

## The individualized learning in Mathematics among Badjao children in Matina Aplaya, Davao City

<sup>1</sup>Jocelyn G. Ubas, <sup>2</sup>Louie Resti Rellon and <sup>3</sup>Guillermo Bonghanoy

<sup>1,2,3</sup>Mathematics and Science Department, College of Arts and Sciences Education, University of Mindanao, Davao City, Philippines

Corresponding author:  
guiller102@yahoo.com

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### ABSTRACT

The Badjaos are known to be shy, ridiculed, discriminated, and cannot interact with other people or races thus affects their behavior in the community and performance in schools. The study aimed at describing the processes and techniques of the individualized learning mechanisms; determining their pre-test and post-test scores; and ascertaining if there was a significant difference in the pre-test and post-test scores of the participants in the individualized learning. We introduced an academic intervention program in Mathematics through tutorials by implementing individualized and personalized interactions. The Mathematical topics and contents included are the results of the needs analysis survey during the focus group discussion (FGD) and key informant interviews (KII). By utilizing the quasi-experimental setup, the pre-test and the post-test results showed some significance regarding mean differences. Qualitative data was also collected. The research activities had developed a harmonious learning environment among stakeholders. The levels of interest of the Badjao children became very promising as manifested by their gestures and behavior in the learning environment. Supporting these results are their performance inside the classroom and the revelation of their teachers. The tutorial program has impacted on the lives of the Badjao children. They appreciated the activity. The Badjao children in the study now can count and comprehend numerical figures without difficulty. They said that it is not difficult to engage these concepts in Mathematics in their everyday living. There is a desire to continue this program to other cultures in Mindanao as well. The research program had developed a sense of cultural understanding and eventually, it was discovered that the learning and tutoring in Mathematics via individualized learning was found to be an efficient tool for learning in Mathematics with the specific cultural background.

**Keywords:** *mathematics learning, individualized learning, Badjaos.*

### INTRODUCTION

Throughout Southeast Asia, there were inhabitants of the Sulu Archipelago representing the greater nomadic boat culture (Navarro, 2015). They are the most sea-oriented people of a larger Sama-speaking group. In the Philippines, outsiders refer to this group commonly apply the name “Bajau” or “Badjao.” However, Badjaos identify themselves as Sama Dilaut, which means Sea Sama (Dator & Reyes, 2018).

On the stilts above the lapping sea waves, the Badjaos erected an off-shore community that depends primarily on the ocean to survive. Instead of learning about Mathematics or science, the Bajao children are given nets and were taught to catch fish, octopus, and lobsters off their unique handmade boats (Dormido, H. & Ellao J., 2008). The children reportedly spend so much time in the ocean that their eyes have adjusted to seeing more clearly underwater that is why they also experience 'land sickness' when they leave the water (Gabriel & Mangahas, 2017).

The Badjaos knew that they belong to the minority group and have suffered discrimination because of the clear differences in race, ethnic origin, language, culture, and religious belief (Conde, 2016). The Badjaos possess traits and characteristics that are unpleasant (i.e., their behavior and hygiene). The Badjaos also lack social power and people, who are not of their race, manifested untoward traits directed to them (Macalandag, 2009).

The Badjaos are also practically ridiculed in schools and as a result, affected their acceptance or participation in proper education (Campo, 2013). Majority of the Badjao children doesn't want to go to school anymore (Macalandag, 2009). There were efforts to initiate the "adopt a Badjao scholar program." This initiative enables a Badjao child to interact with the school community to help them be acquainted with other cultures. However, in their experiences, they have encountered problems with bullying which affect their desire to learn relevant subjects like Mathematics.

Individualized learning is a procedure where certain groups are singled out for special treatment (Maynard, 1983) and integration into the prevailing practice (Melton, 1981). These strategies in learning contribute to an overall individualized learning environment (Bakx, Sanden, & Vermetten, 2002) that makes students feel independently valued (Tange, 2015). To enhance the Mathematical skills of the Badjao children in Matina Aplaya, the BS Mathematics program of the College of Arts and Sciences Education (CASE) of the University of Mindanao (UM) together with the Office of the Community Extension of the University has put up a tutorial class in Mathematics for the Badjao children. The task was to introduce an academic intervention that includes individualized and personalized interactions and assimilations.

