

Catalyzing the Scientific Content Mastery and Conceptual Understanding of Grade 11 STEM Students through Filipino Translated Comics in Earth Science

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ABSTRACT

This action research aimed to determine whether a science comic written in Filipino is effective in stimulating scientific mastery of content and conceptual understanding of Grade 11 STEM students A.Y. 2017-2018. This research study made use of both quantitative and qualitative. For quantitative, a randomized pretest-posttest control-group design was used. Students were randomly selected and assigned to the control and experimental groups. The control group used the comics written in English while the experimental group used comics on the same topic written in Filipino. For qualitative analysis, an interview and journal narrative was used to gather the experiences of the participants of the study about the developed Filipino-translated comics.

The results revealed that students exposed to comics written in Filipino performed better than those who used the comics in English. They achieved a higher level of mastery of the contents. In terms of conceptual understanding, exposure to the comics in Filipino resulted to improved performance in the test for conceptual understanding. Pretest and posttest scores are positively correlated and mastery of contents is significantly correlated with conceptual understanding. Based on the result of the study, the following are recommended: first, a large sample size should be used next time to increase the generalizability of the results. Second, only simple random sampling should be used and that samples should be randomly assigned to treatment groups. Finally, future research should investigate how comics written in Filipino promote conceptual understanding.

KEYWORDS: *Conceptual Understanding, Content Mastery, Earth Science, Filipino Translated Comics*

INTRODUCTION

Teaching Science embraces the notion that science is for all. It prescribes that science concepts must be understood by the students and could apply them in real-life situations.

As stipulated in DepEd Order No. 52, s. 1987 in accordance with the Bilingual Education Scheme in 1987, high school science should be taught in English. In 2003, the use of English as medium of instruction in teaching science was further stressed and reinforced with the signing of Executive Order No. 210, s. 2003 by President Gloria Arroyo (Official Gazette, 2003).

Moreover, According to former President Benigno Aquino III, "My view on the medium of instruction is larger than just the classroom. We should become tri-lingual as a country: Learn English well and connect to the world. Learn Filipino well and connect to our country. Retain your dialect and connect to your heritage" which the Department of Education (DepEd) gets inspiration in inclusion of Mother Tongue-Based Multilingual Education (MTB-MLE) as a feature of the Enhanced Basic Education Program. It mandates the use of the language that students are familiar with (their first language) as medium of instruction to allow them to grasp basic concepts more easily. The MTB-MLE is implemented in

two modules: 1) as a learning/subject area and 2) as medium of instruction.

Comics are already proven to be effective instructional materials but the language used in the developed comics can change the result, either on positive way or in negative way. The researcher believed that it will help develop conceptual understanding. Moreover, it will help students with poor reading comprehension skills understand the concepts in Science and achieve mastery of the lesson. The end result of which are better performance and higher achievement in Science.

Review of Related Literature

Various references have been utilized in order to gather information regarding this study.

There are many researches which the result shows that teaching Science in Filipino promotes conceptual understanding and content mastery. One of these is from Aquino (2012) entitled "The Effects of Bilingual Instruction on the Literacy Skills of Young Learners", monolingual instruction in either Filipino or English had a stronger effect on the children's literacy skills compared to bilingual

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instruction. Moreover, mother tongue-based instruction, as compared to second-language instruction, had stronger effect on the preschoolers' literacy skills.

In SEAMEO-INNOTECH (2014) project "Translation of Marie Curie's Science Lessons in Filipino". They came up with "translated lesson plans in poster layout" (p.20). The lesson plans in poster layout written in Filipino were used during demonstration lessons and were evaluated by public high school students in Laguna. Result shows that students learned the lessons better because the contents of the posters were written in Filipino.

Moreover, the same result as Reyes (2010) in "Using Filipino in the Teaching of Science", two science classes in Grade 4 were taught by the same teacher, one in English and the other in Filipino. Evaluation scores were better in the class conducted in Filipino than in that conducted in English. This suggests that using Filipino in teaching Science would be more effective than using English. Filipino should therefore be used as the LOLI for Science in Grade 4.

In addition, Bayo-Ang (2015) on the Effect of Science Learning Modules on Content Mastery and Conceptual Understanding of Grade 9 Students, the intervention module written in Filipino promotes conceptual understanding and mastery of content than module in English.

Thus, in the research of Calanoga, Cortez, Espartero and Padilla L (2015) entitled "The Effectiveness of Bilingualism in Teaching and Learning Process", the use of Bilingualism as medium of instruction in teaching is not effective since the mean gain scores of experimental group is lesser than the mean gain scores of control group. Furthermore, this implies that using bilingualism in teaching does contribute good effect in student's Engagement and Academic Performance.

Statement of the Problem

This action research aimed to determine whether a science comic written in Filipino is effective in promoting mastery of content and conceptual understanding of Grade 11 students. Specifically, this study answers the following research questions:

1. Do students who are exposed to science comics written in Filipino performed better than those who use science comics in English?
2. Do students understand the concepts better if they are written in Filipino than in English?
3. Is there a significant difference in the pretest and posttest scores of the experimental and control groups?
4. Are the pretest scores of the control and experimental group significantly correlated with their posttest scores?
5. Are mastery of content and conceptual understanding significantly correlated?

