International Journal of Humanities and Social Science Invention
ISSN (Online): 2319 – 7722, ISSN (Print): 2319 – 7714
www.ijhssi.org ||Volume 6 Issue 10||October. 2017 || PP.50-60

Analysis of learner's conception in upper sixth C and D classes(classes de terminale C et D) Benin Republic, regarding some problems- situations in electromagnetism.

Appollinaire A- GOUTON[1], Philippe BRIAUD[2], Gabriel AVOCEVOU[3]
[1]*Student in Thesis of Mathematics and Physics Institute of Porto-Novo, Benin Republic.*
[2]*Conferences Master in Physics CREN – IU-FU Philippe. Brian @univ- Nantes. fr*
[3]*Conferences Master of Mathematics and Physics Sciences Institute of Porto-Novo, Benin.*

Summary
Our research work has to analyze the different types of conceptions, in electromagnetism for upper sixth C and D classes of some public or private schools with regard to some problem – situations.TheLiker type of questionnaire helps us to evaluate the percentages, when answers are given. We could then know if the Learners were able to recognize statement that are of scientific type. The results of that study prove that our sample of learnerspossesses some conceptions of either experience first, general knowledge or scientific knowledge type;

- *iscapable to recognize a statement of scientific knowledge or general knowledge type for question about waves and for a question about electricity and magnetism as well;*
- *Contrarily to that, has little challenge to recognize a statement of experience first type, about both the types of questions.This shows that the conceptions have an incidence over the teaching and the Learning.*

Keywords: *representation, conception, situation – problem, typology obstacle.*

Date of Submission: 28-09-2017 Date of acceptance: 14-10-2017

I. Introduction

Nowadays many research results in Sciences didactics have proved that the difficulties in learning arepartially the causes of noticeable failures.According to these works, difficulties are not related only to the knowledge itself, but also to the image that students and teachers have upon sciences.While fixing their work on the conceptions, Searchers also leant on students points of view about Sciences and their teaching. Among those research works, we have those of Roletto (1995); Orlandi (1989 - 1991), Tibeeghien (1989), Berthou-Gueydan (1994). Darley 1994) and Robardet (1995) all quoted by Soudani (1996.p.l)... so many questions that force a reflection and understanding of Sciences and more specially physic phenomenon.

After getting birth, human beingdevelops day by day the acquired abilities that help him to walk, sounds that help him to talk and to develop his understanding.Form his birth to the end of his lif, he uses his understanding to serve in diverse activities. It is by developing his abilities that he will acquire new knowledge. But according to De Vecchi and Giordan (1989. Learning is not only accumulating knowledge, but succeeding inputting concepts together to build knowledge.

According to the current research works about learning, learners' conception begins to force attention and this research workembraces the same perspective. Our work will focus on electromagnetism in upper sixth D and C Classes. Driver, Guesne andTiberghi (1985) have proved that even after receiving a teaching of good quality that supposes tohelp him to understand the concepts, the learner comes back to his former conceptions as soon as examination is over. This means that the teacher should know what those conceptions are all about, before he can make them disappear.

II. Theorical area problem statement.

2.1 Definition of conception.

All the authors agree that a conception is an idea kept in mind. It explains to the learner the different challenging situations (Astolfi, 1992; Giordan and De Vecchi, 1987; Giordan, Girauld, Clement, 1994, Thouin, 1996). Conceptions are original productions, or like a built universe of significances putting to work some accumulated or more or less structured knowledges that are close or away from scientific knowledge that serve as references. In each specific situation, this whole is just partially activated and mobilized, according to the importance of the situation perceived by the learner. (Giordan, Girault, Clement, 1994. p10).

It is also an explanatory pattern .It helps student to explain different situations by using his experienced situations. That is, why a conception can progress and get built, according to the situations and explanations gotten by the learner. The learner is the builder of his knowledge, his own conception. thirdly ,the conceptions have an individual and social genesis (Giordan and de vecchi.1987.p.85).The learner structures his conceptions as he is growing .He learns by himself, his parents , friends,teachers, media, ''professional and social activities as adult''(Giordan and de vecchi.1987.p.85)

2.2. Using of the word conception, instead of representation

The word representation is very often used during research works in sciences didactics. The researchers later realised that that word was more or less ambiguous . it was differently understood according to the schools that use it, as much in psychology in philosophy ,linguistics ,ethnology,as in pedagogy or in didactics Since the word has many definitions and is used in several manners,researchers agree to use the word conception (Giordan,Girault and Clement (1994.p.17) declare this: butunsensitively, the word ''conception'' appears in some works,instead of ''representation'' to the extent that Giordan and De vecchi (1987) and Giordan and Martinand (1988) suggest to didacticians in experimental sciences to use the word "conception" in the place of "representation" which has many meanings and was causing confusions with the objects graphic representations. For the above mentioned reasons, we use the word "conceptions".

2.3.**The conceptions typology**.

We need a suitable typology to classic our conceptions. While selecting the written works, we discover that Bachelard (1960) has established a typology that consists of categories according to the epistemological obstacles, since he pretends that the problem of scientific knowledge in terms of obstacles must be raised. That classification consists of 10 items that M.Touin (1987.p.21 to 23) repeated in his doctorate thesis.
This is how he described them:

- Experience first obstacle: That makes to explain a phenomenon according to the appearances.

