CROSS-AGE PEER TUTORING AS INTERVENTION TO CULTURAL MINORITY STUDENTS WITH LEARNING DIFFICULTIES IN MATHEMATICS

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This study determined the effectiveness of cross-age peer tutoring among cultural minority students who have learning difficulties in Mathematics at Mindanao State University – General Santos City (Philippines). Cultural minority students consisting of the B’laans, Maguindanaoans, T’boli, Maranaos, Tedurays, Samals, tausugs, Tagakaolos, Manobos, and Mandayas came from various parts of the island of Mindanao, Philippines. Being members of the cultural ethnic groups and being economically disadvantaged, these students were granted admission in the University even if they did not pass the admission test. This is in line with the vision-mission of the University to work for the upliftment of the cultural minorities in Mindanao and to help them integrate with the mainstream of the society. Poor academic background, though, caused these first year students to have difficulty in learning academic subjects particularly Mathematics. This study focused on cross-age peer tutoring as intervention for the first year cultural minority students. Tutoring is conducted free by senior students in the University. To determine its effectiveness, two groups of cultural minority students were examined – one group which attended peer tutoring classes and the other group which did not attend peer tutoring classes. Pretest and posttest scores were analyzed for both groups to determine their Mathematics performance. Interviews were also conducted to determine students’ perception and appreciation of the peer tutoring. Results of the research showed that cultural minority students benefitted academically and socially in peer tutoring. Mean gain scores of those who attended were significantly higher. The cultural minority students performed better in Mathematics and enjoyed the experience of attending tutorials. It is therefore recommended that MSU – General Santos encourage and support cross-age peer tutoring to become a regular part of the activities of student organizations in the University and this be provided free not only to the cultural minority students but also to other regular students who have learning difficulties in Mathematics.

Keywords: Peer tutoring, Cultural minority students, Learning difficulties in Mathematics.

Introduction

One of the national goals of the Philippine government is to work for the upliftment of the economically disadvantaged cultural minorities. Education act of 1982 states “The state shall promote the right of the nation’s cultural communities in the exercise of their right to develop themselves within the context of their cultures, traditions, interests, beliefs and recognizes education as an instrument for their maximum participation in national development and in ensuring their involvement in achieving national unity”.
To achieve this goal of integration, educational programs are instituted by the government for the cultural minority students. Mindanao State University in General Santos City, a premiere University in Southern Mindanao, provides cultural minority students the opportunities to obtain quality education in the University through the College Bound Program. Every year, this program admits poor, cultural minority students from the various parts of Mindanao even if they did not pass the University admission exam to afford them equal opportunities to pursue higher education (MSU General Catalogue, 1993).

The cultural minority students at MSU consist mostly of the B’laans, T’bolis, Maguindanaoans, Tagakaolo, Tedurays, Samals, Tausugs, Manobos, and Mandayas. These cultural minority students, however, encounter difficulties in learning their academic subjects during their freshman year particularly in Mathematics. Based on records at the MSU Registrar’s Office, about 30% only passed their Mathematics courses during their first year. Their reasons for poor performance include poor academic background, lack of interest in Mathematics, and inability to cope with the vast development and challenges due to some economic-related and culturally influenced factors. There is a need, therefore, for appropriate intervention so that the poor performance of the cultural minority students in Mathematics can be remedied.

In MSU, one of the academic support services being undertaken by student organizations under the supervision of Office of Student Affairs is peer tutoring. This program aims to help younger students with learning difficulties on their academic subjects. Peer tutoring is free and is conducted within the University campus after class hours. In tutorial classes, the tutors are usually senior college students. Various studies have shown the potential benefits of peer tutoring. Topping (2008) cited that peer tutoring leads to better academic performance and enhanced associations with peers. The study of Mastropiere, et. al (2010) showed that peer tutoring have social benefits such as higher self-confidence and more positive attitude towards school. It was also observed that there is greater learning when peers are actively engaged in academic discussions among themselves. In addition, in peer tutoring, students can learn from one another. The peer tutor helps others learn difficult concepts and increases his own understanding of the subject matter.

