

A PEDAGOGIC EXPERIMENT IN PHYSICS AND LANGUAGE-ART LINKAGE THROUGH ACROSTIC VERSES AT THE HIGH SCHOOL LEVEL: AN ACTION RESEARCH

Lalit Kishore

Jeevan Vigyan Academy, Jain Vishava Bharti, Rajasthan, India

lalit_culp@rediffmail.com

The paper describes a classroom intervention of physics and language-art links. The revision of physics terms was tried through acrostic verses. A procedure for such an intervention has been standardized and described along with its advantages. A set of students (N=25; Age: 14-15 years) in an urban English medium school underwent the pedagogic experience and their reactions to the experiment were significantly favourable ($p < 0.01$; $DF=2$). The objectives of the action research were; to provide an experience to students in creating physics related acrostic verses and to revise physics topics by creating acrostic verses as group work. The examples of created verses have been described in this paper. Students saw the intervention as a refreshing change from the conventional rote memorization for revision

Keywords: Physics instruction, Cross curricular linkage, Revision, Acrostic verse

INTRODUCTION

Acrostics are blank verses in which the letters of a concept, label, key word or a topic begin with words, phrases or sentences that are continuous from one line to another. Such poems are easy to write with a little play of words. In such a poem, the name of the concept is written vertically with each letter capitalized. Thereafter, by consulting the textual material on the concept, the words and phrases describing it beginning with the capitalized letters are written from one line to another.

Gardner's multiple intelligences theory (1983, 1998), advocates that musical intelligence be inculcated through all the subjects along with other intelligences like verbal, spatial, logical-mathematical, bodily-kinesthetic, inter-personal intra-personal and naturalist intelligences. Gardener's theory is being used by many educators for classroom instruction and organizing the curriculum. Creating verses and lyrics is the musical intelligence related language-art form.

Recently, Kishore (2007, 2008) has used the Japanese Haiku poetry for language-art link of physics and revision of and statements of various laws and principles. Joshi (2007), out of personal interest, has been writing poems on physics topics

but not as a pedagogical tool for classroom instruction. Consequently, a need was felt by the practitioner to try out a pedagogical intervention in the action research format to gain experience and find the efficacy of acrostic verses for revising physics. There exists evidence for the efficacy of cross-curricular linkages of other subjects like sciences and language arts but not for subjects like mathematics and physics.

METHODOLOGY

An intervention action research methodology was used. An attempt was made at grade nine to link revision of physics terms of the textbook to creation of acrostic poetry through modeling and demystifications. The objectives of the action research were:

- to provide an experience to students in creating physics related acrostic verses;
- to revise physics topics by creating acrostic verses as group work.

A set of students (N=25; Age: 14-15 years) in an urban English medium school underwent the pedagogic experience. The following two examples were used by the practitioner cum action researcher to demystify the creation of acrostic poems.

Ø SPEED

S: Speed is measured in meters

P: Per second

E: Ever increasing speed causes acceleration

E: Example of ever-increasing speed is to free fall of a body

D: Distance moved per unit time is called speed

Ø CURRENT

C: Current's

U: Unit is ampere

- R:** Rate of flow of charge is
- R:** Referred to as current
- E:** Electric current is the drift of
- N:** Negatively charged particles or ions
- T:** Towards an anode due to potential difference

The procedure for creation of acrostic verses was as follows. After a chapter ‘Force and Motion’ in physics was completed, the sample was asked to revisit it through the language-art of acrostic poems for revision work. The use of the dictionary of science was allowed to be referred along with the textbook.

The procedural steps in the pedagogy were as follows:

- The teacher gave two examples of creating acrostic poems to demystify the process.
- For a completed chapter students were asked to create acrostic poems in groups of 3 under the teacher’s guidance followed by sharing of poems among various groups.
- At the third stage, students were asked to create acrostic poems individually as a home assignment.
- After the assignment all the poems were shared.

Ø **OUTCOMES**

After the intervention, a hand written compilation of ten acrostics became available for future reference and was put in the school library. Here are some examples of the acrostic poems created by students that are part of the compilation.

Ø **MOTION**

- M:** Motion, that is linear, is an
- O:** Object’s
- T:** Translation
- I:** In space from
- O:** One place to another
- N:** Next type of motion is rotary motion

Ø **ENERGY**

- E:** Energy is the capacity to do work.
- N:** Nuclear energy
- E:** Electrical energy
- R:** Rotational mechanical energy
- G:** Gravitational and potential energy are some examples of energy
- Y:** Yet other energies are solar energy and wind energy

Ø **FORCE**

- F:** Force on
- O:** Objects
- R:** Retards or accelerates them
- C:** Changes their shapes or direction of motion
- E:** Electrical force, gravitation force, nuclear force etc. are examples

By playing with a limited vocabulary and words, the students felt and articulated the challenge without distorting the concept and explanation. To provide leverage, the need was felt that the capitalized letters could also include examples and contrast with other concepts. For example, the acrostic poem of speed took a good amount of thinking to complete it since its definition is short.