Example: We can see the moon turning, but it falls. The appearing race of the sun makes to think that it turns round the Earth). ''The first experience first, or to be specific, the first observation is always a first obstacle for the scientific culture. That first observation comes with a luxury of images; it is picturesque, concrete, natural, and easy. It just needs to be described to amaze. One may believe to understand it, but there is interruption instead of continuity between the observation and the experimentation".

- **The verbal obstacle**: That consists in explaining a phenomenon just by referring to a word, a phrase, a picture (Bachelard used the example of wrongly used sponge). A matron considers that << the blood is a kind of sponge, impregnate with fire >>. Elsewhere, fire is compared to a sponge containing a magnetic fluid…clouds are water sponges…).

The substantialist obstacle: that consists in explaining a phenomenon by applying a substance' existence.(One can imagine for example that "the electric substance'' must be impregnated with the substances through which it goes: the electric substance that goes though wine has its taste, the one of milk is a sweet taste, the one of wine is an acid taste, etc…)

Before we can understand that obstacle, we need to understand what some authors mean by substance when Descartes said "I am a thinking substance", he means that no matter my way (mode) of thinking (imagining, remembering, etc), that are varying, something remains identical, a substrat, a stone called substance.

General knowledge obstacle:it consists in explaining a phenomenon by referring to a general conception in an abusive manner, under the term of correlation, a diversity of phenomenon have been gathered, such as blood correlation, metal solidification and water congratulation.

Example: ice water melts because of "energy ''. There is indeed a risk of hastier generalization that seduces and satisfies a naïve understanding such generalizations block the thought. When concepts are interrupted, the experience loses its sharpness and the detail is despised; likewise the accuracy, the empiric rigout, one doesn't know how to "deform the concepts (how to confront them to the experimentation, modify them, sandy complicate them).

- **Unitary knowledge obstacle:** that consist s in explaining a phenomenon by qualifying it as normal, usual or natural.

Example: a television set produces pictures because an electric current goes through it. This obstacle is extended (out spread) to a general vision world: All the difficulties are solved before a general principle of the nature. This obstacle concerns the prescientific period where science, metaphysics and religion were not yet differentiated

- **The pragmatic knowledge obstacle:** that consist in explaining a physic phenomenon on the base of its appearant usefulness or uselessness.

Example: The nose is made that way to wear glasses. This positivist approach is already banished by Voltaire in "Candide".

The true one should be the useful one. "In every phenomenon, the human usefulness is sought for; not only for the positive advantage it bears, but as an explanation principle. Getting usefulness is getting a reason". A psychoanalysis of the objective knowledge need to be done, for it to be broken from any pragmatic consideration.

The animist obstacle: that consists in explaining a phenomenon by attributing a will to an object: when we attribute life to the minerals, we talk about their illness, about their organs. Example: when a stone is freely falling, its movement is accelerated "because it hastes to meet the ground".

This obstacle bases on the valorization of the life (the lasting anima, no matter its meaning, air, breath, sol, is always related to the idea of life; animo means to blow, to fill with air ,and also to give life). Since it is divided into three reigns: vegetal, mineral, animal, this obstacle consists in calling the chemistry, the physics, the biology for help. There, the living is a universal principle of explanation.

The obstacle created by the myth of digestion: consists in explaining a phenomenon by identifying it to assimilation. Example: a patient is healed because his illness has been digested. **The obstacle created by the myth of universal germ:** consists in explaining phenomenon by identifying it to a form of germination. Example: life appears on a new volcanic island because every stone contains a seed.

The obstacle of quantitative knowledge:consists in explaining physic phenomenon by a simple operation on numbers .Example a little water of 1°c mixed with a big quantity of water of 30°c turns it to water of 20°c .this obstacle can be surprising .we have said that knowledge by substance and qualities was an epistemologies obstacle. To operate in science, one needs to measure, to quantify, to mathematics, to go from quality to quantity; which means from subjectivity to objectivity. Epistemologies obstacle are to be taken as a whole of socio cultural elements. Theyare psychologic and become some base upon which our orientation knowledge, our contacts with objects are edified.Aboutthis matter, Bachelarddeclares that"when we are looking for the psychologic condition of science progress, we get to the conviction that the problem of scientific knowledge should be laid in term of obstacle".

In this list, we consider 4 types of obstacles since the others are mostly met in the primary school level. Wehave the experience first obstacle, the verbal obstacle, the substancialist obstacle and the general knowledge obstacle. To this list, we mean the conception that gives a Scientifics explanation for the question asked. This will help us to know whether the students in upper sixth C and D have more or less elaborated conceptions and to determine their nature.

2-4Statement of the problem

The act of learning is infinitely more complex than what one can usually suppose. It is not enough to say or to show for the student to automatically record. Learning is not just the only simple mechanic of reception as considered in the magisterial pedagogies .we cannot think of a "destruction" of the conception since they are only tools upon which the students can set their understanding. One should "do with'' them to go "against'' and try to turn them into elaborated conceptions, more adapted to the situation by offering further potentials of amelioration. We can add that knowledge cannot be substituted to the preconceived ideas except when the learner is confronted to a real educative project in which he gets interest and meaning.

We should confront those conceptions to real knowledge to know what the students conception are based on. There must then be some exchanges, there will be more chances for the teacher to discover the same conception with different students. He can then set an epistemologist break with the students and reorganize the student ideas so that he can acquire the conception that will help him to continue his learning with less difficulty.

