said vicinity materials better correspond to the daily experience of learners. These teachers are more or less constrained to do it from the moment whereas supported by Matchinda (1999:108)‹‹…*financial resources shall again for long remain insufficient in Africa, it shall especially be preferable to search accessible equipment and material in the locality* ››.

The teacher and at times the learners and to a lesser measure learners' parents, are obliged to conceive and manufacture the necessary didactic materials, particularly in Sciences. What can be the quality of such a material knowing that the conceptors and manufacturers do not have a solid knowledge in the domain?

Elsewhere, resent results from cognitive psychology researches come to greatly modify knowledge as regards the evolution and working of the brain and memory, hence knowledge on the manner that learners learn. According to Morisette (2002), the contribution of neurosciences to pedagogy is at a determining point that several researches in education permit themselves to affirm that pedagogy is a science. Consequently, teachers have advantage to master the bases of modern conception of learning in other to better sustain the learners in their learning process and to evolve in their practise at the rhythm of this new science. Discoveries on the working of the human mind give us some precious enquiry on the types of more efficient interventions than

others to enable learners carry out a solid and lasting learning. These very resent discoveries incite to pass from a pedagogy of the transmission of knowledge to a pedagogy of building of knowledge. Morisette (ibid), assert elsewhere that to learn, is to build ones' own knowledge by himself through a transformation of his models, his representations. It is for this reason that the teacher must facilitate these transformations by putting adequate situations in place. These methods of teaching modify according to his personality and the environment in which he works. This particularly pedagogic environment must be created by the teacher so as to render his learners active in the process of their knowledge building. To this effect, the teacher must build tasks that he will propose to learners. These tasks must present certain characteristics: complex, contextualised and significant to enable learners to operate, to put themselves in action to build their knowledge and consequently develop their intelligence. For these knowledge to be effectively put in place, should one not have an adequate didactic material? In other words, what can be the influence of the use of a proximity didactic material and the building of tasks on the development of learners' intelligence? In other words, does proximity didactic material and the building of tasks influence the development of learners' intelligence?

This main question which will guide our work gives room to other questions termed secondary: Does audio-visual utilization determine the development of learners' intelligence? That is our first research question.

Apart from audio-visual tools, learners and teachers can dispose of mechanical models, some vegetal specimens, and small proximity laboratory material. As such, research questions that we can ask ourselves are as follows:

-Does the quality of animal and vegetal samples determine the development of learners' intelligence?

-Does the quality of small proximity laboratory material contribute to the development of learners' intelligence?

-Does tasks building determine the development of learners' intelligence?

-Does the construction of tasks depends on the development of learners' intelligence?

These interrogations give way to three research hypothesis formulated as follows:

RH1: Proximity audio-visual utilization determine learners' intelligence.

RH2: The quality of animal and vegetal samples determine the intelligence of learners' intelligence.

RH3: The quality of proximity laboratory material contribute to the development of learners' intelligence.

RH 4: The construction of tasks depends on the development of learners' intelligence

## 2. Methodology

### 2.1. Study population and characteristics

The teachers who have participated to this study are those of primary schools Diamaré, Mayo-Danay, Mayo-Kani and Mayo-Tsanaga divisions of the Far North Region of Cameroon. The enrolment of this accessible population is 357 teachers made up of holders of professional diplomas of various grades; they are either civil servants contract or contractualised teachers; and of teachers not bearers of professional diplomas who, for most of them do not have professional diplomas but academic diplomas and do not crop on the state budget. The period of data collection took place on during the months of April and May 2017. For the 357 questionnaires distributed, 300 were returned, which corresponds to a recovery rate of 84.03%. These responders present the following characteristics: 57.30% are men, against 42.70% of women; the average ages fluctuate between 31 and 40 years with 60.70%. These teachers have between 5 and 15 years of teaching experience in primary schools. As concerns their grades, let us note that contractualised grade One teachers (CG1T) holders of CAPIEMP, are the most represented (84.66%), followed by teachers without professional diploma (7%). Next comes civil servant teachers (IEG: 6.70%; IAEG: 1.30%; and IAA's:0.30%). These teachers are handlers of class two up to class six, with those of class three who present the highest population (30.70%).

### 2.2. Data Collection Instrument

The questionnaire and data collection instruments that we used, our research being exploratory and targeting to show the link that exist between the quality of proximity didactic material in Sciences and Education to the Environment, the building of tasks to propose to learners and their impact on the development of learners' intelligence. This questionnaire is organised in five headings thus the first four are geared towards independent variables of each of our research hypothesis: and the fifth heading regroups questions that treat the dependent variable which is unique.

