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The Tools of Local Knowledge in the Teaching of Physics-Chemistry: What Interests for Junior High Learners in Côte d'Ivoire

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Abstract: ***In this work, we are referring to the interests of students in lower secondary education classes relating to local knowledge tools in the learning of physics and chemistry. Considered as resources for authentic learning situations, these tools which are: tales, proverbs, games, and myths effectively contribute to building knowledge and developing high-level cognitive skills in the learner. . However, many learners ignore their contributions to teaching physics and chemistry in college. Here we present the results obtained from a questionnaire survey of 207 students in the first three levels of education in the college. Based on the examination of theories and acceptances of local knowledge tools, and on the assumption that learners most often have misconceptions of local knowledge tools, we measure individual interest and the situational interest of students using pre-post and point questionnaires. From this survey, it emerges that the students' interest in local knowledge tools strongly depends on family transmission, the teacher, their usefulness in class practices, and the cognitive engagement of the student. student to ensure the success of the activity. The results obtained give real hope for the improvement of teaching / learning of physics and chemistry in the first cycle of secondary education. However, this study recommends didactic and pedagogical strategies to be used by the teacher to help the student understand, to make connections with concepts and concepts already learned in other disciplines for a cognitive engagement of the latter. in the use of these tools in physics-chemistry classroom activities in college.***

Keywords: Local knowledge tools, Student interest, junior high school, academic performances, Didactics

1. Introduction

Teaching experience at the teachers training College of Abidjan as well as in the monitoring of future college teachers with bivalent profiles, predominantly "physics-chemistry" in the field led us to many questions about mastery by the latter of the different stages of the skills-based approach. This approach, which has been in effect in Côte d'Ivoire since the rewriting of teaching programs and the generalization of their application in 2009 (COFEMEN, 2012), should allow students in lower secondary education to improve their capacity of analysis, of becoming aware of their beliefs, values and prejudices, of making links between theory and practice, of improving their ability to work in a team and of grasping the complexity of situations. In its conception, the competency-based approach therefore aims to build education on the basis of know-how, evaluated within the framework of the performance of a set of complex tasks. Teaching then becomes learning (Roegiers, 2008). These students encounter many difficulties in the practice of this approach, which result from both the misunderstanding of the process and the design and use of learning situations in the physics and chemistry class by the teacher. These difficulties have important impacts, with regard to the use of this approach in the construction of knowledge in the pupil of the first cycle of secondary education. This is what led us to question ourselves, on the one hand, on the way in which students' knowledge, skills and attitudes are used in various contexts by teachers of these levels of education in college and university. on the other hand, the design and use of authentic learning situations in their teaching practice.

While the scope of some difficulties may seem limited, others can generate significant consequences for the construction of knowledge and the development of high-level cognitive skills in these students. Several authors have observed a lack of interest on the part of students in the use of learning situations in the classroom (Moran, Hawkes & El-Gayar, 2010). This disinterestedness has important consequences for the practice of the skills approach and the practice of this approach among these pupils of lower secondary education. One of the major impacts related to students' lack of interest relates to the lack of critical regard they demonstrate when they learn. Indeed, they seem so busy understanding what they have to learn or even fighting their resentment towards learning situations that they find it difficult to take a step back from what they are doing to ask a a critical look at what they need to understand and learn.

To improve the performance of the latter, we decided to feed the learning situations of local knowledge tools in order to observe their effects on the evolution of their learning of concepts in physics-chemistry. We intend to help them use a collection of critical thinking specific intellectual tools that can be applied to the social studies program as a whole. This integration of social and cultural questions in physics and chemistry lessons aims to develop analytical means among students in order to allow them to understand the social challenges of scientific activity (Aikenhead, 2006).

This study therefore highlights the interests of these students in the use of local knowledge tools for the understanding of concepts in the learning of physics-chemistry in college. It is

for us to mobilize in the same approach transversal and disciplinary skills including knowledge and know-how related to improve the learning performance of students compared to more traditional learning situations. Indeed, the representations they have of these tools from their environment, well rooted in them, could constitute a driving force in the construction of knowledge, and therefore in the acquisition of knowledge. To understand the interest students have in using local knowledge tools in the physics and chemistry class, it is important to look at the usefulness and usability of these tools.

Thus, the article is organized as follows. In the first part, we present theoretical benchmarks; which helps to build the research questions. The second part deals with the methodology of our work. The results for assessing students' interests with regard to knowledge tools are described in a third part. The last part explains the causes and discusses their scope.

2. Theoretical Basis

It is a question of discussing the different concepts, their origin and their general characteristics. We are seeking to clarify a number of concepts:

Types and choice of didactic and pedagogical tools
First of all, note the fundamental difference between teaching and educational materials (manuals, projector, tape recorder, computer, etc.) and teaching and educational materials (working documents, exercises and educational activities). In our mind, the notion of didactic or pedagogical tool, essential as soon as we approach the field of the use of tools, arises from the conjunction of these two elements, which associates material and support in a coherent whole. Close links between the constituent parts guarantee educational effectiveness. Not all activities are suitable for all types of support. Once this is chosen, there is a kind of natural selection from the range of possible activities, depending on their degree of adaptation to the support.

