

A Physics Teacher as a Journalist: The World in the Students' View

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To cite this article:

Abdul-Sahib Hasani N. A Physics Teacher as a Journalist: The World in the Students' View. *Arabic Language, Literature & Culture*. Vol. 2, No. 1, 2017, pp. 9-12. doi: 10.11648/j.allc.20170201.13

Received: December 26, 2016; **Accepted:** February 20, 2017; **Published:** March 4, 2017

Abstract: A physics teacher taught Farsi Language for middle school students in the academic year 2015-2016 in Abadan. Physical sciences demonstrations and mathematical puzzles motivated the students to improve their observation skills and to make progress in writing skills. They found some similarities between observing a physical phenomenon and observing a social problem. And they discovered that the reports are the same for physics and sociology fields i.e., the report must be real and clear with simple words and phrases. They learnt to look carefully and to use humour and metaphors to make their compositions clearer and more visible.

Keywords: Journalist, Middle School, Writing Skill, Physics, Composition

1. Introduction

Three decades ago, researches were conducted to explore the view of journalists and humanities specialists as physics students [4]. But, here, the author lets the middle school students to act as physicists and mathematicians and to make reports and express their ideas. Due to some regulations in the educational system and prolongation of primary school from five years to six years, some teachers of mathematics and physical sciences – Physics, biology, and chemistry – were released from high school in the academic year 2015-2016, in Abadan, and they were reassigned to work in the middle school and primary school. So the author got the mandatory opportunity to work in the boys' Ghadir Middle School, as a Farsi Language teacher for seven to nine graders. All of the students were bilingual – mainly Arabic and a few Kurdish and Lor (with accent near to Kurdish). The course consists of three subjects: dictation and reading contained in a book called Farsi. And composition has its own book called Writing Skills contained eight lessons for each grade.

2. A Demonstration of Physical Sciences

The third lesson of writing skills for eight graders dealt with good observation and vision for writing [6] and this

technique is reminded and reviewed in the first lesson of writing skills for nine graders [7]. To check the students' visions, some demonstrations had been set up among them as the following: two identical coins separated by a wetted piece of paper worked as a battery. Theoretically two identical metal pieces cannot work as a battery but practically they produce a tiny electric current due to some impurities and inhomogeneity. The produced electricity monitored by a zero-center microammeter – see figure 1a and figure 1b.



Figure 1a. A coin voltaic cell.

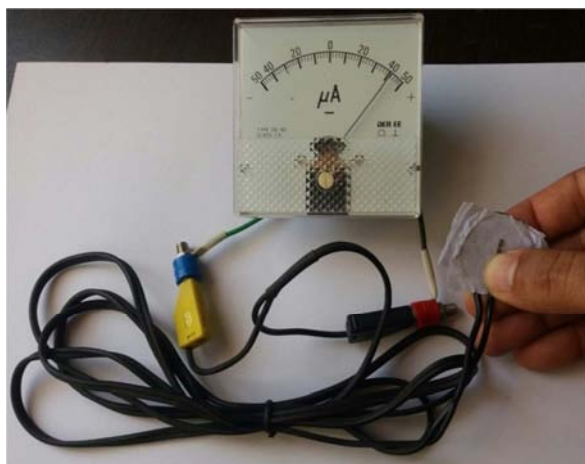


Figure 1b. A coin-wire voltaic cell.

The researcher asked the students to look carefully and to avoid asking any questions because answering their questions would affect their visions. The author drew the demonstration tools from a bag and borrowed a water bottle from a student to wet the separating paper. The electric current was less than ten microamperes (Figure 1a) so a coin removed and one of the lead covered end of the connecting wire applied as an electrode which raised the current to more than thirty microamperes (Figure 1b). When the students were astonished by the moving pointer, the teacher asked

them to write what they had seen and to list their questions. Listing questions about a subject as a technique for improving writing skills, was the seventh lesson of writing skills for seven graders [8].

Really the researcher was not searching for a scientific and sophisticated report but was interested in how they would perform, how they would interpret an unfamiliar phenomenon and what kind of questions would strike their minds. To avoiding interference with their mind the author did not give any instruction about the experiment, though almost all the classes asked for some descriptions and for naming of parts of the demonstration tools. It was not the Naming of Parts of Henry Reed [5] but had similarities that may be found in Gatto's work [2], [3]. So the teacher only said that when you are travelling by a train, you look through the window and you would narrate stories after your trip. You can do the same here, look carefully and tell what you see.

Table 1 shows details that are not relevant to a scientific report. However, it reveals the vision details of students that reported an unfamiliar observable fact.

The composition title and objective was 'just look and write' but table 2 shows that the interpretations and theorizing were much more than observations and appearance descriptions.

Table 1. Results of students' observations. Parenthesis in the first column show students number.