Scope and Limitation

This action research investigated the effect of Filipino and English comics on conceptual understanding and mastery of content of Grade 11 students. It made use of a pretest-posttest control group design. Data analysis made use of descriptive and inferential statistics. This study was conducted in School Year 2017-2018 and was participated by Grade 11 students at Mayamot National High School.

Hypothesis

Students who are exposed to comics written in Filipino perform better than those who use the comics written in English. There is a positive correlation between content mastery and conceptual understanding.

The specific hypotheses are:

1. There is a significant difference in the pretest and posttest scores of the control group.
2. There is a significant difference in the pretest and posttest scores of the experimental group.
3. There is a significant difference in the pretest scores of the control and experimental group.
4. There is a significant difference in the posttest scores of the control and experimental group.
5. The pretest and posttest scores of the control group are correlated.
6. The pretest and posttest scores of the experimental group are correlated.

Methodology and Research Design

This research study made use of both quantitative and qualitative. For quantitative, a randomized pretest-posttest control-group design will be used. Students were randomly selected and assigned to the control and experimental groups. The control group used the comics written in English while the experimental group used comics on the same topic written in Filipino.

Figure 1 shows the research design used in this study. The 'treatment' refers to the use of the comics written in Filipino.

Group 1 (Experimental)	O (Pretest)	X (Treatment- Filipino Comics)	O' (Posttest)
Group 2 (Control)	O (Pretest)	(English Module)	O' (Posttest)

Figure1. Research design

Students who used the English version of comics are considered the control group because it is a well-known fact that instructional learning materials in science are written in English.

After using the Filipino-translated comics, for qualitative analysis, an interview and journal narrative was used to gather the experiences of the participants of the study about the developed Filipino-translated comics.

Results and Discussion

Content Mastery

Analysis of content mastery scores using t-test for independent samples assuming equal variances revealed that there is a significant difference in the mean score of the control and experimental group, $t(46) = -2.14$, $p < .05$. Since the mean score of the experimental group ($\bar{x} = 101.9$) is higher than the control group ($\bar{x} = 87.90$).

Therefore, students who were exposed to the comics written in Filipino performed better than those who used the comics in English. Moreover, the comics in Filipino promote content mastery better than the comics in English.

Conceptual Understanding

Analysis of the pretest and posttest scores of the control group using paired t-test showed no significant difference, $t(18) = 1.44$, $p > .05$, indicating that exposure to the comics written in English did not improve their conceptual understanding. It indicates that the English language hinders understanding of the concepts.

Similarly, paired t-test of the pretest and posttest scores in the test for conceptual understanding of the experimental group showed that there is a significant difference between the pretest and posttest scores $t(29) = -5.08$, $p < .05$, indicating exposure to the comics in Filipino enhanced conceptual understanding of the learners with observed difficulty in reading and comprehension of the English texts.

Analysis of posttest scores of control and experimental group using independent-samples t-test revealed that there is no significant difference in the scores for control ($M = 7.3$, $SD = 2.70$) and experimental group ($M = 8.5$, $SD = 2.58$); $t(42) = 1.67$, $p > .05$, implying that both groups performed equally in the conceptual understanding. This indicates that the performance of the two groups in the test for conceptual understanding is the same. However, within-subjects comparison favors the experimental group suggesting that the comics written in Filipino helped those with reading and comprehension problem achieved conceptual understanding.

Correlation Between Pretest and Posttest Scores

The pretest and posttest scores of the control group are significantly correlated, $r(17) = .58$, $p < .01$. Similarly, the pretest and posttest scores of the experimental group are also significantly correlated, $r(28) = .66$, $p < .000$. A positive linear relationship exists between test scores in both groups with the experimental group slightly higher. A student who performed well in the pretest will also perform well in the posttest.

Correlation between Content Mastery and Conceptual Understanding

Posttest scores in content mastery and conceptual understanding of the control group are not significantly correlated, $r(17) = .307$, $p > .05$. However, for the experimental group, they are significantly correlated, $r(27) = .571$, $p < .05$. It means that for the control group, mastery of contents using the comics in English will not help learners acquire conceptual understanding. However, it is opposite in experimental group. Mastery of concepts led to conceptual understanding.

Conclusion

Students exposed to comics written in Filipino performed better than those who used the comics in English. They achieved a higher level of mastery of the contents. In terms of conceptual understanding, exposure to the comics in Filipino resulted to improved performance in the test for conceptual understanding. Pretest and posttest scores are positively correlated and mastery of contents is significantly correlated with conceptual understanding.

Recommendations

Based on the result of the study, the following are recommended: first, a large sample size should be used next time to increase the generalizability of the results. Second, only simple random sampling should be used and that samples should be randomly assigned to treatment groups. Finally, future research should investigate how comics written in Filipino promote conceptual understanding.

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