The range of supports actually corresponds to the existing possibilities of physically storing a sum of information to make it available to the learner and the teacher. Below are the local knowledge tools on which our choices are focused.

The proverb according to Larousse (1989) is a short, colorful, maxim sentence, often expressed in a few words, translating a general and traditional truth and which most often appears in the spoken language to support an affirmation, confirm a decision. It expresses a truth of experience or a council of wisdom and to which the speaker refers. Its use makes it possible to express an abstract thought in terms of images to make it more accessible to the interlocutor. The proverb allows a kind of co-construction or co-enunciation, at the end of which meaning is constructed "in real time" during the interlocutory exchange. He uses models that implement constructions involving various elements of nature, history, and everyday life. The proverbs convey at the same time a precise idea related to the object of the interaction during which they intervene on the one hand; a broader and more global knowledge that goes beyond the time and space of emission of the proverb on the other hand (Adja, 2001). Proverbs have their roots in the tradition which observes, explains and interprets social and environmental relationships.

Riddles are both a game and an exercise in mind. In Africa where speech remains important, riddles still transmit ancient wisdom and develop the imagination of the child. They presuppose a very broad knowledge of the environment: names of illustrious characters, parts of the human body and their characteristics, the characteristics of animals and plants, natural phenomena, etc. Riddles according to Mungala (1982) appeal to memory, imagination, the spirit of observation and are based on educational principles such as pedocentrism, emulation, and democratization. Riddles touch on different disciplines such as history, geography, science, etc. They can be fun, mysterious or appeal to logic. They are an integral part of daily life and entertain as much as they support the child in the development of his thought. Bronner (2016) indicates that the riddle is used to pique the curiosity of students at the start of the intervention.

Games in the African tradition are not only exercises intended for the training and physical endurance of the youngest, but also effective means to promote fundamental learning, develop intelligence, perceptions, the tendency to experiment. , the power of invention (Nguessan, 2014).

Games of chance, counting or mathematical combination develop children's reasoning and imagination; it is through imitation games that children are introduced to the practice of the group's productive activities and, observance of the rules of the game constitutes for the child a real moral, social and intellectual education which forms its character (Mungala , 1982).

These tools often constituted for the wise men of ancient times, a means of transmitting through the centuries in a more or less veiled way, by the language of the images, knowledge which received from childhood, will remain engraved in the deep memory of the individual to reappear perhaps at the appropriate time, enlightened with a new meaning (Moumouni, 1998). They are training and teaching aids.

Teach local knowledge tools
Detailed suggestions that illustrate how teachers can help students develop a collection of specific critical thinking intellectual tools that can be applied to the social studies program as a whole. These instructions cover the intellectual tools necessary to perform various tasks - from asking questions and interpreting images to solving problems or engaging in a social cause.

Motivation
Several authors have proposed definitions for this concept. In didactics/pedagogy, Legendre considers that it is "a triggering factor which makes it possible to overcome natural inertia, to initiate a path and possibly generate learning" (Legendre, 2005). It consists in arousing in the learner the desire to learn, to capture his attention, to interest him. For McCombs (1984), motivation is a “dynamic set, mediated internally, of metacognitive, cognitive and

affective processes which can influence a student's tendency to come into contact, to commit to providing the effort and to persist in the tasks of learning on a continuous and self-directed basis". He talks about intrinsic motivation for continuous learning.

Interest

A person's level of interest has a strong influence on learning, it influences their level of attention, their goals and the quality of learning that will be achieved.

Generally: "favorable disposition of attraction, attention, benevolence, desire, envy, favor, incitement, propensity, preferably, sympathy that a person feels towards another person, a situation, a thing, an activity, an idea, and who perceives a satisfactory advantage for it "(Legendre, 2005).

In Didactics / Pedagogy: "object which arouses the attention and curiosity of a subject in an educational situation and which incites him to be actively involved in his learning" (Legendre, 2005).

In a learning situation therefore, interest is understood as the awareness of the usefulness of learning something and which leads to resolutely engaging in the learning of this thing. It is possible to make a significant contribution to developing the academic interest of students. This interest is not static, it develops or regresses over time depending on experiences (Renninger& Hidi, 2016).

The primary feature of interest is to be linked to specific content. It refers to a specific class of tasks or areas at the origin of interest, which differentiates it from curiosity, an attribute of the person little dependent on content (Pintrich, 2003). Interest arises from an interaction between the person and his environment. Conceived as a more or less lasting relationship between a person and an object in their living space (Hidi, 2001; Krapp, 1999), interest results in a psychological state (being interested in ...) defined by four characteristics: focus of attention, persistence of effort, optimization of cognitive functioning, and a positive emotional charge (Ainley, Hidi & Berndoff, 2002; Schraw & Lehman, 2001).

