An Intervention of Academic Peer Mentoring Program towards Mathematics Grade among Secondary Students in Malaysia

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Abstract: Academic peer mentoring program between peer mentors and mentees has been widely implemented by school counselors. However, few researches have been examined the outcome of the Peer Mentor Module (PMM) on mathematics grade achievement in school. The PMM aim to improve the peer mentor’s soft skills namely in interpersonal relationship, communication, motivation, empathy and emotional stability. The present study examines the effect of participation of form four students in a secondary school in academic peer mentoring program as well as differences between individual and group approach on mathematic grade achievement. A total of 45 sample form four students who failed in mathematic monthly tests whereby 30 students as mentee served as treatment group while the remainder 15 students as a control group. All 20 peer mentor students participated in an eight hours workshop using the Peer Mentor Module. The subjects were examined at week one for pre-test and post-test at week eight. Data were analyzed using frequency, percentage and mean, with inferential analysis using Mann-Whitney U tests. Statistical analysis included (group x time) measures t-test to determine between and within group mean differences. The finding supports the hypothesis that PMM intervention shows positive effects on increasing the mathematical grade. It was found that the mathematical grade of Individual Peer Mentor Treatment Group is higher than the Group Peer Mentor Treatment Group. Therefore, a one-on-one session (one peer mentor and one mentee) provide better individualized attention for students as well as establish understanding of the content and advices from a peer mentor. This approach can become an important aspect in implementing the guidance and counselling practice that focus in academic peer mentoring.

Keywords: Academic peer mentoring, peer mentor module, peer mentor, mentee

1. Introduction

Mentoring is considered vital in the field of education (Johnson, Geroy & Griego, 1991; Wanguri, 1996), as well as guidance and counseling (Gregson, 1994). Mentors are defined as counselors, mentors, tutors, coaches or sponsors (Roche, 1979), while mentees are known as protégé, individuals who are lacking of knowledge and experience or students in need of guidance (Fagenson, 1989; Wright & Werther, 1991). Guidance and mentoring can also stimulate interest in helping friends, which is a starting point to the formation of a society that cares about others in the realm of education (Mizan Adiliah, 1987). The guidance of peer mentors is another caring effort to help their under-achiever peers.

Interestingly peer mentor is another form of peer influence however it needs not be negative. Although the current literatures show there exist negative peer pressure, there is a growing literature indicating positive effects of peer interactions, particularly when adults prepared structured interaction. For example, there is a burgeoning literature on same-age peers helping their peers, either as counselors, mediators, or tutors, and the benefits of cross-age tutoring are fairly well recognized at this moment (King, Staffeiri, & Adelgais, 1998; Topping, & Ehly, 1998).

This formal mentoring process is widely believed to be related to positive outcomes for both the mentor and mentee. (Habibah, 1991). According to Young and Perrewe (2000), mentoring benefits educational organizations due to the presence of a healthy process of socialization, information that conveyed in a more effectively way, as well as increased productivity. There is a feeling of mutual trust, mutual appreciation, and high self-confidence in schools when mentoring goes well. A more in-depth study of the mentoring system has also found that mentoring program practices are able to influence the progress of mentees, especially to students of institutions of higher learning (Sharifah, 2006; Sambrook, 2001; Morey & Miller, 1983).

Academic Peer Mentoring

Schools and universities have set up academic mentoring services for students. It was reported that most this institutions defined academic mentoring as a developmental relationship between a more experienced individual (a mentor) and a less experienced partner (a mentee). The mentee is supported through regular interactions by
the mentor’s guidance to gain skills, perspective and experience. Usually academic mentors help to achieve the goal set by the school or university in various ways, including:

- Becoming a role-modeling study habits and teaching students about time management, note-taking, reading textbooks, active listening,
- Providing supportive and cooperative learning environments where students feel free to interact and learn from each other,
- Helping students become self-regulating learners by inspiring students to progress independently and not allowing them to rely on the tutor for their success in the subjects.

Therefore, to the group of low-achieving academic students who needs attention other than the teachers, are their peers. A group of peer mentor involved in the academic mentoring programs can help mentees improve their level of self-esteem, motivation and academic grades. Young and Perrewe (2000), stated that a mentee who likes to engage in peer mentoring programs is a person who likes to succeed, has internal locus control, high self-concept and high emotional stability compared to people who are not interested in the mentoring process. While Noll (1997) found that students who are interested in peer mentoring programs are those who are always open to new experiences and learning. This can also indirectly increase the number of excellent and balanced students in school.