As regards the quality of audio-visual tools, three items enable to evaluate this quality; for the quality of vegetal and animal samples, three items equally help to evaluate it. Four questions help to evaluate the quality of proximity laboratory material. The building of tasks is evaluated through seven questions. Meanwhile the development of intelligence is evaluated through the help of four questions.

## 3. Results

Our search being exploratory, to treat our data we have used descriptive statistics and inferential statistics. Before applying these statistics tests, we have proceeded by a codification of data, which were henceforth treated through the help of SPSS 17.0 Software. More so, we have shown the degree of significance of the link between

the variables of our hypothesis thanks to the calculation of contingence Coefficient(c) which indicates the strength of linkage between two variables.

### 3.1. First Phase of analysis: Descriptive analysis

This first phase is descriptive, it helps to bring out informations on the phenomenon studied. These informations are been presented in tables and in form of circular diagrams or disks. Indice of percentage (Pi) has enabled us to characterise our data.

- **As of the Utilization of audio-visual tools**

We realize that 57% of our investigation affirm to often use audio-visual tools against 39% who support that they never use these didactic materials. These results are been justified by the fact that for their usage, these tools require certain conditions such as electrification of the school; meanwhile most of our schools are not. More so, these audio-visual tools are not easily accessible by the teachers, meanwhile we are in the hour of NLE (Numerical Learning Environment). This handicap constitutes a brake to the responsibilisation of the learner, to his autonomy and as a result an influence on his development as regards the cognitive aspect.

- **Of the quality of audio-visual tools used**

The data collected clearly shows that 5% of our respondents estimate that the quality of audio-visual tools is good; against 42% who think that it is approximate and 7% say the quality is bad. These percentages allow to believe that teachers can well find audio-visual tools of good quality in their environment to illustrate their lessons. This is a proof of the richness of our immediate environment.

- **About the quality of animals and vegetables samples**

Results indicate that a relative proportion of our respondents (46.3%) estimate that the vegetal and animal samples that they use are of good quality, meanwhile 43.7% affirm that this quality is approximate and only 10% support that it is bad. Explanations to be given reside in the fact that these didactic materials are immediately available and accessible and to teachers who can select amongst a large fan of during class outings.

- **About the quality of proximity laboratory material**

These data shows that 46.7% of our respondents estimate that this laboratory material is a good quality, 48% affirm that the quality is approximate and 52% say that this quality is bad. [Explanations to be given reside in the fact that these didactic materials are immediately available and accessible]. These results indicate well that one can find a laboratory material of good quality in the immediate environment; hoping that the effectively use them. In the case where the school disposes of a micro-science Kit, the laboratory material is carefully disposed there. If it's the teacher who provides it, the quality can only be approximate.

- **About the frequency of tasks proposal to learners**

Results obtained indicate that 60.7% of respondents often propose tasks to their learners, against 27.7%who alwayspropose and 11.7% never submit their learners to tasks.Those teachers who do not propose tasks to are certainly those who have no ideaabout the notion of *tasks*. On the other side, it will be interesting to know if the tasks proposed to learners respond to the characteristics of a task.

- **Of the quality of tasks proposed to learners**

Regarding our results we note that, 49.7% of our respondents affirm that the quality of tasks they propose to learners is good, 37.3% support that the quality is approximate, against 13% who say that the quality of tasks proposed to learners is bad. These results do justify by the fact that tasks is a recent pedagogical data and others are not sufficiently equipped in the construction of tasks. Meanwhile the importance of tasks had been demonstrated by the works of Morissette and of Roegiers (2003)who affirm that (2002) *task presently* constitutes *the most pedagogic approach most susceptible to start the process to learn in a child.*Morissette in her works presents the advantages of a tasks both for learners as well as for teachers.

- **About the level of tasks resolution by pupils**

We note at the light of resultstha a relative majority of our respondents (51.3%) estimate that the level of tasks resolutions of pupils is high if During sciences and environmental education lessons a familiar didactic material to them is been used.Elsewhere, 48% think that this level is average.The aptitude to execute tasks by pupils dependson many modalities amongst which: the quality of didactic material, its usage even, the nature of tasks proposed**.**

### 3.2. Second phase of analysis: inferential analysis

Continuing from the descriptive analysis, we proceed to an inferential analysis and to the verification of hypotheses on the proximity didactic material, the building of tasks and the development of learners' intelligence.