This psychological state updates an individual or situational interest. Individual interest is characterized by a student's relatively stable preferences for a particular activity. Interest in a situation is more related to a student's emotional response to the perception of certain stimuli in the immediate environment (Renninger & Hidi, 2016). The concept of situational interest, triggered from the outside but leading to a psychological state characteristic of intrinsic motivation, the role of success (Covington & Mueller, 2001) or utility (Husman & Lens, 1999) in the triggering and sustaining interest suggest that these two motivations, far from being incompatible, are likely to combine in an additive relationship.

The value placed on the activity results from both its intrinsic interest, its usefulness in relation to future projects, what one might call its desirability and its cost, i.e. aspects negatives related to engagement in the activity. Among the many competing concepts in the field of motivation, the interest is best able to take into account the characteristics of knowledge and learning situations without ignoring the characteristics of the person (Bergin, 1999; Schiefele, 1991).

We therefore retain that in learning, interest and motivation are determining factors for engagement in activities, achievement of performance, regular progression, achievement of learning objectives and goals assigned to education and training and, ultimately, success.

Utility and usability: two motivating factors

One way to understand the motivation of learners in the face of local knowledge tools is to take into account their perceptions of these tools. Research works exist around the perception of utility and usability among users of these tools in general (Davis, Bagozzi & Warshaw, 1989), but also in learning situations (Moran, Hawkes & El -Gayar, 2010).

Usability refers to the ease of use of the tool for the learner (ease in learning to use it, ease in finding the functions and carrying out the tasks that one wishes to do, ease in finding one's bearings in the tool, understanding of usage errors, etc.).

Utility refers to the perception of learning through the tool and therefore of achieving your learning objectives (better understanding of course content; faster learning with less effort).

These representations that the learner has of the tool, directly participate in the intention of using this tool. The intention of the learners to use local knowledge tools is influenced first by the perceived utility (or expectation of performance) and by the more or less favorable attitude towards these tools, and in a lesser measure by their perceived ease (or expectation of effort) (Sumak, Hericko & Pusnik, 2011).

Competency-based Education

The Competence-Based Education (CBE) puts an approach based on learning outcomes at the forefront, whatever the place and the form of acquisition; as opposed to the traditional approach, based on training content, programs and their duration. It essentially consists in defining the skills inherent in the exercise of a trade and in transposing them within the framework of the development of a training benchmark or study program. This approach therefore induces a paradigm shift: moving from a logic of knowledge transmission to a logic of skills development.

This change should not obscure the uncertainties associated with the competency-based approach. Certain authors (Crahay, 2006; Rey & Al., 2003) present several risks which it is necessary to underline in order not to induce practices which could prove counterproductive. For example, a utilitarian vision of knowledge presents the risk of amputating knowledge from what makes it critical and of enclosing learning in activities arbitrarily designated as useful (Cheneval-Armand & Ginestié, 2009). Another example is the confusion that can be caused by this approach between what is expected and the means to be implemented. If the notion of competence makes it possible to specify

what is expected, it should not obscure the knowledge necessary to achieve it.

The CBE requires choosing the learning situations that respect as much as possible the criteria of integration, authenticity and focus on competence, by looking for real situations for which we want to train the learner; or even sample situations that pertain to real tasks.

Interest the learner

Ottavi (2008) by defining the perimeter of use in the field of education of the verb "To interest" indicates that the word "Interest" belongs to the same semantic field as "interest", "interest", "interesting" , as well as "disinterested" and "uninterested", all linked to the world of school and education through usage and history, in its senses which fluctuate more. "To interest" has a "material" and "moral" meaning, as the Littré dictionary says: "interested" means miserly, and also designates the attitude of the one who wants to know. More simply, "interest" means "concern": that interests ... The moral sense of interest, that is to say, touch, move, is then very close, "this interests me" means that an importance is granted to a thing, it can mean that there are material interests or on the contrary that one feels an attraction. For Decroly (2009), pedagogy must be organized around "centers of interest", which correspond to the child's spontaneous questions and tastes.

Within the framework of this work, we propose, from the concepts of theoretical benchmarks, to analyze the interest of the use of local knowledge tools in the teaching of physics-chemistry among students in the first cycle of secondary education, in addition to paying special attention to the critical view they take of these tools.

Research Question

Given the ideas put forward in the framework of the theoretical benchmarks that we have just presented, we articulate our work around the following research questions:

What is the portrait of the interest of Côte d'Ivoire students in local knowledge tools in physics-chemistry class in the first cycle of secondary education? How does their interest in local knowledge tools evolve during the cycle? Do students recognize the usefulness and usability of these tools in teaching physics and chemistry?

It is a question of measuring individual interest and situational interest in the use of local knowledge tools by students in lower secondary education.

To answer these questions, we have built a methodology specific to this research that we are now presenting.

3. Methodology

In this part, we explain the tools for collecting and processing data in relation to the context of our study.