Most of the studies about peer tutoring deal about its benefits among regular students with learning difficulties on academic subjects. However, peer tutoring was not yet studied regarding its effectiveness among cultural minority students in the college level, particularly the economically disadvantaged and underprepared minority students in Southern Philippines. This led the researcher to conduct a study on the effectiveness of peer tutoring in improving the academic performance of cultural minority students in MSU-GSC (Philippines) particularly those with learning difficulties in Mathematics.

Literature Review

The Philippines consists of 7,107 islands and some of these are inhabited by a number of different cultural minority groups. In Mindanao, the second largest island of the country, there are lowland, highland, and coastland cultural minority groups which are often referred to as lumads. Most of them are mountain inhabitants and live using traditional practices, similar to how their ancestors lived hundreds of years ago (www.philippines.hvu.nl). To protect the rights and multi-dimensional well-being of the economically-disadvantaged cultural minorities, the Philippine government adopts the policy to integrate these groups into the mainstream of society and to protect their customs, traditions, and beliefs. Government agencies such as the National Commission on Indigenous People are created to ensure that basic services are effectively and responsively delivered to the cultural minority people (www.ncip.gov.ph). The cultural minority groups in Mindanao include the B’laan, T’boli, Maguindanaoan, Maranao, Tagakaolo, Teduray, Samal, Tausug, Manobo, and Mandaya. These minority groups have traditions, customs, and way of life which have remained intact for centuries (www.ethnicgroupsphilippines.com). They often reside in mountain slopes and other coastal areas of Mindanao. Many of them are living below poverty level because of poor economy, lack of education, or lack of access to job opportunities. The frequent armed conflicts between rebel groups and the
Philippine government in Muslim areas have also caused displacement among the Muslim cultural minority groups (www.internal-displacement.org).

To solve poverty among the cultural minority groups, one long-term solution implemented by the government is providing access to education among cultural minorities. Mindanao State University – General Santos City, a government university in Southern Mindanao, is one institution which provides educational opportunities for the self-development of cultural minorities. The University vision-mission explicitly states that the University “shall provide trained and skilled human resources for the development of SOCSKSARGEN (South Cotabato, Sultan Kudarat, Sarangani, and General Santos City) and Southern Mindanao and help improve the living conditions of Muslims and other tribal communities”. Consistent with this vision-mission of the University, 300 poor but deserving students are granted admission to the University every year through the College Bound Program even if they did not pass the admission test (www.msugensan.edu.ph)

Student records at MSU have shown, however, that cultural minority groups experienced learning difficulties in their academic subjects, as evidenced by numerous failing grades and dropping from subjects. Among the identified causes were underpreparedness for college education, poor academic background, and some sociocultural factors. Academic support is, therefore, necessary to help the cultural minority students to survive the rigors of college education.

One of the common academic interventions being adopted in Philippines schools to help students with learning difficulties is cross-age peer tutoring. In this type of tutoring, the tutor is a fellow student who is older. Recent researches have shown that students can effectively teach each other. There are some students who can learn more easily when taught by their peers than when taught by their teachers. It is also easier for them to be corrected by fellow students than be checked by their teachers because their peer tutor is not an authority figure (Lindgren, 1976). According to Carnell (2002), peer tutoring works because students are given more personalized support and attention. Students are also trained how to learn more effectively and to develop positive attitude towards learning. Peer tutors are also perceived to be more approachable and more patient to give instructional support than what a teacher could regularly provide his students. Cross-age peer tutoring provides many advantages particularly to those who have learning difficulties in a subject (Santrock, 2008). In developmental education, tutoring is also one of the most recommended programs to support the academic and personal growth of underprepared college students (Boylan, 2002). Learning assistance through tutoring is particularly important for students who are deficient in their skills so they can finish their courses of study in college more successfully.