Coins value		Wires colours									Microammeter									
											Face					Pointer				
	√	×	B	R	K	W	Y	R & K	B & Y	B & R	R	K	□	Δ	μA→HA	0° – 100°	R	AB	Reading	
7 graders (94)	1	1	1	1		1	1				1	2	17	1	2	2		2	1	
8 graders (33)		2						1				5	2				1		4	
9 graders (55)		1			2			4	1	1		6	19				4		5	

Abbreviations in table 1: √ = correct, × = wrong, B = blue, R = red, K = black, W = white, Y = yellow, □ = the face was square, Δ = the face was triangle. μA→HA = reading HA instead of μA. 0o – 100o = the dial scaled from zero to one hundred. AB = the pointer moved from A to B.

Table 2. Interpretation and theorizing.

	Naming microammeter							Pointer deflected due to							This equipment measures						
	T	A	C	Km	F	V	S	O	W	D	C	E	H	M	Fingers pressure	Metal strength	Water	Energy	Electricity	Mal	Nm
7 graders (94)	6	2	4	6	3		2		1	3	1	7	2	1	1	2	1	1	1		1
8 graders (33)						2	2					1					1				
9 graders (55)	10					1		3				4								1	

Abbreviations in 'Naming microammeter' column: T = thermometer of water heater, A = ammeter, C = compass, Km = speedometer like what we use in a car, F = dynamometer, V = voltmeter, S = scale (weighing instrument), O = ohmmeter.

Abbreviations in 'Pointer deflected due to' column: W = wind, D = like water in dam, C = water coolness, E = electricity, H = heat, M = magic.

Abbreviations in 'This equipment measures' column: Mal = Malfunction in devices like battery and mobile, Nm = number of microbes on a coin.

While there was no point on the dial called A or B, – see figure 1 (a) and figure 1 (b), two seven-graders 'saw' points A and B and gave a theory about those points. One student wrote "the pointer will move from A to B for a very hot object" – don't touch the 'hot' coins! And the other explained the opposite: "the pointer will move from A to B for objects that are not so hot" – thank you for letting me hold my coins!

A disobeying seven grader that was always searching for a way to disturb the class wrote:

'It seemed that the equipment measures the crimes.

Because when my teacher gave that device [the microammeter] to my friend [classmate] the pointer moved.'

confession is good for the soul but bad for the reputation!

Another seven grader, calm and silent, wrote:

'There is a very small ant, I think, that has its home, school, and country inside that device. And whenever the ant starts a job, the pointer will move. Or it might move the pointer before starting its job. This will make its life easy and it becomes happy.'

But the strangest theory proposed by a nine grader:

'The coins were not so cold and the thermometer reached +20°. When the teacher flipped the coins [the teacher really reversed the electric current by replacing the two connecting wires by each other.] the thermometer reached -20° because the coins cooled down to -20°.'

How did he reach -20°C in Abadan Island with its eight to nine months summer! Why the teacher's fingers did not freeze? Keep in mind that imagery was not an unknown subject for middle school students. Table 3 summarizes the imagery contents of writing skill books for three years period of middle school.

Table 3. Imagery practiced during middle school.

Grade	Lesson	Title
7	1	Write what you see.1
	4	Contrast two pictures and describe each picture separately.
8	1	Choose one of two pictures and describe it.
	4	Describe a picture from anywhere.
	7	Contrast two pictures and describe each picture separately.
9	1	Imagine yourself inside a spacecraft on the moon.
	4	Imagine yourself inside a crowded bus.
	7	Imagine a tree that: a) its roots penetrate the clouds.
		b) its branches spread over the earth. c) it is suspended in the air.

No one mentioned the wetted piece of paper and why the author did not ask them for a piece of paper. That paper was salt-saturated. Being practical is not important but being theoretician or not being: this is the problem!

3. Imagining Ourselves in the Universe

Imagination was another important factor for developing writing skill appeared, for the first time, in the last assignment of lesson seven of writing skill for seven graders so the author conducted a mental experiment for all classes: Suppose that we, the human beings, can see and hear through the globe, then what about two persons, one standing on the North Pole and the other on the South Pole? What would be their vision about each other and what would be their chatting? After some discussions the teacher drew a simple picture like figure 2 on the whiteboard:

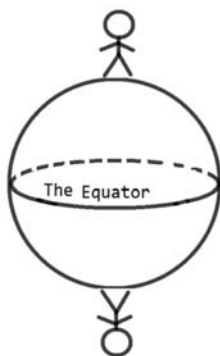


Figure 2. Suppose that these two persons can see and hear each other. What would be their vision about each other and what would be their chatting?