Population and research sample

The population targeted by this study is therefore that of the students of the college where the trainee professors of bivalent profile, predominantly physics and chemistry are authorized to give lessons. These are the first three levels of the college (6th, 5th, and 4th). The experimentation took place in each first trimester of the 2016/2017, 2017/2018, and 2018/2019 school years at the Jean Piaget Application College of Abidjan's Normal School (ENS). The pupils of the 4th classes were regularly followed during the three school years (2016/2017, 2017/2018; and 2018/2019); those in 5th grades were followed during the 2017/2018 and 2018/2019 school years; as for those in 6th grade, they participated in the experiment only during the 2018/2019 school year. The sample is made up of 207 students distributed as follows:

Table 1: Characteristics of the sample

	Academic level		
	Form 1	Form 2	Form 3
Number of classes selected	3	3	3
Population by class	25	23	21
Population by level	75	69	63
Total population	**207**		

The research was carried out with pupils of form 1, 2, and 3. The sample consists of 207 students who were invited to participate in the study on a voluntary basis. It is therefore a digitally restricted convenience sample. For a better representativeness of the subjects, the students were selected from their first grade of physics-chemistry assignment from the 6th grade. Profile 1 corresponds to pupils who have obtained a mark greater than or equal to 17 in this assignment; Profile 2 corresponds to those who have obtained a score less than 17 but greater than or equal to 14; Profile 3 corresponds to those who have obtained a score less than 14 but greater than or equal to 12; Profile 4 corresponds to those who have had their grade greater than or equal to 10 but less than 12.

Each level of education has been divided into four success levels based on the marks obtained in the first physics-chemistry assignment since the 6th grade.

Table 2 summarizes the four profiles of students in our sample who participated in this study.

Table 2: Summary of the profiles in our sample

	Profile 1	Profile 2	Profile 3	Profile 4
X : first mark obtained by a pupil on the first physics-chemistry assignment from the class of form 1	$X \geq 17$	$14 \leq X < 17$	$12 \leq X < 14$	$10 \leq X < 12$

Table 3 gives the distribution of subjects by profile and by level of education.

Table 3: Distribution of subjects by profile and level of education

Teaching level / Profile identified	Form 1	Form 2	Form 3
Profile 1	15	15	14
Profile 2	17	15	15
Profile 3	22	18	17
Profile 4	21	21	17

Instruments of data collection

Data collection was carried out in four stages. First, as the most effective way to answer our research questions is to ask the study population questions to get their feelings, we have explored more deeply the perception that students have of local knowledge tools. In order to know the opinion of our subjects on the motivational quality of the activities linked to local knowledge tools, we used the Likert scale (Always-Often-Rarely-Never) to assess their motivational quality of the learning situations designed. from these tools; and offered in class activities. Second, we used a "pencil and paper" questionnaire to take into account what the subjects know, and especially how the perception they have of these tools in relation to the values to which they are attached is manifested. This allowed us to assess the importance that our subjects place on local knowledge tools. Third, we looked at the four variables that are: attention, understanding, satisfying emotional experience and commitment to effort characteristic of indicators of interest (Cosnefroy, 2007) to obtain information on the origin of the interest and its nature (situational or individual). This allowed us to follow step by step the evolution of the importance given to local knowledge tools by students by level of education.

Finally, noting the vigor with which certain subjects assert their choices or their repulsions and the variety of interests they manifest, we deemed it useful to assess the reasons which prompt them to give a certain interest to local knowledge tools. It is a question of analyzing the elements which can have a certain influence on the interest of the pupils with regard to these tools.

4. Analysis Plan

To determine the characteristics of the interest that students in the first three levels of college education show in local knowledge tools in the physics and chemistry class, we used data from the answers to the questions asked of them. submitted. The purpose of using several types of data was to check whether the indications from different sources converge. Like Ecuyer (1990), the content analysis of the data collected allows us to retain the following four objects of observation: 1. Motivations; 2. The interests and curiosities of the students; 3. Sources of interest; 4. Reasons for interest.

First object of observation: the motivations

The first object of observation examined was motivations. By motivations, we want to assess at the level of our subjects the motivational conditions of learning situations constructed from local knowledge tools. These learning situations form the substance of the lessons. The questions relating to motivational conditions, 10 in number, are designed to check the degree of interest that students show towards these tools through their choice on the following Likert scale: Always-Often- rarely Never. It is a question of determining the majority of the pupils who are at the ends of the scale.

Second object of observation: the interests and curiosities of the students

As a second object of observation are the indicators of interest, which have been examined in terms of two secondary objects of observation: the interests and curiosities of pupils in the 6th, 5th, and 4th year classes. Evaluating the number of student responses taking into account the four success levels based on the grade obtained for the first physics-chemistry assignment from the 6th grade (profile 1, profile 2, profile 3, profile 4) makes it possible to make account of the interest and love that they show towards local knowledge tools (storytelling, proverb, riddle). The evaluation is done as a percentage of success.