The reactions of the students on a three point scale, favourable-neutral-unfavourable, were collected. A chi-square analysis was done and results of the same are summarised in the following table.

Reactions	Frequency		Chi-square
	Expected	Observed	
Favourable	8	16	
Neutral	8	5	11.12**
Unfavourable	8	4	

**p = 0.01 level

Table 1: Summary of students’ (N = 25, DF = 2) reactions to the intervention

Nonetheless, it was a mental challenge to create such poems in physics. The more the mental effort in a creation, the more the pleasure on completion and the longer the retention of the concept. The following are advantages of converting the physics text into acrostic poems for revision purposes. Some were articulated by students:

- Creative mental challenge and effort to create long-lasting memory of concepts.
- Activation of the right hemispheres of the brain.
- Cross-curricular linkages provide pedagogical soundness to physics for students who otherwise view it as an abstract and dry subject.
- Enhanced liking for physics.
- Feminization of physics due to emotive aspect of poetry and making it more female friendly.
- Enhanced understanding due to reorganization of text and change in the level of abstraction.

RESULTS

The students favored the intervention of language-art and physics linkage (Chi square, 0.01 levels of significance). They found transforming the text of physics lessons into acrostic verses a creative exercise. It worked as a refreshing change from the routine homework assignments and cramming system of remembering physics.

Other formats of verses, besides acrostics, are cinquain (a French poetic form) and haiku (a Japanese verse) which are straightforward due to inherent rules and do not require much play with the words. In acrostics the words and their synonyms are explored from the first-lettered words of the given term and hence for vocabulary building and heightened mental challenge, acrostics seemingly have an upper hand. While for a short statement, haiku is more preferable and for describing a thing briefly, cinquain is more suitable.

DISCUSSION

Nowadays poetry is being used both as a therapy and a pedagogical tool in fields as diverse as the well-being industry, mental health, dentistry and academics. Furthermore, poetry helps the stressed to relax (Bricklin, Golin, Grandinetti, & Lieberman, 1990). Thus acrostic is not merely for remembering the subject matter since it provides mental exercise in playing with the words to re-sequence them to fit into a new structure and pattern. Moreover, reading and acrostic poetry in musical speech has pleasing effects and could be helpful in sublimating emotions.

According to Bricklin et al. (1990) poetry does not always rhyme but has a pattern and rhythmic structure that is sometimes unsophisticated and other times profound. Acrostics are recited as rhythmic free verse, and it is the rhythm that gives them the balancing effect and inner artistic joy to the creator and singer.

Most science teachers feel shy of creating and reciting poetry and hardly any studies are available for cognitive development

of students in science subjects by the use of various poetic forms. Some action research has been in using the Japanese language art form of haiku for developing musical intelligence of students at the middle school level (Kishore, 2008). A news item (Kishore, 2010) reports the use of rap lyrics to remember the concepts of mathematics and tackling word problems in an American school context as a joyful activity to reduce math-phobia.

Thus, it emerges that there is a need to promote action research and try out acrostic analogues in other languages for science instruction. Also, there is a need to include music as a way to learn science to make it more inclusive. The music-smart students must find a place in learning science, mathematics and technology.

REFERENCES

- Bricklin, M., Golin, M., Grandinetti, D., & Lieberman, A. (1990). *Positive living and health*, Emmaus: Rodale Press.
- Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*, New York: Basic books.
- Gardner, H. (1998). Are there additional intelligence? The case for naturalist, spiritual, and existential intelligences. In J. Kane (Ed.), *Education, information and transformation*, New Jersey: Prentice-Hall.
- Joshi, V. (2007). Vibrations 22: Human bonding. *IAPT Bulletin*, 24(10).
- Kishore, L. (2007). Haiku poems in physics, *IAPT bulletin*, 24 (10).
- Kishore, L. (2008a). Haiku in physics, *Teacher Plus*, Jan. Issue.
- Kishore, L. (2008b). Physics and language art links through acrostic verses, *CASTME Journal*, 28(1), 19-21.
- Kishore, L. (2010). Teacher uses rap to help students to remember math concepts, *Cplash*, June 29, www.cplash.com/category/pageIndex/262.