What are the learner's conceptions about electromagnetism and what are the challenges they build?

III. Analysis pattern, research question and hypothesis

3-1 analysis pattern:

The attitude scalequestionnaire that is used is a scale of Liker bearing the name of the American psychologist Rensis Likert. It is a scale of judgment spread into the psychometrics questionnaires by which the interrogated person expresses his level of agreement or disagreement about a statement.

The scale contains five or seven choices of answer that help to shade the level of agreement. The text of labels is variable. The pattern we use is the following: 1- total agreement, 2- agreement, 3- neutral (Neither disagreement or agreement); 4- disagreement, 5- total disagreement. To this five, we add the choice 6- representing the result of those who didn't answer. To each answer,it is possible to give a mark (positive or negative) that helps for a quantitative treatment of the data, for example, to calculate the percentage of the answers given by the questioned sample.

3.2-Research questions and hypothesis.

- This study's objective makes us to ask the following research questions:
- what are the types of conceptions in electromagnetism for the students in upper sixth C and D in the public or private secondary schools in Porto- Novo (Benin) for the academic years 2012-2013, 2013-2014, 2014-2015 ?
- Did the students have the same understanding of the assignments in the course of electromagnetism Learning Situations?

Considering those questions? Two hypotheses can be set:

- There is a significant difference in the Learners conceptions in electromagnetism. That difference is more or less important according to the nature of the question.
- Learners don't often have the same understanding about the assignment in the course of electromagnetism Learning Situations.

IV. Data collection methodology

The methodology used in the research work goes with data collection by using questionnaire, then the interpretation of results.

1- 1- target population

For the present research work, we use the students in some public and private secondary schools of Porto-Novo as population. We have "Davie", "Djassin," "Tchaada "Secondary schools, and the Catholic College Notre Dame de Lourde of Porto-Novo. The students are registered in C or D series for the years 2012-2013, 2013- 2014, 2014- 2015. The reason of our choice is that, firstly, the series C was going to disappear from the country and could be gotten only in the noticeable schools, secondly, the same teacher of series D should get a considerable population of student so that we can have two groups of students to each teacher, either in the same school, or in a school of our choice and another one where he teaches in the same series. That population turns around 600 students. We chose 360 students for our ample. We have to limit our ample because of challenges related to accessibility to the groups. Twelve groups were chosen : 8 in series D and 4 in C.Eight teachers took care of them: 4 teachers of series C and 4 teachers of series D. the teachers of series C were named C1, C2, C3, C4 while those of series D were named D1, D2, D3, D4. Each group of series C has 25 learners while we have 35 students in each group of series D. We notice that each series D teacher will be watched with two different groups.

The students in series C are considered to have more facilities in school: before getting to that class, they had to be good at Mathematics and Physics in the two preceding forms. But the students in series D should have an average level in mathematics and Physics sciences in the two preceding forms. Series C can be gotten in few schools since it was disappearing in our country. That is why we have only 4 groups of series C students. We also notice that our population consists of students who are between sixteen (16) and twenty-five (25) years old.

This is the result gotten from the eight (8) teachers with the twelve (12) groups. We have the answers of the eight teachers. Out of 100 teachers in series C we got eighty (80). Out of two hundred and eighty (280) learners of series D, we got two hundred and seventy-four (274). So we have a total of three hundred and fifty-four (354) learners who answer the questionnaires. This sharing out of the respondarts is presented in the table below.

Table 1: The groups, the series and the population of students.

Teacher (teaching experience)	Number of groups	Series	Population of students
TeacherC1 (7 years)	1	C	17
Teacher C2 (24years)	2	C	23
Teacher C3 (5years)	3	C	20
Teacher C4 (12years)	4	C	20
Teacher D1 (5years)	5	D	33
Teacher D1 (5years)	6	D	33
Teacher D2 (16years)	7	D	35
Teacher D2 (16years)	8	D	35
Teacher D3 (12years)	9	D	34
Teacher D3 (12years)	10	D	34
Teacher D4 (3years)	11	D	35
Teacher D4 (3years)	12	D	35

4-2 Measurement instruments

4-2-1 the opened answers questionnaire

After some readings and researches related to the conceptions and their types, we have decided to use opened answers questionnaires. So, we easily found out different types of conceptions from the learners. We know that

with multiple choice questionnaire, we are no longer sure that the learner has given this answers because he know the subject or because his lucky and he has chosen the accurate answers .We believe that the use of opened answers questionnaire will provideus with relevant information about the way the conception are structured at the student level .These conceptions will easily be classified and used by the teacher in order to give his learners the best teaching.

Our research focusing on the electromagnetisms is organized around nine (9) questions.

Here are the nine questions as they are presented in the questionnaire.

1) A simple pendulum is made up with stretchable wire and a marble in iron .when we move a magnet closer to the marble, the pendulum moves away from the vertical. when we move away the magnet , the space reduces until the pendulum takes back its initial position
2) A mobile magnetic needle placed in an area far from a magnet and iron takes a determined direction. What is this direction?
3) We put above a straight magnet a paper sprinkled with minuscule irons. We notice some lines made by the minuscule irons on the paper. Why?
4) For a better reception of the waves on radio and television, the "ok" circuit of the receivers must be at a given frequency .what is this frequency?
5) After observing the electric circuit of bicycle, give the source of the current.
6) A television set produces pictures. Why?
7) How are voices transmitted through a television?
8) A calculator can make mathematic calculation. Why?
9) A dam on a river can produce electricity. Why?

