

ONLINE PEER MENTORING TO ENHANCE MATHEMATICAL PROBLEM-SOLVING STRATEGY AMONG INTROVERT AND EXTROVERT PERSONALITY

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Abstract: *Mathematical problem solving is a process of constructing a mathematical model and devising strategies to solve mathematical problems. There are many factors affected student's ability in problem solving. Personality is one of them. Due to this factor, a qualitative study is carried out on online peer mentoring in problem strategy among introvert and extrovert personality. 40 students participated. They have undergone (Myer Briggs Personality Test) and the students are classified under 8 groups which consists of introvert and extrovert. After answering the paper, the students were interviewed. The result of the study shows that online peer mentoring for introvert and extrovert enhance the ability of the students in their performance.*

Keywords: *Mathematical problem solving, introvert, extrovert*

Introduction

A mathematical problem is a problem that is amenable to being represented, analyzed and possibly solved with the methods of mathematics. Mathematical problem solving is a process of constructing the mathematical model of the problem. It involves abstraction from the details of the problem and the modeler must be careful not to lose the essential parts in translating the original problem. Due to Durkin (1991) to solve mathematical problem the students must use high level of thinking that is to analyze the problem and synthesize steps to solve the problem. Due to Polya (1971) in solving problems, a person needs to go to several processes including understanding the problem, compiling a completion plan, implementing the plan and reexamining results. There are many factors affected student's ability in solving problems such as intelligence, logical thinking skills, creativity and cognitive style, personality, values, attitude and interest. Based on this, personality affects problem solving process in mathematics. Personality is divided into two that are introvert and extrovert.

Literature Review

Introvert is a quiet, reserved and thoughtful individual. They do not seek out special or social engagement as these events can leave introverts feeling exhausted and drained (Holland, 2018). Introvert is manifested by solitary behavior. They are characterized by orientation in life

through subjective psychic contents (Jung,). They are 4 types of introvert. They are social introvert, thinking introvert, anxious introvert and restrained introvert.

Social introverts are shy in social settings. They prefer to be alone or go with selected friends. Thinking introvert is deep in thoughts, wondering about life and analyzing himself. He reflects what he feels and losing himself on his dreamy imagination. Anxious introverts isolate themselves, especially the unfamiliar ones. Restrained introverts need to take time to warm up and gather thoughts before speaking or act.

Introverts are opposite of extroverts. Extroverts were often described as the life of a party. They seek out interaction and conversation. They are not one to miss a social gathering and they thrive in the frenzy of a busy environment. Extroverts outgoing, vibrant nature draws people to them. They have a hard time turning away the attention. They thrive off interaction.

Every student with different type of personality can influence their way of having confident attitude, communication and other activities including learning, so does with the introvert.

There are few researches studied about introvert in mathematics classroom. A qualitative research done by Septiana, Kusmayati and Fitriana (2018) to 34 students at Senior High School Sukoharjo Indonesia using written test and interview revealed that there was different in communication intensity in an introvert personality. In Mathematics, introvert students could arrange conjectures, arguments formulate generalization, definition but difficulty in reading with understanding a mathematics representation.

Second research, Sarah Wahyu Sumanti (2016) did on 3 introverts and 3 extroverts of a school in Surabaya. She found that the introverts can only think qualitatively at a given subject matter. The extroverts on the other hand can think qualitatively (labelling, visualizing, comparing and searching complete and clear info use more than one info encoding or decoding), quantitatively (constantly spatial relationship , analyzing integration, generalization precise) and abstractly (activating prior mathematical knowledge , logical evidence, defining problem, inferential thinking, projecting and restructuring, mathematical inductive, deductive thinking, relational mathematics, elaborating mathematical activity.

Third researchers, Ebole Chinelo, Njideka Francisca and Amarchi Blessing (2016) investigated on academic achievement of introverted and extroverted students in Senior Secondary School in Awka South Local Government of Anambra State, Nigeria. They found that by using advance organizer, extroverts achieved slightly higher than introverts in their mathematics examination. Fourth research done by Azizah and Suhendra (2019) stated that extroverted students assumed that Mathematics is difficult so that they feel worried and are lack of enthusiasm when they are in classroom and the highest anxiety happened in the examination and doing assignment provided by the teacher. On the other hand, introverted students assumed that Mathematics is a complicated but interesting subject in the sense that they feel scared and not confidence in class, but they are calm and ease in the examination.

Fifth research done by Danar (2016) said that introverted traits often coincide with creativity and can add value to an organization. Thus, professional in creative industries may create a more stable culture of innovation and acceptance. The example creative industries are

architecture, film, computer or IT services, museum, performing arts, publishing, research and development (DCMS 2016).

There are many ways in devising problem solving. One of the effective methods is by peer mentoring among the members in a group. Peer mentoring is a relationship between people who are at the same career stage or age in which person has more experience than the other in a particular domain can provide support as well as knowledge and skill transfer. Peer mentoring as an intervention has been suggested to be effective in supporting students in the transition to third level education through enhancing a sense of belongingness and improving student's satisfaction, engagement and retention rates. Peer mentoring suggests two-way reciprocal learning activity. It is mutually beneficial for both the mentor and the mentee as it involves the sharing of knowledge and experience between both parties. As the peer mentors teach and guide the mentee along, they find themselves working harder to understand information, recall it more effectively and apply the knowledge in different ways that help the mentee to learn. As such, peer mentors have a better grasp of the subjects and do well in exams. In peer mentoring the students are paired and grouped together with mentors who study similar course as them, as such mentors can provide study tips on specific course that will help the mentees to learn more effectively. Through their experience, mentors can share their own strategies in overcoming the difficulties. They encountered with the specific topics or subjects of the course with tips reading available to the students. They can avoid spending hours in the process of trial and error.