### Mentoring Modules

Russell (1974), states that modules can improve students' academic performance and be used for teaching in non-academic fields as well. Most modules are built for several purposes such as facilitating the teaching and learning process, improving motivation, raising the level of leadership and others (Jamaluddin, 2008; Sidek 2002). The use of modules can be applied in any situation whether in individual, group, academic or non-academic activities that can help students towards more convincing and positive change.

The research findings of Habibah Elias (1991), prove that the use of modules can help to improve the academic achievement of a student. Shaharom Noordin and Yap Kueh Chin (1991), explain about the use of modules individually or in groups allow students to choose the most appropriate way of learning for them to be more effective and productive.

Through past studies, mentors who involved in mentoring relationships with mentees, are seen to be in a better position in dealing with discussions through hot topics without undermining mentee’s self-confidence (DuBois and Karcher, 2005). After testing data from a questionnaire conducted on 600 students in mentoring programs through community and basic schooling programs, Herrera, Sipe, and McClanahan (2000), concluded that the most difficult level in mentoring relationships is the bonds between adolescents and mentors. Accordingly, Rhodes (2002), found that the level of trust and closeness in the Big Brothers Big Sisters (BBBS) mentoring relationship, predicted positive outcomes in academics and behavior, as well as positive effects from long-term relationships.

The Peer Mentored Module (Haizan, 2017) in this study is basically to improve the soft skills of the peer mentors in the mentoring relationship with their peers who has low grade in mathematics. PMM focuses on interpersonal relationship, communication, motivation, empathy and emotional stability. There are two mentoring models associated with Peer Mentored Module ((PMM) interventions in this study, namely, The Model of Mentoring by Johnson & Nelson (1999), and The Model of Youth Mentoring by DuBois and Karcher (2005).

The Model of Mentoring focuses on the mentoring relationship between the mentor and the mentee. The Model of Mentoring was introduced by Johnson and Nelson (1999), explains the core of the development of mentor and mentee relationships which is at the heart of the model. According to this model, mentoring relationships is a blend of construction aspects of socialization, tasks, and life cycle. The socialization aspect, which is the biggest element in this model is matched to the tasks and cycles of human life. Mentors and mentees will go through pre and post stages in mentoring relationships where two factors play a major role, namely socialization and formative make a relationship that is built produce something positive. Positive mentoring relationships that are built after a program, will make mentors and mentors feel more comfortable to each other. Generally, informal mentoring (relationships built spontaneously, unplanned by third parties) is considered more effective and meaningful for both mentors and mentors than formal mentoring (Fagenson, Marks, & Amendola, 1997).
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The Model of Youth Mentoring (DuBois & Karcher, 2005), assumes a more dynamic mentoring relationship and can produce positive developments that should be accompanied by strong interpersonal bonds, especially those categorized through understanding, trust, and empathy. Peer mentor who influence mentoring relationships in more than three aspects, namely socio-emotional, cognitive and identity development, are considered to be able to provide a very effective impact on the results of studies related to adolescents. This model focuses on mutual trust and empathy that leads to socio-emotional, cognitive development and identity building.

In term of approach between guidance and mentoring the module has a caring relationship that foster positive development of assisted peers (Rhodes, 2002). The PMM also used the Carl Rogers theory of Person Centered aims to build student autonomy and independence by placing the direction of learning responsibility on the shoulders of students. Rules in student-centered focus on lifelong learning skills and practices and freedom of problem solving. The theory and practice of student-centered learning is based on constructivist learning theory that emphasizes the critical role of students in building the meaning of life from new information and past experiences. In this theoretical approach, student interest is prioritized and student opinion is recognized as central to the learning experience.

Two hypotheses were derived for the present study based on a review of the literatures. First, it is expected that both treatment group and control group have no differences in mathematic grade. Second, it is expected there is a difference in mathematic grade between peers under individual approach treatment and peers with group approach treatment.

2. Method

Participants - A total of 45 students from form four class (16 years old, 30 boys, 15 girls) who have failed in mathematic (mentee) at a secondary school in Selangor. The participants have agreed to be mentored by their peers (Peer mentor, 20 students) who have better score in mathematic grade. There were 30 sample who has failed in mathematic from their previous monthly test were randomly selected to participate in the program (Peer Mentored Module). They were selected proportionally across two classes, the art and commerce class the two groups, 15 students were selected into individual (a one-on-one) and the remaining 15 students were selected into the group (one to 3 mentees). The remaining 15 students (Control Group), formed a true, randomly assigned control group, also selected proportionally from the two classes.