As we Can remark it, the questions in electromagnetism areoriented toward two main themes: firstly, the electricity and the magnesium and secondly the waves. In the course of our analysis, we will come back to those two themes.

4-2-2 the questionnaire at attitude scale

Ina second time, we have used the questionnaire at attitude scale of Liker type.

From each question from the opened answers questionnaire, a declaration has been formulated in order to bring each respondant to give his opinion by indicating his agreement, with the declaration according to the following Liker scale.

1: total agreement, 2: agreement, 3: neutral (neither disagreement nor agreement)

4: disagreement 5: total disagreement.

The declarations are presented in the questionnaire as following.

1-The pendulum takes back its initial position when we move the magnet from the marble because the magnetic force of the magnet on the marble reduces until it conceals.

2-A mobile magnetic needle placed in a area of the space, away from any magnet and iron, takes the direction indicating the south pole of the earth.

3-when we put a paper sprinkled with minuscule irons above a straight magnet and when we tap, we have drawing of lined made by the minuscule iron to forms some lines under the effect of the attraction.

4-For a better reception of radio and television waves, the "ok" circuit of the receptor must be at the frequency of the circuit resonance.

5- The source of bicycle electric circuit current is a generated situated at the back tyrelevel.

6-A television set produces a picture thanks to beam of charged particle directed by the waves.

7-The telephone can transmit voices because the sound goes through the telephone wires.

8-A calculator can make mathematical operations because it contains some circuit that decodes the numbers of electric impulses.

9-A dam on a river can generate electricity because the current makes the turbines move which produces the electric current.

To answers these questions, the student simply put a cross(x) on the selected answer according to Likert scale.

We can remark throughout these declarations that they don't all represent the scientific explanation. The waves are of experience first type, general know ledge and scientific knowledge. This questionnaire helped us to determine how to explain his or her understanding of a subject and how it he or she can agree or disagree with the affirmation.

Those two questionnaires have allowed us to explore the type of conceptions of learners after analyzing those questionnaires; we have identified the types of learner's conception about the electromagnetism. Comparing the two questionnaire of the same learner we have not identified some differences related to the way to answer. When it is an opened answer and when it is a declaration where he must give his opinion. Moreover, The comparison between the studentshaving difficulties (series D) with those who are more successful (series C)

has allowed us to identify some conception that harm learners and others and which permit to have a better understanding and to be successful in secondary school.

4-2-3 the experiment phase

The experiment took place before the lesson focusing on the electromagnetism starts in order not to impart learners some knowledge. The teachers under consideration must distribute the questionnaires before the lesson about the electromagnetism begins. These questionnaires had already been numbered from one (1) to three hundred and sixty (360). Each number corresponded with one student because me had to determine the origin of each questionnaire so as to determine if the questionnaire had been filed by a learner series D et C for the two of questionnaires .

They needed to give learners clear instruction. They had to:

Explain to learners the reason of these questionnaires. Learners had to answer research questions didactics in experiment and physics subject.

2- Inform them it is achieved anonymously and they must be serious when filling the questionnaire.

3- Explain them that each respondant should answer nine (9) questions of the two questionnaires even if he thinks that his answers were totally wrong.

4-distribut to learners the questionnaires with opened answers at first.

5-ask students to give back the questionnaire with opened questions before having the questionnaire at the attitude scale where they will cross their choice.

6-Ask learners to workindividually .

Research limitation

This research is limited by many factors.

It is limited to the teachers and the students of series C or D because learners must deepen their knowledge in electromagnetism in accordance with the curriculum. This is the reason why the electromagnetismhas received a special focus. Some factors such as the uncertainty of the taught subject every years the level of the teaching led us to limit our work.

Data treatment

Firstly, we have carried out a descriptive study is order to determine learners conception ,if they were capable to recognize a scientific declaration related to any type of conception how,to make classification by showing their agreement or disagreement with the declaration.

Secondly after classifying learners answers in different classes that is experience first, general know ledge, Scientifics knowledge, we have analyzed the result in order to determine if there is a striking difference in the way series C or D learners answers questions. Moreover, after our results some groupings have been made to be in harmony with the condition of the implementation of the chosen procedure. We have established two categories. The first one is made up with experience first conception as well as answers which didn't have classification and some question with no answer and the second one is made up with conception of general knowledge and scientific knowledge. Giordan, A, Martinand,J,-L,Astolfi, J-P, Rumelhard , G, Coulibaly, A.,Develay, M.., Toussaint , J,Host, V & collaborateurs . (1987). L'élève et /ou les connaissances scientifiques : approche didactique et la construction des concepts scientifiques par les eleves .Berne . Peter, Lang 205p.

Tardif, J.(1992). Pour UN enseignant strategique: l'apport de la psychologie cognitive.
Montréal : Edition Logique, 474p.

Thouin .M (1987) '' une typologie des représentations du monde physique chez des élèves au début du secondaire '' Thèse de doctorat, Montréal, Université de Montréal 267p.

Thouin M (1989) '' typologie des représentations en science physique chez des élèves du secondaire ''Revu des sciences de l'éducation, vol .xv, n° 2, p.247-266.