Several studies have shown that peer tutoring helps not only the tutees but also the peer tutors. Sprinthall (1990) noted that student tutors show higher levels of maturity and leadership. They also develop deeper concern for others and improve their own level of achievement. Moreover, Woolfolk (1993) stated that peer tutors experience an enhanced sense of personal worth. When tutors help other students who are having difficulty, this gives a feeling of fulfillment to the tutors because they are helping other persons to learn.

Many studies were conducted on the effectiveness of peer tutoring in learning Mathematics. Walker (2007) found out that peer tutoring helps solve underachievement in Mathematics and that interaction between tutor and tutees deepened knowledge and interest in Mathematics among high school students. Tella (2013) studied the effects of peer tutoring on primary school pupils’ learning outcomes in Mathematics and found out that there was significant effect of peer tutoring in achievement and attitude towards Mathematics. Similar study on peer tutoring was conducted by Robinson, et. al (2005). The study revealed that cross-age peer tutoring has a positive effect on Mathematics skills in computation, conceptual understanding, and problem solving among African-American and other minority students.

Based on this review of literature, this study was conducted to find out the effectiveness of cross-age peer tutoring as intervention for cultural minority students with learning difficulties in Mathematics. The analysis of the literature suggests that peer-tutoring can provide positive academic and socioemotional benefits for the cultural minority students of MSU – General Santos City.
Methodology

Two groups of first year cultural minority students of MSU were used in the study. The first group, consisting of 25 cultural minority students attended peer tutoring sessions in Mathematics for one hour, three times a week in MSU-GenSan campus. The first group is multiracial and consists of the B’laans, T’bolis, Maguindanaoans, Tagakaolo, Tedurays, Samals, Tausugs, Manobos, and Mandayays. The second group, also consisting of 25 cultural minority students, did not attend peer tutoring sessions. The second group is also consisting of the B’laans, T’bolis, Maguindanaoans, Tagakaolo, Tedurays, Samals, Tausugs, Manobos, and Mandayays.

At the start of the study, both groups were given a 30-item pretest in Mathematics. The first group regularly attended the peer-tutoring sessions in Mathematics. The twenty-five cultural minority tutees were handled by five peer tutors who are senior BS Mathematics students. During the tutorial sessions, the cultural minority students were grouped by five’s and one peer tutor lead each group. In the process of tutoring, the peer tutor asked the tutees what specific lesson they had, and what part of the lesson they were confused or having difficulty in understanding. The tutees were encouraged to openly express their concerns because cultural minority students are mostly meek and shy. The cultural minority students were also allowed to express their problems using their native dialect. Tutoring included discussion and explanation of the lesson, giving a number of examples, and presentations of step-by-step solution. The process of tutoring was interactive – when the tutor explains, the cultural minority tutees are allowed to ask questions or express their understanding to the tutor. At the end of the session, quizzes were given for evaluation.

The first group attended the peer-tutoring sessions for three months while the second group did not attend any tutorial session. At the end of the third month, the posttest in Mathematics was given to both groups. The result of the pretest and posttest of the two groups were analysed statistically using t-test for dependent samples and t-test for independent samples at 0.05 level of significance. The pretest and posttest scores were interpreted qualitatively using the following scale: 0 to 5 (Very poor), 6 to 10 (Poor), 11 to 15 (Fair), 16 to 20 (Good), 21 to 25 (Very Good), and 26 to 30 (Excellent).

Interviews consisting of open-ended questions, were also conducted individually among the cultural minority students who attended tutorial classes. They were asked about their perception on peer tutoring and its effect on their understanding of Mathematics.

Results

The pretests of the two groups were analyzed to find out the level of competencies in Mathematics of the two groups of cultural minority students at the start of the study. The result showed that the group with peer tutoring got a pretest mean score of 7.67 while the group which did not undergo peer tutoring got a pretest mean of 7.03. Both mean scores are qualitatively described as Poor performance. The t-test for independent samples showed that there is no significant difference in the pretest mean scores of the two groups (t=1.032, p=0.307). This indicates that the numerical competency in Mathematics of the two groups were equivalent. The low mean scores also imply that both groups of cultural minority students have Poor knowledge in Mathematics at the start of the study.