Third object of observation: the sources of interest

Regarding the third object of observation, our analysis was conducted using the variables that characterize interest: attention, understanding, emotion and effort. It is about analyzing the subject's ability to voluntarily focus his mind on a tale, or a proverb, or a riddle, or a game; which is the subject of concern of the subject. We report on the desire to work, the level of concentration, the ability to understand without making an effort in the student with regard to local knowledge tools. By applying these variables to all of the learning situations incorporating these tools, we were able to identify by variable, the number of students who chose it.

Fourth object of observation: the reasons for the interest

The last object of observation was the reasons for the interest. The interest in local knowledge tools integrated into learning situations may seem innate because the pupil evolves in a family environment which reflects the interests of his parents. Education and the family environment are the main sources of student interests (Larcebeau, 1955). The reasons for interest are assessed with the following five variables: family transmission, intrinsic reasons, usefulness, success and the teacher. We assess the student relationship and the use of tools at the family level or the interest that the student family shows in local knowledge tools integrated in learning situations; the pleasure the student derives or finds in these tools; personal preferences; his investment and persistence in the task, the value placed on the task and the result, the teacher's contribution in their efficient and effective use, in the success of the learning situations offered to students.

Outcomes

To answer our research questions, the various data collected were processed according to the four objects of observation: motivations, indicators of interest, sources of interest, and reasons for interest.

The motivations

Table 3 summarizes the students' opinion on the motivational quality of learning situations incorporating local knowledge tools.

The main questions proposed to the students were to make them think about their relationship with local knowledge tools in learning situations. We were trying to get the students to have their feelings for these tools.

Analysis of the results in Table 4 below, for each question, shows that the majority of students checked the expressions Always-Often, that is to say a little more than one pupil in two, to the detriment of the expressions Rarely-Never. This is the case with the question "In general, do you find that learning situations incorporating OCLs are clear for your understanding?" or:

- In 6th grade, we note that 38 pupils checked the expressions Always-Often against 23 pupils for the expressions Rarely-Never, with 14 pupils undecided;
- In 5th grade, 43 students checked the Always-Often expressions against 14 students for the Rarely-Never expressions, with 12 undecided;
- In the 4th year class, the results indicate that 45 pupils checked the expressions Always-Often against 13 pupils for the expressions Rarely-Never, with 5 pupils undecided.

We note peaks for the questions:

Table 4: Analyzes of students' opinions on the motivational quality of learning situations incorporating local knowledge tools

In general, do you find ...	Form1				Form 2				Form3			
	Always	Often	Rarely	Never	Always	Often	Rarely	Never	Always	Often	Rarely	Never
That the learning situations integrating the OCL are clear for your understanding?	18	20	13	10	22	21	7	7	22	23	8	5
That they required you to complete different tasks?	21	19	11	09	22	22	7	9	23	22	5	7
That they had something to do with what interests you in life?	24	22	8	9	22	21	9	5	23	22	7	6
That, by practicing them, you had the opportunity to make choices?	16	17	12	11	21	23	10	5	22	22	8	5
that they involved a challenge?	18	17	12	11	22	20	10	8	23	23	7	5
That they required cognitive engagement on your part?	20	21	8	7	22	22	9	6	23	23	5	7
That they required that you use the knowledge acquired in other courses?	13	16	10	10	21	20	10	10	21	22	7	7
That they took place in collaboration with your classmates?	21	20	12	10	21	20	11	9	23	22	6	7
That in these situations, have you been given enough time to work?	14	15	10	10	18	20	7	9	22	23	8	5
That the work you have done in these situations is authentic?	23	21	3	6	21	22	8	10	23	23	6	6

"In general, do you find that they required you to perform different tasks? »Where the expressions Always-Often were checked by 40 pupils of the classes of 6th with 15 undecided pupils, 43 pupils of the classes of 5th with 9 pupils undecided, and 45 pupils of the classes of 4th with 6 pupils undecided;

"In general, do you find that they had something to do with what interests you in life? »For 46 pupils of the 6th classes with 12 undecided pupils, 43 pupils of the 5th classes with 12 undecided pupils, and 45 pupils of the 4th classes with 5 undecided pupils for the expressions Always-Often;

"In general, do you find that they required a cognitive commitment on your part? »Where the expressions Always-Often were validated by 41 pupils of classes of 6th with 19 undecided pupils, 44 pupils of classes of 5th with 10 pupils undecided, and 46 pupils of classes of 4th with 5 pupils undecided;

"In general, do you find that they took place in collaboration with your classmates? »For the expressions Always-Often, we note for the classes of 6th 41 pupils with 12 undecided pupils, for the classes of 5th 41 pupils with 8 undecided pupils, and 45 pupils of the 4th classes with 5 undecided pupils;

"In general, do you find that the work you have done in the context of these situations is authentic? "Concerning the expressions Always-Often, we note for the classes of 6th 44 pupils with 22 undecided, for the classes of 5th 43 pupils with 8 undecided pupils, and 46 pupils and 5 pupils undecided for the classes of 4th.