**RH 1: ‹‹The use of proximity audio-visuals determines the development of learners' intelligence››**

At the reading of table 1 related to the data of this hypothesis, we can observe that the Khi² calculated is of 14.64 at a freedom degree of 4. The value of Khi² read in the Fischer table is of 9.49. At the view of these results, we then realise that the Khi² read is inferior to the Khi² calculated. What leads us to reject oH and to conserve aH.

Mores, the contingency coefficient has a value of 0.216; which attests the significant link which exists between the quality of proximity audio-visual tools and the development of learners' intelligence. The efficiency of this correlational significance corroborates Piaget's works who thinks that the manipulations of the objects belonging to the physical environment of the child is a source of his intelligence construction.

Table N°1: Khi² calculation of research hypothesis 1

| | Value | Dol (bilateral) | Asymptotical significance (bilateral) |
|---|---|---|---|
| Khi-two of Pearson | 14.640[α] | 4 | .006 |
| Probability report | 14.041 | 4 | .007 |
| Linear by linear association | 5.371 | 1 | .020 |
| Number of valid observations | 300 | | |

α: Cell 1 (11.1%) has a theoritical enrolment inferior to 5. The minimum enrolment is 1.05.

**RH 2: ‹‹The quality of animals and vegetables specimens determine the development of learners' intelligence››**

Reading from table N°2 related to this hypothesis, we can observe that the Khi² calculated is of 11.34 to a freedom degree of 4. The value of Khi² read in the table of Fischer is of 9.46. Looking at these results, one therefore realises that the Khi² calculated is superior to Khi² read. What leads us to reject oH and conserve aH. The contingency coefficient has a value of 0.191. Which well attests the significant link between the quality of animals and vegetable specimens and the development of learners' intelligence. The efficiency of this correlational significance corroborates Matchinda's works (1999) which support that exploration activities of the environment enable learners under the guide of the teacher to explore their environment( factory, farm, market,…). This contributes to the development of observation curiosity, critical, questioning spirit and by so doing the development of the learners' intelligence.

Table N°2: Khi two calculation of research hypothesis 2

| | Value | Dol | Asymptotical significance (bilateral) |
|---|---|---|---|
| Khi-two of Pearson | 11.344[α] | 4 | .023 |
| Probability report | 12.420 | 4 | .014 |
| Linear by linear association | .839 | 1 | .360 |
| Number of valid observations | 300 | | |

α: Cell 1(11.1%) has a theoretical enrolment inferior to 5. The minimum theoretical enrolment is 1.50.

**RH 3: ‹‹The quality of proximity laboratory material contribute to the development of learners' intelligence››**

At the reading of table N°3 having traits to this hypothesis, we observe that the Khi² calculated is of 11.04 to a freedom degree of 4. The value of Khi² read in the table of Fischer is of 9.46 at a significant limit of 0.05. To the light of these results, we have realised that the Khi² read is inferior to the Khi² calculated. That leads us to reject oH and accept aH. More to that, the contingency coefficient has a value of 0.188. This well confirms the significant link which exists between proximity laboratory material and the development of learners' intelligence. The efficacy of this correlational coefficience confirms the works of Montessori who supports that sensory material is an investigation instrument of reality, a decoder of real. In addition she affirms that the development of intellectual and motor facultiesof the child depends on the richness of his environment, reason why she invites educationists to have a complete confidence in the strengths of a child, to respect his freedom of action and prepare the necessary mood favourable to his development.

Table N°3: Calculation of Khi two of research hypothesis 3

| | Value | Dol | Asymptotical significance (bilateral) |
|---|---|---|---|
| Khi-two of Pearson | 11.041[α] | 4 | .026 |
| Probability report | 11.380 | 4 | .023 |
| Linear by linear association | 7.994 | 1 | .005 |
| Number of valid observations | 300 | | |

α: Cell 2(22.2%) has a theoretical enrolment inferior to 5. The minimum theoretical enrolment is .80.