The pretest and posttest results of the group which did not undergo tutoring was analyzed and the results showed an improvement from a pretest mean score of 7.03 to a posttest mean score of 15.90. The t-test for dependent samples indicated a significant difference between the posttest and the pretest of the group (t=25.5, p=0.00). The result indicates that even without attending peer-tutoring classes, the group of cultural minority students significantly improved their Mathematics performance. Qualitatively, their Mathematics performance improved from Poor level to Fair level. For the group who attended peer tutoring, there was also an improvement from a pretest mean score of 7.67 to a posttest mean score of 18.67. The result of the t-test for dependent samples on the pretest and posttest scores indicated a significant difference between the posttest and pretest of the group which attended peer tutoring.
(t=27.82, p=0.00). This implies that there is a significant improvement in the Mathematics performance of the cultural minority students when they attended peer tutoring. The higher posttest mean score showed that cultural minority students learn more in Mathematics after three months of attending tutorial classes.

In terms of the mean gain scores, the results have shown that both groups improved in their performance. The group which underwent peer tutoring, however, obtained a higher mean gain score of 11.00 compared to the mean gain score of the group without peer tutoring which is 8.87. The result of the t-test indicated that there is a significant difference in the mean gain scores of the two groups (t=4.05, p=0.00). This result indicates that cultural minority students who attended peer tutoring showed significantly higher improvement in Mathematics performance than those cultural minority students who did not attend peer tutoring. The higher mean gain score of the group with peer tutoring indicates that there is greater learning in Mathematics among cultural minority students who attended peer tutoring than those who did not attend. Hence, the result implies that peer tutoring is an effective academic intervention among cultural minority students to improve their performance in Mathematics.

Results of the Interview

The cultural minority students who underwent peer tutoring provided the following comments when they were interviewed regarding their perception about peer tutoring:

- The free tutorial is very helpful to cultural minority students like us because we cannot afford to pay tutors
- I can easily ask questions from my tutor
- The tutorial sessions are enjoyable. My friends and I see each other during tutorials
- I easily understand my Math lessons because the tutor gave us many examples
- I feel confident after attending tutorials because it prepares me for my next lesson in Mathematics
- I am more relaxed listening to my peer tutor than listening to my teacher
- It is easier to ask questions from my peer tutor than from my teacher
- I enjoy attending tutorial classes because the atmosphere is informal and relaxed, and my peer tutor gave us enough time to understand the lesson
- In the tutorial class, I don’t feel discriminated as a cultural minority student. All of us are poor learners in Mathematics
- I am grateful the tutors are helping us
- Peer tutoring helped us understand better the step-by-step solution in solving word problems
- I wish there are also peer tutors in my other subjects

The various comments showed that cultural minority students found the peer tutoring sessions to be helpful in improving their understanding of Mathematics. They feel more relaxed in learning with their peer tutors and become more confident in Mathematics after the tutorial sessions. They are not intimidated to ask questions from their tutors and considered the tutorial classes enjoyable with their friends. They also appreciate the free services of the peer tutors. The cultural minority students recognized the relevance of peer tutoring and hoped that peer tutoring be conducted also for other academic subjects.

Conclusion

Based on the findings of the study, it can be concluded that cultural minority students benefitted academically and socially when they attended peer tutoring. Although those who did not attend peer tutoring also improved their Mathematics performance, the mean gain in performance of those who
attended peer tutoring was significantly higher. The cultural minority students did not only learn Mathematics, they also enjoyed the experience of attending tutorials and appreciated the effort of their tutors to lessen their learning difficulties in Mathematics. It is therefore recommended that cross-age peer tutoring be a regular part of the activities of student organizations in the University and this be provided free not only for cultural minority students but to other regular students with learning difficulties on their academic subjects.

References