These results show that for each question the number of students who tick the expressions Always –Often increases by level of education. The proposed activities clearly show that they correspond to the fields of interest of the students, harmonize with their personal projects and respond to their concerns.

The results reveal other class-related factors that influence the student's motivational dynamics, but they indicate that these conditions are necessary to stimulate student motivation (Viau, 2000). Thus, the integration of local knowledge tools into activities not only provides students with a concrete context, tangible to knowledge that can be abstract, but also and above all allows them to give a benchmark that promotes the creation or weaving of links between the various elements which may seem extremely distant, at the same time as facilitating their construction (Pellaud et al. 2006). This integration of local knowledge tools in learning situations that allow interactive moments, improves the perception that students have of the value they have for what they do, and reduces their anxiety and doubt that some of them will experience their ability to accomplish the requested task.

The fact of using a language accessible to students using knowledge tools allows a description of the phenomena invoked which definitely departs from formulas and other mathematical demonstrations; which pushes to develop one

of the most interesting aspects of scientific education: the phenomenological approach, which requires developing "with your hands" interpretations free of concepts, laws, formulas, theories, equations or other scientific formalisms (Pellaud et al. 2006). This promotes a qualitative understanding that is often more than enough to understand the behaviors and properties of the universe. This approach is almost a necessary step in the development of scientific knowledge.

Local knowledge tools participate in the appropriation of thought aids. They allow interactivity between students where their interventions allow to better situate the general level of their understanding and to be able to act accordingly by trying to deconstruct certain misconceptions by confrontation or argumentation between peers, but also by the use of " a more suitable term for a more detailed explanation (Eastes & Pellaud, 2004).

The interests and curiosities of the students in our sample

Table 5 summarizes the assessment of the number of student responses taking into account the four success levels according to the grade obtained for the first physics-chemistry assignment from the 6th grade (profile 1, profile 2, profile 3 , profile 4) to give an account of the interest and love that they show towards local knowledge tools (story, proverb, riddle, game). The evaluation is done as a percentage of success.

What lessons can be learned from the results of this questionnaire in Table 5 below?

From a psychological point of view, the feeling provoked by the local knowledge tools in the pupils is their great love, the interest which they show towards these tools. For the latter, the local knowledge tools integrated into the learning situations attract their attention. We note, however, significant variations in the interest that these pupils give to proverbs by profile and by level of education. Their contact with local knowledge tools over time improves the interest these students place in the tools. For the different profiles by level of education, the percentages vary little, but we note remarkable variations from one level of education to another. Indeed, the analysis of the results of the questions in Table 5 reveals the following:

"Do you like OCL", we note that these students love the tales and games offered more. For all the profiles of the three levels of education, the percentages noted are above 30%. Regarding riddles and especially proverbs, we note that the love shown by these latter towards these tools evolves according to their level of education. We thus go on average from 16% in 6th grade to 20% in 5th grade, and to 25% in 4th grade. Their contact with proverbs as well as with other tools more captures their interest.

Table 5: Interests and curiosities of the students in our sample

	Form 1				Form 2				Form 3			
	Profile 1	Profile 2	Profile 3	Profile 4	Profile 1	Profile 2	Profile 3	Profile 4	Profile 1	Profile 2	Profile 3	Profile 4
	%	%	%	%	%	%	%	%	%	%	%	%
Do you like OCL												
- Tales	30	32	31	32	30	31	31	32	30	29	29	29
- Proverbs	21	16	15	13	22	20	19	19	26	26	25	25
- Games	29	32	30	31	27	28	30	31	27	28	28	28
- The riddles	20	20	24	24	21	21	20	18	17	17	17	18
Do you like, in your environment,												
- tell the tales	32	35	36	38	33	34	32	32	30	30	30	30
- give the proverbs	18	16	14	13	21	20	20	18	24	22	21	20
- make the games	33	34	34	33	31	30	30	29	26	28	28	29
- give riddles	17	15	16	16	15	16	18	21	20	20	21	21
Which tool do you prefer?												
- Tales	31	30	30	30	30	29	29	30	30	30	31	29
- Proverbs	20	16	14	12	22	20	20	19	25	25	23	22
- Games	29	30	31	32	27	30	28	28	28	30	29	30
- The riddles	20	22	25	26	21	21	23	23	17	15	17	19
Do you want to know												
- Tales	21	20	21	25	22	23	24	24	23	21	22	22
- Proverbs	31	30	29	28	31	30	30	29	34	32	30	29
- Games	21	23	22	22	22	22	21	23	23	23	22	24
- The riddles	27	27	28	25	25	25	24	24	20	24	26	25
Are you interested in your environment												
- to tales	24	22	26	27	24	25	25	26	24	22	22	21
- to proverbs	27	27	24	23	26	25	25	24	28	27	27	26
- games	23	24	25	26	25	26	27	29	24	28	27	29
- riddles	26	27	25	24	25	24	23	21	24	23	24	24
Find yourself useful in education												
- tales	25	25	26	27	24	25	25	26	24	24	25	26
- Proverbs	25	24	24	22	26	26	25	24	28	28	27	27
- Games	26	27	27	28	25	26	26	27	25	25	24	26
- the riddles	24	24	23	23	25	24	24	23	23	23	24	21