**RH 4: ‹‹The construction of tasks depends on the development of learners' intelligence››**

At the light of table N°4 related to this hypothesis, we can observe that the Khi² calculated is of 17.55 to a freedom degree of 4. The value of Khi² read in the table of Fischer is of 9.46. Looking at these results, one therefore realises that the Khi² read is inferior to Khi² calculated. This leads us to accept aH and reject oH. More to that, the contingency coefficient has a value of 0.235, which attests of the contingency link which exists between the consideration of tasks and the development of learners' intelligence. The efficiency of this correlation significance corroborates the works of Morissette (2002) who affirms that the task has a main interest to arouse the interest of learners, awaken their intelligence and their sensibility, and help deliver in them the taste to succeed and to work in team to solve the problem submitted. As such, the solving of tasks by learners contribute to the development of their intelligence.

Table N°4: Calculation of Khi two of research hypothesis 4

| | Value | Dol | Asymptotical significance (bilateral) |
|---|---|---|---|
| Khi-two of Pearson | 17.556[a] | 4 | .002 |
| Probability report | 19.277 | 4 | .001 |
| Linear by linear association | .192 | 1 | .661 |
| Number of valid observations | 300 | | |

α: Cell 1(11.1%) has a theoretical enrolment inferior to 5. The minimum theoretical enrolment is 1.95.

**4. Interpretation and discussion**

The aim of this work was to prove that the use of proximity didactic material and the construction of tasks in the teaching-learning process of Sciences and Education to the environment contribute to the development of learners' intelligence.

The confirmation of the first research hypothesis portraying the influence of the quality of audio-visual tools on the development of pupils' intelligence, rejoins the conclusions of the descriptive and experiment works of Liger and Onbgwa (2000) according to which the development of scientifical spirit thus of learners' intelligence passes either by observation of models or from images of didactic materials, either by their manipulation. This point of view is sustained by Leif and Rustin(1966:146) who, talking about the substitution of objects think that: ‹‹ the human organism might clearly be presented to the eye if on skeleton –even simply fabricated wood- one could place leather muscles, wool stuffed, of nerves tendon, (…) everyone at this place and at the exact proportions, (…), such a similar intuitive material could be put at the disposal of schools for all what has to be learned››.

The result of the second research hypothesis which links the quality of samples and the development of pupils' intelligence reveals a capital influence of this type didactic material on the development of the intelligence of pupils. In effect, the works of Liger and Onbgwa (2000) indicate that Education and Science lessons to the environment either necessitates some observations or enquiry pedagogic outings (class walk) help to collect animals and vegetables samples which shall be conserved for a subsequent use. The confirmation of the third research hypothesis related to the impact of the quality of proximity laboratory material on the development of pupils' intelligence, come to reinforce the conclusions of Piaget (1967) on the constructivism on the one hand and of the Liger and Onbgwa (2000) on the importance of experiment on the development of the child's intelligence. As such, one of the targeted goals by experiments is to put the child in contact with the thing studied; he must be an active observer geared towards the goal, that of discovering and not a spectator passively storing what he's been affirmed. He also has to be an active reporter of what he discovers; either he expresses orally, or he translates by writing or through the help of a small laboratory material is necessary in the dev elopement of scientific spirit.

Research hypothesis 4 which deals with the construction of tasks and the development of the pupils' intelligence is confirmed; that which re-joins the conclusions of descriptive works of Morisette (2002) according to which then task which is a complex situation (presence of a task, of a difficulty to overcome), contextualise (having traits with daily life), and signifying to the pupil (coats an importance for the pupil), is an unavoidable pedagogy nowadays. His role in the construction of knowledge by pupils is established, from the same facts of his characteristics. In effect, it is admitted that the pupil easily constructs his own knowledge if the task submitted is to him has a trait with his daily life and if it coats an importance to him. As such, to propose tasks to pupils seems ideal to us, because that calls for manipulation, creativity, reflexion; the teacher being just a simple guide, a facilitator and a constructor of challenging situations. Otherwise, the option of tasks to carry out enable pupils to construct their own personal knowledge so as to face complex situations of life.

**5. Conclusion**

We can affirm the end of this article that the positive impact of using proximity didactic material in relationship with the construction of tasks on the cognitive development of learners is clearly proven in this work. It is unanimously admitted that didactic and pedagogic materials, coupled with contextualised text constitute a determining factor in the success of learning. Meanwhile, the main reference documents in the domain of basic education do not clearly define a policy to follow for the development of endogenous capacities in terms of conception and fabrication. The existence of such a policy will meanwhile favour the putting in place of a lasting process of endowment of schools in didactic materials and in tasks families capable of serving as models. Other investigations can also carry on the moments of using didactic materials during the teaching-learning process; the impact of scientific representations of pupils on the construction of tasks and knowledge.

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