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Action Research on Naming and Writing Chemical formula in General

Chemistry Course (4008)

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Abstract

During the first semester of teaching general chemistry, the main problem faced my students is difficulty to understand writing and naming chemical formula. The main objectives of this research are to enable my students to name and write the formula of inorganic chemical compounds correctly. Observation, Questions and Exam have been carried out so as to find out reasons to the problems. Cooperative learning to solute worksheet, group work in classroom, and using technology in teaching were used as strategies to improve outcomes. The findings of the action research indicated that the students increased confidence and proficiency in naming and writing chemical compounds using teaching and learning strategies, and the results also showed that teaching strategies were effective in improving of the student in the classroom. In the end, as a teacher for general chemistry course, the action research helped me to identify different strategies that improve teaching and learning process.



Step 1: Problem in my teaching practice and the Learning goals for my students

The problem I identified in my classroom was that most of my students have great difficulty in applying the learned concepts, or in understanding the main concepts in naming and writing formula of inorganic chemical compounds.

Due to previous problem I faced while teaching general chemistry course, the main learning goals are the following:

- To enable my students to name simple inorganic chemicals by their chemical formulas.
- To enable my students to write formulas for simple inorganic chemical compounds correctly.

Data Collection

Each data is collected to help my students for better understanding, and apply the concepts being covered during naming and writing inorganic chemical formulas. These data are collected by the following:

- Exam: in addition to being a tool of assessment, it is intended to find common mistakes committed by students.
- Observations of students taking part in class room activities.
- Questions: during questions I recognize the student's difficulty in naming and writing chemical formula.

Step 2: Plan of action

My Strategies

To achieve my objectives, I focused on using the following strategies:

First strategy: Worksheet solution by cooperative group: My worksheet included different type of binary compounds, leaving sheet unidentified to students. Each three students were divided into groups during lecture to write the name and chemical formula in the blanks. This method allows the students to share concepts and learn from each other.

The design of the Worksheet for the naming and writing chemical formula was divided into two tables.

The first table was designed to name chemical compounds, the names are found by the following rules:

- Rule 1: Metal + Non – metal. Names end with "ide".
- Rule 2: Metal + Polyatomic. Name end with the name of polyatomic ion.
- Rule 3: Transition metal + Non-metal. Name end with ide. the charge of transition metal is presented as roman numerical
- Rule 4: Transition metal + polyatomic ion. Name end with name of polyatomic ion . the charge of transition metal is presented as roman numerical
- Rule 5: Non-metal + Non-metal .Name end with "ide". Prefix such as mono, di, tri ...are used for both elements.
- Rule 6: binary acids. named as hydroic acid

The second table was designed to write chemical formula. The formulas are found according to the following steps :

- Step 1: Write the symbols.
- Step 2: Determine the oxidation numbers above each symbol.
- Step 3: Determine the common multiple of the charges.
- Step 4: Use criss-cross rule to write formula and use () when you have polyatomic ions.

Table (1): writing the name of the compounds.

<i>No</i>	<i>Formula</i>	<i>Name</i>
1	NaCl	
2	CO ₂	
3	FeCl ₃	
4	MgCO ₃	
5	P ₂ O ₅	
6	Ca ₃ (PO ₄) ₂	
7	NaHCO ₃	
8	H ₂ S	
9	NH ₄ NO ₃	
10	AgCN	
11	Pb(SO ₃) ₂	
12	HI	
13	Fe(OH) ₂	
14	Zn(HCO ₃) ₂	
15	(NH ₄) ₂ SO ₄	



Table (2) : Writing the formula of the compounds

<i>No</i>	<i>Name</i>	<i>Formula</i>
1	Magnesium chloride	
2	Aluminum sulfate	
3	Diboron tetrabromide	
4	Potassium chloride	
5	Copper (II) oxide	
6	Tin(IV) selenide	
7	sodium dihydrogen phosphate	
8	Sulfuric acid	
9	Perchloric acid	
10	magnesium acetate	
11	copper (II) bicarbonate	
12	Xenon dioxide	
13	Copper (I) Iodide	



Second strategy: Each group requires finding ten household products that contain inorganic chemical compound. This strategy helped students to name these compounds and write their chemical formulas. On other hand, Students will identify chemicals in their homes.

Third Strategy: Each student uses the chemical names application on mobile phone. This application include test by names and formulas chemical compounds. Using chemical names application helped every student be involved by thinking, writing, and learning.

Step 3: Data collection in Action

After applying my strategy I began collecting post data. The same techniques were used to collect the data. These techniques are: Post assessment exam, Observation, and Questions.

Step 4: Assess



For the post exam, it can be observed that the grades in naming and writing chemical formula are improved. When comparing before and after assessment, the improvement become obvious and very magnificent.

I observed the students have a lot advancement to apply naming and writing chemical formulas on the complex chemical compounds and they devolve from perfunctory thinking to deep thinking.

My students became more confirmed and positive during questions.

Step 5: Evaluate

- Strategy helped students accurately to name and write formula without difficulties.
- Strategy enables students know the basic rules and principles of compounds with their formulas.
- Strategy changing classroom from inactive to active.
- Cooperative learning strategy helps students to solve problems.
- Action research gives me an area to learn by myself and bring best improvements in teaching.

Step 6: Future Action

- Many of the activities engaged the students in understanding to name and write formula of chemical compounds representations in using technology in teaching such as, video on YouTube. I expect using YouTube in teaching will enhance students understanding and improve the results.
- Chemistry teachers should not assume that students possess chemical background.

Thanks