Are you interested, attracted by												
- storytelling evenings	28	28	29	29	27	27	28	28	28	28	28	28
- Proverbs	24	23	23	23	25	24	24	23	27	26	26	25
- Games	26	25	26	27	25	26	25	26	24	25	24	26
- the riddles	22	24	23	21	23	23	22	23	21	21	22	21

"Do you like, in your environment, to tell stories (give proverbs, make games, give riddles)" we note important percentages for stories and games. Their percentages go beyond 30% on average against 20% on average for riddles and proverbs. Many of them are a little reluctant towards proverbs. However, the percentages of these pupils who like to say proverbs in their environment increase with their level of education.

"Which tool do you prefer?" The results show that storytelling and games are the most popular local knowledge tools for students with an average percentage of 31%. The more their level of education evolves, the more their attraction to proverbs increases: the percentage varies for the 6th around 15%, 20% for the 5th and 24% for the 4th. Their contact with these tools over time improves their interest and their desire to understand and learn these tools.

"Do you want to know these tools" the results show the desire of the students to know these tools is more important for these tools with an average percentage of 30% for the 3 levels of education for proverbs, followed by riddles with a neighboring percentage the 24%; finally come, tales and games with an average percentage of 20%. These results demonstrate the importance that society places on these tools.
"Are you interested in your environment" the results show that these students are certainly interested in storytelling and games with a percentage of around 23% but they are more interested in proverbs and riddles with respective average percentages of 26 % and 23%. The more their level of education evolves, the more their attraction to proverbs increases; their contact with these tools over time considerably improves their interest and their desire to handle these tools.

"Find yourself useful in education" we note that the different percentages are in the same proportions. These percentages are around 23% on average for the usefulness of the tool.

"Are you interested, attracted by these tools" we note that these students are attracted by the tools offered. For all the profiles of the three levels of education, the percentages found hover around 25%. These students, most of them, feel an intense need for escape as these tools can satisfy them by developing their personality.

We take from Tables 4 and 5 that a significant portion of our students (25%) on average believe that the proverb in Africa, its use in speech is the expression of the maturity and wisdom of the speaking subject. The students selected for this work like all the local knowledge tools. To satisfy their curiosity and their passion for dreaming about these tools, they follow the evenings with these tools with an average percentage of 20% per local knowledge tool.

Ultimately, we note that these tools give our work sample the feeling of doing work that is of interest and is useful for both the teacher and the students in the context of assessments.

5. Indicators and Sources of Interest

Tables 6 and 7 analyze respectively the four variables identified on the interest that are: attention, understanding, emotion and effort for the indicators of interest; and of the five categories of reasons on which questions are raised: family transmission, intrinsic reasons, usefulness, success and teacher for the sources of interest.

The assessment is made as a percentage of students who responded by indicator and by level of education.

The analysis in Table 6 shows the following:

- The tales capture the attention of the students for an average of 30% against 26% for their ease of understanding, 20% for the pleasure of learning these tales, 20% for the commitment of the students in the effort in the effective understanding of these tales in physics class.
- The proverbs capture the attention of students for an average of 28% against 26% for their ease of understanding, 25% for the pleasure of learning these tales, 22% for the commitment of students in the effort in effective understanding of these tales in physics class.
- Riddles capture the attention of students for an average of 27% against 26% for their ease of understanding, 24% for the pleasure of learning these tales, 22% for the commitment of students in the effort in effective understanding of these tales in physics class.
- The games capture the attention of the students for an average of 30% against 26% for their ease of understanding, 23% for the pleasure of learning these tales, 21% for the commitment of the students in the effort in the effective understanding of these tales in physics class.

These results obtained by level of education show that the value placed by students on local knowledge tools results both from their usefulness, from their desirability, that is to say from their positive aspects linked to their commitment to 'activity. They correspond to the student's fields of interest, respond to their concerns which allows them to succeed in the activity with more rigor (increase in the level of requirements), but also more participation in class by elucidation questions. or in-depth studies aimed at ensuring a detailed understanding of the use of these tools in class activity.

These tools therefore encourage the student's cognitive engagement; which allows him to ensure the success of the activity in physics class.