Thouin .M (1996) introduction aux sciences de la nature, concepts de base, percées historique et conception frequente . Sainte –Foy (QUé) : Edition Multimondes .189 p.

Vygotsky,L(1985) , pensée et langue : éd.sociales

V. Presentation of the results.

This past of the work presents the results we have got on the basis of different statistical tests.

This descriptive statistical section is divided in two parts:

- The first past is related to the respondents' opinions about waves.
- The second part focuses on the respondants' opinions about electricity and the magnestism.

5-1 - Respondents' opinions about waves

Our questionnaire is designed around nine (9) declarations. Out of these declarations, two (2) are the ones related to the waves. The first part of this section focuses on these declarations we can find in the questionnaire, that is question (4) and six (6).

Table 2 presents the results on the basis of Likert scale, that is, the answers moving form "total consensus"to "Total disagreement". Moreover the results of the learners who gave no answer are presented in the category (6).
These opinions are presented in statistics.

Table2: Participants opinions about waves.

Declarations	**Classification according to Bachelard**	**Number of learners**		**Percentage of learners**		**Total C and D**	**Percentage of respondents**	**Likert**
		Series C	**Series D**	**Series C**	**Series D**			
Question 4 For a good Reception of radio and TV waves, the ok circuit of these receivers must be at the frequency of the circuit resonance	Scientific Knowledge	15 16 05 01 01 00	75 80 37 19 22 11	39.47 42.10 13.16 02.63 02.63 00.00	30.74 32.78 15.16 07.78 09.02 04.51	90 96 42 20 23 11	31.91 34.04 14.89 07.09 08.16 03.90	1 2 3 4 5 6
Question 6: Atv set produces a picture thanks to a beam of particles directed by some ways	Scientific Knowledge	14 15 04 03 02 00	27 73 86 28 16 14	36.84 39.47 10.52 07.89 05.26 00.00	11.06 29.92 35.25 11.47 06.56 05.74	41 88 90 31 18 14	14.54 31.20 31.91 10.99 06.38 04.96	1 2 3 4 5 6

(1) Total agreement, (2) Agreement, (3) Neutral, (4) Disagreement, (5) Total Disagreement, (6) No response.

5.2- Respondents'opinions about the declarations on the electricity and the magnetism.
Our question now at the attitude scale is made by seven declarations related to the electricity and the magnetism, that is, the numbers 1, 2, 3,5,7,8 and 9. Table 3 presents the results in accordance with liker scale.

Table 3: Respondants'opinions about some declarations on the electricity and the magnetism.

Declarations	**Classification according To Bachelard**	**Number of learners**		**Percentage of learners**		**Total C and D**	**Percentage of respondants**	**Likert**
		Series C	Series D	Series C	Series D			
Question 1 The pendulum takes back its initial position when we move the magnet away from the marble because the magnetic force initiated by magnet on the marble reduces until it cancels.	Scientific Knowledge	26 07 02 01 01 01	120 51 42 09 08 14	68.42 18.42 05.26 02.63 02.63 02.63	49.18 20.90 17.21 03.69 03.28 05.74	146 58 44 10 09 15	51.77 20.57 15.60 03.55 03.19 05.32	1 2 3 4 5 6
Question 2: A mobile magnetic needle placed in an area of the space far away from a magnet and from an iron, takes a direction indicating the south pole of the earth.	Scientific Knowledge	02 04 04 12 14 02	20 51 22 71 74 06	05.26 10.53 10.53 31.58 36.84 05.26	08.20 20.90 09.01 29.09 30.33 02.46	22 55 26 83 88 08	07.80 19.50 09.22 29.43 31.21 02.84	1 2 3 4 5 6
Question 3: When we place above a straight magnet a paper sprinkled with minuscule irons and we tap, we have some lines created by the minuscule irons on the paper because the magnet obliges the minuscule irons to form	Scientific Knowledge	15 11 06 02 03 01	23 86 70 26 11 28	39.47 28.95 15.79 05.26 07.89 02.53	09.43 35.24 28.69 10.65 04.51 11.47	38 97 76 28 14 29	13.47 34.40 26.95 09.93 04.96 10.28	1 2 3 4 5 6

somes characteristic lines due to the attraction.								
Question 5 The source of the electric current of a bicycle is a generator situated at the back tyre level.	Experience first	13 09 02 07 06 01	66 54 08 40 50 26	34.24 23.68 05.26 18.42 15.79 02.63	27.05 22.13 03.28 16.39 20.49 10.65	79 63 10 47 56 27	28.01 22.34 03.55 16.67 19.86 09.57	1 2 3 4 5 6
Question 7: The telephone can transmit some voices because the sound goes through the wires of the telephone	Experience first	07 08 04 09 07 03	49 54 51 36 46 08	18.42 21.05 10.53 23.68 18.42 07.89	20.08 22.13 20.90 14.75 18.85 03.28	56 62 55 45 53 11	19.86 21.98 19.50 15.96 18.79 03.90	1 2 3 4 5 6
Question 8 A calculator carries out mathematic operations. Because it contains some circuits that code numbers in electric impulse	Scientific Knowledge	16 12 02 04 04 00	78 95 44 09 05 13	42.10 31.58 05.26 10.53 10.53 00.00	31.97 38.93 18.03 03.67 02.05 05.32	94 107 46 13 09 13	33.33 37.94 16.31 04.61 03.19 04.61	1 2 3 4 5 6
Question 9 A dam on a river can produce electricity because the current of the water forces the turbines to turn thenselves,which create the electric current	Scientific Knowledge	25 09 01 02 01 00	159 49 12 08 10 06	65.79 23.68 02.63 05.26 02.63 00.00	65.16 20.08 04.92 03.28 04.09 02.46	184 58 13 10 11 06	65.25 20.57 04.57 03.55 03.90 02.12	1 2 3 4 5 6

(1) Total agreement, (2) Agreement, (3) Neutral, (4) Disagreement, (5) Total disagreement, (6) No answer.