Peer mentoring provides a platform for students to create an informal networking and knowledge sharing opportunity with new students. Potential peer mentoring will undergo an interview session with the module convenor to gain an understanding of the module and what is expected of the peer mentor. Mentors are required to attend the first workshop to be held prior to the commencement of the scheme. Due to the pandemic COVID – 19 which had started in 2019, the world has taken few steps in ensuring the safety on their community. The same goes to education sector where the process of peer mentoring in problem solving had done online. Indian University of Pennsylvania in United States of America has started the process since 2007 and the trained peer mentors can help within the area of academic resources, campus resources, goal setting, study skills, time management and transition to online instructions.

Few researches have been carried out. One of them is done by Wan Norliza et al (2012). This method is called as Je Vous Teaching and Learning Strategies consisting of seven phases which are gathering SPM Mathematics result, giving diagnostic test focusing on topics that the students were weak. The inventory of students learning style were given to analyze which category of learning style does the students were grouped in. After that the lecturers imparted knowledge through one hour of direct teaching. Then the students were grouped in five for coaching and peer mentoring session where the students did the exercise in the Intensive Mathematics Book. Later, the students will go through doctor – patient session. Lastly the students will be evaluated on the topics. The data of diagnostic test and evaluated test will be made.

In that method the process of coaching and peer mentoring session consisting of 5 members in a group is a very helpful method to accelerate the problem-solving process of the students.

Online peer mentoring has been developed in few universities such as Nottingham – Malaysia University, Monash University, Melbourne University and Aston University.

In 2019, the world has been attacked by the pandemic COVID – 19 where at universities, schools, government, private agencies, and businesses stopped face to face activities and applied technology in every aspect of their work. This is to ensure that the chain of the pandemic of COVID – 19 can be cut off. In education sectors, creative ways have been triggered to implement knowledge to students. one of the effective methods suggested is online peer mentoring. Indiana University of Pennsylvania in United of America has started the process since 2007 and the trained peer mentors can help within the area of academic resources, campus resources, goal setting study skills, time management and transition to online instructions. Online peer mentoring has been developed in few universities such as Nottingham University, Monash University, Melbourne University and Aston University.

One paper has reported on the findings of online peer mentoring for language students at open university at UK in 2018. Within a qualitative paradigm, multi data sources were employed to collect and analyze data. Participation was measured from analysis of online interaction, while participant views were capture through interview, from posts and surveys.

Findings revealed that mentors were perceived by student's wo used the scheme to be instrumental in building confidence and motivation. In addition, varying participation patterns indicated that students used online learning communities to meet their differing needs during their studies.

Due to the above-mentioned fact, it is a dire need to implement online peer mentoring among introvert and extrovert personality in solving mathematical problems.

Methodology

Sustainable tourism as defined by The World Tourism Organization (UNWTO) is tourism that takes full account of cuThis is a qualitative research where 40 students participated. The students in the class have gone through Myer Briggs Personality Test to be classified as Introvert or Extrovert. They were then grouped into 7 groups. Each group must answer a set of past examination questions according to their group's number. For example, first group will answer first question, second group will answer second question, and so on until eighth question. For the 6th and 7th group they can go to any group they like. While answering the question, the introvert must do his part that is to identify the objective of the question and the extrovert must do his part that is to devise the right plan to solve the question. The answering session is for one hour. Then the students must access google classroom and answer the interview question.

Analysis

From the data, it could be seen that 12 students we classified as introvert and 20 students were classified as extrovert. The first question asked was about to know the objective of the question. The introvert seems to know exactly what to find in the question given but the extrovert wanted to ask somebody who was classified as "expert "in that field.

The second question wants to know whether the students could restate the problems in their own word. The introverted students were scared and not confident to do so, while the extroverted students able to put into their own words.

The third question wanted to know whether the question could devise a plan in solving. Introverted students showed his ability in devising plan due to his own thinking. Extroverted students must refer to good students before conjecturing his plan.

The fourth questions objective was to know how the students show the steps. Introverted students seem to think rationally before arranging the steps. Extroverted students can easily arrange their steps in answering the question.

The fifth question wanted to know whether the students were able to reflect at their steps. The introverted students could easily reflect their steps. The extroverted students, too, could do so. The last question wanted to know whether online peer mentoring could enhance introvert or extrovert personality while answering mathematical problem. The introverted said that online peer mentoring could enhance extroverted students. the extroverted students said that online peer mentoring meant for them.

Conclusion

It can be concluded in Mathematical problem-solving introverted students have a good, organized, rational and reflective thinking while extroverted students have good expression and have an organized way in answering questions. Introverted and extroverted students will be the best companion while solving Mathematical problem solving and online peer mentoring is a good method for them. It can be concluded that introverted and extroverted students will be the best companion while solving mathematical problems. It is due to their personality where introverted students have a rational and reflective thinking while extroverted students can organize way in answering questions and able to express well.

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