Table 6: Indicators of the interest of the tools by level of student success

	Tale				Proverb				Riddle				Game			
indicators / Teaching level	1. a %	1. b %	1. c %	1. d %	1. a %	1. b %	1. c %	1. d %	1. a %	1. b %	1. c %	1. d %	1. a %	1. b %	1. c %	1. d %
Form 1	**32**	**25**	**24**	**19**	**28**	**27**	**25**	**20**	**29**	**27**	**23**	**21**	**31**	**25**	**23**	**21**
Form 2	**29**	**26**	**23**	**22**	**27**	**25**	**25**	**23**	**26**	**26**	**25**	**23**	**32**	**26**	**23**	**19**
Form 3	**29**	**27**	**24**	**20**	**28**	**25**	**24**	**23**	**27**	**25**	**25**	**23**	**27**	**27**	**24**	**22**

1. a : Warning ; 1.b: Understanding; 1.c: Emotion; 1.d: Effort

Table 7: Reasons for interest

	Tale					Proverb					Riddle					Game				
reasons / Teaching level	2. a %	2. b %	2. c %	2. d %	2. e %	2. a %	2. b %	2. c %	2. d %	2. e %	2. a %	2. b %	2. c %	2. d %	2. e %	2. a %	2. b %	2. c %	2. d %	2. e %
Form 1	24	17	21	17	21	20	21	20	20	19	22	17	22	22	17	21	20	21	20	18
Form 2	22	17	20	19	22	17	19	20	22	22	20	19	20	20	20	20	20	20	19	20
Form 3	22	19	21	17	21	21	19	21	19	21	22	19	19	19	21	22	21	19	17	21

2. a : Family Transmission ; 2.b : Intrinsic reasons; 2.c: Utility; 2.d: Success; 2.e: Professor

The analysis in Table 7 shows the following:

- As far as storytelling is concerned, family transmission makes it easier for students to understand 22% against 18% for their intrinsic reasons, 21% for the usefulness of the tools, 18% for their participation in the success of the activities, and 21 % for the teacher's contribution to the effective understanding of these tales in the physics class.
- For proverbs, family transmission facilitates their understanding among students by 19% against 20% for their intrinsic reasons, 20% for the usefulness of the tools, 20% for their participation in the success of the activities, and 21 % for the teacher's contribution to the effective understanding of these tales in the physics class.
- For riddles, family transmission facilitates their understanding among students by 22% against 18% for their intrinsic reasons, 20% for the usefulness of the tools, 1820% for their participation in the success of the activities, and 20 % for the teacher's contribution to the effective understanding of these tales in the physics class.
- Concerning games, family transmission facilitates their understanding among students by 21% against 20% for their intrinsic reasons, 20% for the usefulness of the tools, 19% for their participation in the success of activities, and 20 % for the teacher's contribution to the effective understanding of these tales in the physics class.

From the overall results, we note that family transmission, which indicates the resumption of an interest present in the family, plays an important role in the effective understanding of these tools. It accentuates the interest that these students have in the use of local knowledge tools for which the family constitutes the emotional and cognitive extension of the tools and students relationship with parents. It is an important contribution to the efficient and effective understanding of these tools. The tools chosen for the activities clearly show that they correspond to the areas of interest of the students, harmonize with their social practices and respond to their concerns.

The teacher's contribution to student learning appears to be decisive in the mobilization of their skills through educational practices in the classroom (Carette, 2008). Interest manifests in class or is related to the characteristics of the teacher. The teacher's mastery of local knowledge tools allows the latter to use teaching strategies to help the student understand, to make connections with concepts acquired in other disciplines, and to articulate lessons to the problems of everyday.

Ultimately, the percentages obtained indicate that the value placed on the activity by the students results from both its intrinsic interest, its usefulness, its desirability, that is to say positive or negative aspects related to the engagement in activity. We note an active participation of the latter. These percentages reflect the interest given by the sample chosen for the importance given to local knowledge tools in terms of understanding the concepts and concepts of physics and chemistry in secondary school.

6. Conclusion

This study focused on highlighting the usefulness and importance of local knowledge tools in classroom activities. We therefore sought to know how these tools could be used in the context of learning situations in place of the texts generally used in the physics-chemistry class.

Today, the failure of our students is due to a number of factors, including the abandonment of our culture in their education. However, to facilitate learning or teaching, we need to rely on our culture, our already conceptual there to explain the world. Indeed, as soon as the notion or the operation to acquire is of a certain complexity, it is clear that the simple demonstration of the operations does not allow all the students to form the new idea. When we then move on to its symbolic expression and solve problems only on symbols, these students are no longer able to remember its meaning and they are forced to blindly comply with the relative rule. Handling the formulas without understanding the physical meaning of the phenomenon. The main thing would not only be to build knowledge but to develop skills using local knowledge tools that allow students to learn effectively by themselves. Tools well rooted in the culture of the land in the language and civilization that emphasize the personal work that the student.

To conclude, we note that the results obtained indicate that the value placed on the activity by the students results from both its intrinsic interest, its usefulness, its desirability, i.e. positive or negative aspects. related to engagement in the

activity. We note an active participation of the latter. These percentages reflect the interest given by the sample chosen for the importance of local knowledge tools in terms of understanding the concepts and concepts of physics and chemistry in secondary school.

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