VI. Analyse of the results.

As it can be noticed in the table, we have rewritten the declaration for clarity purpose. One can note that we haven't repeated the declarations in our comments below the tables because the text will be heavy. We have used the number of the declaration. The reader can consult the tables if need be.

A look at this table reveals that the respondants are in a proportion of **65.95%** with the declaration(4). In fact,**31:91 %** totally agree**; 34.04 %** agree. We can notice that **14.89%** offered a neutral opinion. **15.25%** disagree or totally disagree. It is worth mentioningthat the declaration number four is scientifically written.

The percentage is **45.74%** (14.54**%** totally agree and **31.20%** for agreement for the declaration number 6). This declaration is also scientifically written**. 31.91%** have a neutral declaration. The proportion of disagreement and total disagreement **17.37%**.**04 96%** of the respondent without opinions are those of series D only.

A glance at table 3 shows that it the declaration number one**, 72 34 %** agree (**51.77%**totally agree and **20.57%** agree). Let's note that **15.60%** have a central opinion whereas the proportion of disagreement is **03, 55%** and that of total disagreement is **03.19%.**

According to Bachelard's classification, the declarations are scientific knowledge. As for the declaration number 2, the respondantsagree,that is, a proportion of **27.30%** (**07.80%** for total agree and **19.50**% for agreement**). 9.22%** have a central opinion and **60.64%** totally disagree with the subject (**29.43%**disagree and **31.21%** totally disagreement).This declaration is the type of scientific knowledge.

Learners' opinion about the declaration number 3, of the type of scientific knowledge, isof a proportion of **13.47%** for agreement, **9.93%**disagree and **4.96%** totally disagree. **26 .95%** gave a neutral opinion about this subject. The declaration number 5 is of the type of experience first. The percentage of the respondants is **28.01%** for total agreement and **22.34%** agree. It is interesting to note that **9.57%** of the respondants didn't answer this declaration and **3.55%** offered no opinion.

The declaration N°7 that of Experience first type shows shared responses. In fact **41.84%**of therespondants disagree (**15.96%** disagree and**18.79%** totally disagree).Moreover there are hesitating respondants since **19.86%** of the respondants don't have any opinion about the subject.

The declaration number 8 is the type of scientific knowledge. The concernedrespondantsdraw closer.learners agree in a proportion of **71.27%** that is **33.33%** agree and **37.94%** totally disagree. The statistics related to the hesitating rspondantsare considerable, that is,**16.31%**.

As for the declaration number 9, the respondants agree in a proportion of **85.84%** (**65.25%** of total agreement and **20.57%** for agreement. Only **04.61%** the respondants offered a neutral opinion. This declaration is of scientific Knowledge type.

VII. 6. Discussion

7.1respondant's opinions about the declarations a on the waves.

The first part focuses on the declarations about waves, especially waves, that is, declarations 4 and 6 of scientific knowledge type. They have the same topic, that is, theemitted, captured and reflected waves. As shown through the results, we pretend that there is no difference scientifically speaking between learners, in series C and those in seriesD. They are able to recognize that the declarations are of scientific nature, that is, the explanations are true in a proportion of **65.95** for the declaration number 4 and **45.75%** for the declaration number 6 of our sample. The declaration number 4, which is of scientific nature, deals with the good reception of radio and television waves. One can note that the learners' proportion that agrees is **65.95%.** However **12.25%** disagree with the declaration. We can say that series C and D learners are familiar with the notion of electric resonance that is observed when we maintain constant the value of the efficient tension of the terminal of a circuit (R,L,C) and when we make the frequency vary. This idea is confirmed by the fact that the curriculum of Physics subject of upper sixth series C and D classes contains a learning situation (LS3 : the mechanic and electric oscillation) that develops the notion of electric resonance.

As far as the declaration number 6 is concerned, it is also a scientific knowledge type which deals with the way of the pictures are formed in television. It is interesting to note that the learners proportion which agree is **45,74% ; 31,90%** emit neutral opinion. **17,37%** disagree with declaration. We can say that upper sixth C and D classes are not familiar with to the reality that the jets of electric charges directed by the waves form television pictures. This is a paradox since the curriculum of upper sixth C and D classes contains a learning situation N°1 entitled "fields of forces and interactions" in which we tackle a learning sequence « movement of a charged particle in an electrostatic field » which aims at giving explanations for the picture production in television. This first analysis allows us to think that learners of upper sixth series C and D classes are able to recognize a scientific declaration when they must give their opinions although, we didn't differentiate the answers given by the upper sixth D and upper sixth C learners.