Only two seven graders mentioned the upside-down standing of the two 'opposite' persons with respect to each other. One student considered himself looking downward and the 'opposite' person looking upward. But the second student acted as an experienced physicist. He delivered his idea in a short and clear passage:

'If one were in the South Pole and I were in the North Pole and if we were able to see each other, then I would ask why didn't he fall off the ground? And why did he stand inverted? And he, certainly, would think in the same way because he would see me standing upside-down. And I'm eager to know how a person in the South Pole does not fall off the ground and how can he stick to the ground? It's funny that both of us stay thinking about these questions. It's funny and silly.'

This was exactly his complete composition; short, clear, and precise. It is to be noted here that even a good thinker cannot get rid of self-centricity: looking downward and seeing an individual standing upside-down means we consider ourselves on the top and as standards and measure the phenomena and any person activity by these standards. The geographical maps that we use today are an example of these standards – the north is up. And the south was on the top for Muslim geographers – Al-Idrisi twelfth century map in Al-Andalus Museum in Cordoba is another example.

4. Mathematics and Physical Sciences in the Literature

The forgotten skill was applying natural sciences and mathematics in literature. Here is one of the mathematical puzzles that the author entertained the students with: imagine an airplane that can fly from a city in South Africa 600 miles northward, 600 miles westward, 600 miles southward, and 600 miles eastward. Does it reach the departure point?

All of the students' answers were "YES" plus humour like "the plane will crash" and "if I were in the plane then I could decide for the problem". Two students, in each class, helped me tracing the route on a globe by a strip of paper: A survey like that applied by Casey [1]. All of the students enjoyed virtual flying by a paper strip and convinced themselves that their answers were not correct.

Mathematics can sharpen our vision. As an example it can show us the limit of exaggeration and can remove the tasteless and nonsense statements: 'I told you for 1000 million times,' offending and aggressive words we hear sometimes from here and there!

It is fascinating to emphasize the repetition by using symbolic numbers. We use numbers 40, 70, and 100 in Arabic to describe the large amount of quantities. For example the insect millipede called um-arba'-ow-arbaein (44-legged, literally means 'the holder of forty-four') and in our local accent um-arbieinia (40-legged) and in Farsi the numbers one hundred and one thousand have the same role as with millipede that called hezar-pa (1000-legged). And it is interesting that the word millipede has the same meaning; 1000-legged.

Now, let's return to one thousand of million and calculate the time needed for such repetitions. If one can say his command or suggestion in one second then he needs

$$1,000,000,000 \div 3,600 = 277,777.8 \text{ Hours} \quad (1)$$

or

$$277,777.8 \div 24 = 11,574.1 \text{ Days} \quad (2)$$

or

$$11,574.074 \div 365 = 31.7 \text{ Years} \quad (3)$$

That is, the required time for his repetitions is more than thirty-one years! So 'I told you for 70 times' is more accurate and makes sense.

Mathematics is needed in literature though it seemed that comedy and fun sometimes require violating mathematics. For example the Kuwaiti artist Abdul-Hussein Abdul-Redha said in Saif-el-Arab (Arab Sword) play: "don't care about the enemy; half of them are drug addicted, another half is drunk, and the rest are amusing themselves by snuffing heroin." The fun that led the audience burst into laughter is imagining people population with two halves and something more. However, this statement does not violate the mathematical rules if we consider the set theory.

5. Conclusion

Using physical sciences and mathematics can enrich literature and the enriched literature can help removing the stereotyping of mathematics and natural sciences as hard and finally make the reconciliation between the students and the sciences.

All of the students wrote about two coins while the teacher put one of them aside. At the end of the session and after gathering their compositions papers the teacher reminded them of removing a coin.

In fact our good method of teaching is just to remind the learners of their abilities. Exactly as the Arabic proverb says: *دُكِّرْتَنِي الطَّعْنَ وَ كُنْتُ نَاسِيًا* you reminded me of lancing while I forgot it. They learned to see/look better and to say 'I do not know' when they had no idea about a posed question – the author hopes they retain the fidelity in the coming years.

Also when the students discovered the power of their vision and got more insight into how to see, they started using it at the proper place and time. For example they criticized the city council and parliament members for deficiency of public and essential services in Abadan. They used humour and metaphors to make what they want more visible.

Acknowledgements

This research did not receive any specific grant from

funding agencies in the public, commercial, or not-for-profit sectors.

The author wishes to thank all of participants students especially the mistaken and disobeying, but not lazy and insolent, the ones who led us to write about their work. Many questions and rules hidden by 'good' or passive students while the faulty and disobeying students reveal the deviations and malfunctioning parts of our work and encourage us to do research and write about them. Special thank go to Mr. Nasser Atasheneh, an English Faculty member at Islamic Azad University of Abadan branch, for his invaluable grammatical corrections and suggestions in preparing this paper.

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Biography



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