Research Design

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<tr>
<th>Group</th>
<th>Pre Test</th>
<th>Treatment</th>
<th>Post Test</th>
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<tbody>
<tr>
<td>Individul PMM Treatment</td>
<td>O1</td>
<td>X1</td>
<td>O2</td>
</tr>
<tr>
<td>Group PMM treatment</td>
<td>O1</td>
<td>X2</td>
<td>O2</td>
</tr>
<tr>
<td>Control</td>
<td>O1</td>
<td>X3</td>
<td>O2</td>
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Note:
- O1 Pretest
- X1 PMM intervention to individual
- X2 PMM intervention to groups

Design and Procedure

Respondents for the academic peer mentoring program completed a questionnaire providing demographic and biographic data such as name, age, gender, score in mathematics. All respondents signed an informed consent form granting permission to the researchers to examine past and future grades. The mathematic teachers of the school were also help in the process of selection.

For the Peer Mentor group, a total of 20 Form Four students were selected due to their good grade (A and B) in mathematic. The PMM training on soft skills were arranged for peer mentor for one day. The role of the peer mentor was to assist the mentee as a friend as well as tutoring Mathematic exercises. This module includes relationship building skills, motivation building skills and communication building skills to give confidence to the mentee when helping the mentee.

Students who were selected as mentee were informed to be involved in the academic peer mentoring program. The mentoring activities took place every Wednesday morning (7:30 am - 9:30 am) during their co-curriculum activities at the school hall. Peer mentors were instructed to have social talk with their mentee for 15
minutes before starting the mathematical exercises which given by their mathematic teacher. During the 15 minutes, the peer mentor and mentee are free to ask anything concerning studies or says hello.

Data were analyzed descriptively using frequency, percentage and mean, as well as Mann Whitney U test. Since there are two groups involved to analyze the mathematic results grade, then the Mann Whitney U test was used. The Mann-Whitney U test is used to compare differences between two independent groups when the dependent variable is either ordinal or continuous. This test is a non-parametric test used to analyze the mathematic result grade data obtained from final examination results report because the data are not normally distributed.

3. Results

In this study, findings show that there was no significant difference between PMM Treatment Group and Control Group (\(z = -.748, \ p = .455\)) at \(p > .05\) in mathematic grade. However, Mann-Whitney \(U\) test showed there was significant difference between individual PMM treatment and Group PMM Treatment at (\(z = -2.162, \ p = .031\)) \(p < .05\) for Mathematic grade result. Meanwhile, the Mann-Whitney \(U\) test results in Table 2 show that there is a significant difference between the Individual PMM Treatment and the Group PMM Treatment (\(z = -2.162, \ p = .031\)) at the level of \(p < .05\) for Mathematics grade. In Table 1, the mean value for individual PMM treatment is greater than Group PMM Treatment in posttest (Individual PMM Treatment: \(M = 18.97\); Group PMM treatment \(M = 12.03\)). Thus a one-on-one session (one peer mentor and one mentee) provide better result. This may be due to individualized attention given to low achiever students and had established understanding of the content and advices from a peer mentor. This proved that PMM able to help peer mentors to become a better mentor.

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<tr>
<th>Table 1. Mean Rank for Mathematic Gred Result for individual PMM Treatment and Group PMM Treatment Postest (N=30)</th>
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<tbody>
<tr>
<td>Dependent variable</td>
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<tr>
<td>Mathematic</td>
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<tr>
<th>Table 2. Mann-Whitney U Test for Mathematic Gred Result in Postest between Individual PMM Treatment and Group PMM Treatment (N=30)</th>
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<tr>
<td>Test</td>
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<tr>
<td>Mann-Whitney (U)</td>
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<td>Wilcoxon (W)</td>
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<td>(Z)</td>
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<td>Asymp. Sig. (2-tailed)</td>
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4. Conclusion

This study shows that the Peer Mentor Module does not affect the final grade of Mathematics among the low achiever of form four students. However, there is interesting results of the study that the grade of the final mathematics exam increases for the individual compared to the group method. Indirectly the Peer Mentor Module has had an impact through positive guidance on mentoring relationships. Mentoring programs are used as a mechanism to support changes in the school education paradigm and the importance of mentor partners in academic achievement.

This study proposes conducting the reliability of the module for school students as it has used for the university students. Since the PMM is built for university students, the maturity factor of secondary school students should be taken into account when it is implemented for the school students.
5. Acknowledgement

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