7.2- **Learners opinions about some declarations about the electricity and the magnetism.** Here, the declarations about the electricity and the magnetism will fuel the debate. As far as the declaration number 1 is concerned, learners of upper sixth C and D are able to recognize that this declaration is of scientific knowledge type in a proportion of **72,34%** since they agree or totally agree.In fact,for upper sixth C and D learners,it is easy to agree with the declaration according to which a pendulum takes back its initial position when one moves the magnet of the marble away because the magnetic force of the magnet reduces until it cancels.This explanation is very simple.In fact,they are taught this notion in classes in the framework of the learning situation No1 in the learning sequence" magnetic field".Many learners know that when a simple pendulum is placed in a area where there is a magnetic field,the marble undergoes the magnetic force effects.As such,as soon as the effect of this force cancels,the marble should take again its initial position.Hence,it is easy for them to totally agree with the explanation given for the declaration number 1.The declaration number 2 isof scientific knowledge type.Here,learners have given diversified answers.In fact **27.30%** of the respondants agree whereas disagree and **9.22 %** offered a neutral opinion about the subject .we can think that these electro magnetism notion are not well mastered by learners and it is possible to get this diversity of answers.In fact physics subject curriculum of upper sixth C and D tackles the topic in the sequence"the magnetic field".It is said that mobile magnetic needle placed in the space far away from a magnet and miniscule irons,takes back its direction indicated the south pole of the earth.This is false because, it must be the North pole.

The declaration n °3 is also of scientific knowledge type.It deals with the lines of field created by a straight magnet on a paper sprinkled with minuscule irons.It is interesting to note that the proportion learners who agree is **47.87%** ,that of those who emit a neutral opinion is **26.95%**. One can notice that these figures are closer to one another.However **14.89%** of the respondants disagree with the declaration .We can say that learners of upper sixth C and D classes and namely those of upper sixth D don't master this notion of the lines of field .This is a paradox since the curriculum of physics subject of the classes under consideration contains a learning situation N°1 , the title of which is fields of forces and interactions in which we address a learning sequence based on the magnetic spectrum which the collection of lines of a field characterizing a field sensible to bring about explanations related to this production of lines outlined by the minuscule irons on the paper.For declaration n°5 which is of experience first type , the collected opinions are not similar .In fact , **50.53%** of the respondants agree **,36.53%** disagree and **03.55%** offered a neutral opinion.it deals with the place of the alternator of a bicycle called dynamo which is made with a magnet which is the mobile part and a coil.when the magnetwhich is the rotor that is the inductor turns,the soft iron part allows to make the flux vary throughout

the coil that is the stator and an induced electromotor force appears between the terminals of the coil which produces an induced current in the electric circuit of a bicycle.

Granted that the study of a dynamo of a bicycle is part of the " second form" curriculum and the study of the electromagnetic induction practising the study of alternator a part of upper sixth C and D curriculum; can we think that students could give opinion according to their conception of the problem? At this hypothesis we join Giordan and De Vecchi ideas (1987,p.79) who define the perception as combination of coordinated ideas and coherent exploratory pictures used by the learners to reason facing problem-situation but it emphasizes that this combination illustrates an underlying mental structure responsible for these contextual expressions.

The respondants gave almost the same answers for the declaration 7 which is also of experience first type.In fact **41.87%** of learners agree,**34.57%** disagree and **19.50%** gave a neutral opinion. There is a high percentage of learners who offered opinions stating that they agree with the declaration. However the electric dam (declaration9) concept is more mastered than that of a calculator functioning declaration (8). In fact, for question (9), **85,82%** of the respondants agree. only**07.45%** disagree and **4.61%** offer a neutral opinion.As for question 8, **71.27%** agree,**07.80%** disagree and **16.31%** give a neutral opinion.may be,as regard these results we can ask ourselves some questions since those two questions are of scientific knowledge type. Can we think that learners master the functuning of a turbine because they have been taught in fourth form the notion of electric dams to produce electric current? Or the scientific conception of the subject has been well mastered in scientific upper sixth classes.The data from those two questions confirm that learning is a social process (Garnier et al, 1991).They also confirm the idea that when the learning is well achieved, the learner doesn't have two explanatory systems.But only one option and this scientifically justifies the notions. To round up, we can think that the learners are able to recognize a declaration of scientific knowledge type when we present them one. Is it the same thing when we ask them to provide explanation to this phenomenon?

VIII. Conclusions

The current research Work aims at carrying out an exploratory study on the different types of conceptions related to electromagnetism of upper sixth C and D classes learners in some private and public secondary schools in BENIN. With the view to achieving our goal, we have made a list some writings about some conceptions and their typology. After our literature review section, we set two specific research objectives. Firstly, to make a list of types of conceptions from learners related to the electromagnetism and secondly to analyses those conceptions in order to classify them according to the different types. Results have allowed us to classify the given responses in to five (5) categories which are the following: Experience first, verbal obstacle, substantialist obstacle, general knowledge, and scientific knowledge. As for liker questionnaire, we calculated the percentage for each proposed response. This has allowed us to remark if the learners were able to recognize if a declaration is a scientific declaration or not.

For liker questionnaire analysis, we have opted to separate the questionnaire in two distinct parts. The first part focuses on waves whereas the second one is related to the electricity and the magnetism. This approach has permitted us to notice that the learners are generally capable to recognize a scientific knowledge declaration or a general knowledge declaration for a question about the waves and that of about the electricity and magnetism as well. However they have a few difficulties to recognize an experience first declaration for the two types of questions. This shows that the conceptions have a consequence about our teaching and about the learning of students. In fact, if we don't take into account the learner's incapacity to identify diverse types of conceptions, this means that they can use them to answer questions. As such, the scientific conception is perhaps easily identifiable in a declaration but, is it really identifiable to answer question? It is what we have checked with the questionnaire with opened answers.We can therefore conclude that we have different types of conceptions from upper sixth C and D learners. These conceptions are experiences first, general knowledge and scientific knowledge. When the topic is known to the learners at school or through personal culture, the general knowledge and scientific conceptions are used by almost half of the respondents. In fact, the socio-affective stake and the interaction that must exist so that the learner engages in the learning's are shown when he knows the subject. Willing to learn, the learner invests more and more and the learning is more easily. The teacher must try to provoke some socio-affective stakes to favor success in sciences. Moreover, the learners won't have two explanatory systems but only one that will explain the notions scientifically speaking (1987). Teachers can use the research results to create an imbalance from the so that the learner latter can be able to reformulate his own conceptions in order to make them conformed with scientific explanations. We believe that these results will have a consequence in sciences teaching process. Indeed, teachers should figure out that learners don't have the same level of conception. As such, the learners who have a low level of conception about scientific phenomena could improve their school results in sciences if teachers took into account those differences. Teachers could check the prior knowledge of the students before starting a learning sequence. This approach will give the teacher a sign that will consist to know the level at which his learners are situated. Then taking into account the conceptual level of his learners.Theteacher can propose diverse activities allowing everyone to evolve their

conceptions towards those closer to scientific perceptions we want the learners to acquire. Moreover this learning could be done through a cooperative learning, through the social learning or by meditation. The teacher must if possible, use these of learner's conception to improve the learning in sciences. For the learner some consequences must follow because his learning will be carried out with a better explanatory system which will allow him to having some precise and scientific perceptions of diverse notion he must learn in the course of his life.

An, individual perception about the world is incomplete and depends on his senses and the mental structure of the observer. We don't see the world; we imagine it (Jarroson 1992). We hope a further research will check if the conceptions will change once electromagnetic notions have done taught.

Bibliography

[1] Giordan, A. (1999*). Une didactique pour les sciences expérimentales*. Paris : Belin.
[2] Giordan, A. Girault, &Clement, P. (1994). *Conceptions et connaissances*. Bernes: Peter Lang.
[3] Glaeser, G. (1999). *Une introduction à la didactique expérimentale des mathématiques.* La Pensée Sauvage : Grenoble.
[4] Martiinand, J-L. (1996). *Enseignement et apprentissage de la modélisation en sciences*. Institut National de Recherche Pédagogique : Paris.
[5] Brouseau, G. (1993). *Les obstacles épistémologiques et les problèmes en mathématiques*, RDM,vol. 4.2, p. 164-198. La pensée sauvage : Grenoble.
[6] Astolfi, J-P, et Develay, M. (1989), *La didactique des sciences*. Coll. "Que sais-je ? ". Paris : PUF, 125 p
[7] Bertrand, R. (1986), *Pratique de l'analyse statistique des données*. Sillery. Québec. PUQ, 379 p.
[8] De Corte, E. (1990*). Les fondements de l'action didactique*. 2e édition. Bruxelles : De Boeck, 402 p.
[9] De Vecchi, G. &Giordan, A. (2002*) L'enseignement scientifique* : *Comment faire pour que "çamarche''* ? DelagraveEditions, 270 p.
[10] Garnier, C &al. (1991), Après Vigotski et Piagel, *Perspective sociale et constructiviste. Ecolesrusse et occidentale*. Bruxelles : De Boeck Wesmael, 288 p.
[11] Giordan, A. & De Vecchi , G. (1987). *Les origines du savoir, des conceptions des apprenants aux conceptions scientifiques*. Paris : Delachaux&Niestlé, 214 p.
[12] Giordan, A, Girault, Y& Clément, P. (1994*). Conceptions et connaissances.* Berne : Peter Lang, 315 p.
[13] Giordan, A, Martinand,J,-L,Astolfi, J-P, Rumelhard , G, Coulibaly, A.,Develay, M.., Toussaint , J,Host, V & collaborateurs . (1987*). L'élève et /ou les connaissances scientifiques* : approche *didactique et la construction des concepts scientifiques par les élèves* .Berne . Peter, Lang 205p.
[14] Tardif, J.(1992). *Pour un enseignementstratégique: l'apport de la psychologie cognitive*.
[15] Montréal : Edition Logique, 474p.
[16] Thouin .M (1987) ' *'une typologie des représentations du monde physique chez des élèves audébut du secondaire* '' Thèse de doctorat, Montréal, Université de Montréal 267p.
[17] Thouin M (1989) '' *typologie des représentations en science physique chez des élèves dusecondaire* ''Revu des sciences de l'éducation, vol .xv, n° 2, p.247-266.
[18] Thouin .M (1996*) introduction aux sciences de la nature, concepts de base, percées historique etconception fréquente*. Sainte –Foy (QUé) : Edition Multimondes .189 p.
[19] Vygotsky,L(1985) , *pensée et langage*: éd.sociales.

Appollinaire A- GOUTON. "Analysis of learner's conception in upper sixth C and D classes(Classes de terminale C et D) Benin Republic, regarding some problems- situations in electromagnetism." International Journal of Humanities and Social Science Invention(IJHSSI), vol. 6, no. 10, 2017, pp. 50–60.