This individualized learning activity attempted to assess its effectiveness in the implementation of the tutorial program intended for the Badjao children of grades 1, 2, 3, and kindergarten. The outcome of the program hopes to improve the learning interests in Mathematics of the Badjaos in their classrooms and their application to everyday lives. This endeavor aimed to describe the processes and techniques of the individualized learning mechanisms given to the Badjao children. Also, it aimed to determine the level of pre-test and post-test scores of the participants in the tutorial programs and to ascertain if there was a significant difference in the pre-test and post-test scores of the participants in the tutorial programs. Lastly, it measured the effectiveness of the individual learning processes and techniques.

This study is anchored on the individualized learning techniques and strategies by Keller (Eyler, 2007) who stated that individualized teaching strategies refer to teaching approaches that address the needs of students from a variety of backgrounds, cultures, learning styles, and abilities. Moreover, individualized instruction is an instructional method customized to fit the educational needs and skills of an individual learner. The individualized learning theory involves changing the pace when the information is delivered, the methods through which the content is offered, and the materials distributed. It makes sure that an individual of a common race feels welcome and that their unique needs and learning styles are attended to and appreciated. We have emphasized the need for individualized learning because of the importance of the development of the mathematical skills of the lives of the Badjao's as well as their cognitive development (Voinea et al., 2014).

## **METHOD**

The study engaged the quasi-experimental design. A quasi-experiment is a practical study used to estimate the causal impact of an intervention on its target population without random assignment (Kowalczyk, 2008). This design attempted to determine if the tutorial programs offered for the Badjao children can significantly increase their level of understanding in the different topics in Mathematics.

There were 27 participants composed of 13 students in Grade 1 and Kindergarten (comprising 48.15 percent) and 14 students in Grades 2 and 3 (comprising 51.85 percent). The program started with needs assessment via FGD and KII which lasted for six months. Mathematical contents incorporated in the program were discussed and analyzed by the Mathematics faculty members. The instrument utilized was crafted by the faculty members of the program. The Mathematical topics include Basic Mathematics, Elementary Algebra, Logical Reasoning, and Basic Counting Techniques. The questionnaire developed was composed of 20 items. The reliability and validity of the topics in the questionnaire were carefully determined and analyzed. The first tutorial program started on September 10, 2016, and ended last March 11, 2017, and it has been continuously done until today.

Table 1. Profile of the Respondents

<i>Profile</i>	<i>Frequency</i>	<i>Percent</i>
<i>Grade Level</i>		
<i>Grade 1</i>	13	48.15
<i>Grade 2</i>	7	25.93
<i>Grade 3</i>	7	25.93
<i>Gender</i>		
<i>Male</i>	13	48.15
<i>Female</i>	14	51.85

A pre-test and post-test was given to the students to determine their level of understanding and comprehension of the Mathematical contents incorporated into the activity. The means and standard deviations were used to describe their scores and the Wilcoxon Signed Rank test was used to determine the significance of the difference in pre-test and post-test scores.

Participants' culture was respected at the utmost level by not interfering their way of life. Similarly, the children's desire to help the family sacrificing their presence in the tutorial program was not an issue. Also, the children manifested their presence in the tutorial program because they wanted it. We did not violate any aspect of their religious belief in the duration of the program.

## RESULTS AND DISCUSSION

Teachers and students as tutees were trained in the process of individualized learning techniques. A seminar/workshop was made to address some issues that may come up regarding the process. In the workshop, it was emphasized that individualized instruction is an instructional method tailored to fit the educational needs and skills of an individual learner. The individualized learning process involves changing the pace the information is delivered, the methods through which the content is offered, and the materials distributed. A group of students of the same gender and grade level was assigned with an individual tutor. The tutor did not find it difficult to group the children as most of the participants are classmates and friends in the community. The tutor observes the behavior and interest of students in the tutoring area. The children find it easier to understand and comprehend the subject matter. The tutor discusses the activity inside the classroom during the evaluation phase. Based on the Individualized Instruction Model, learners were provided with in-depth and effective educational materials, such as interactive media or textbooks. Lecture time and presentations are usually kept to a minimum, and learners are encouraged to review, research, and learn the materials on their own. The process allows each

learner to acquire knowledge at his/her own pace. The tutor applied the activity that the Badjao child likes.

Table 2 presents the pre-test scores of the participants. It had revealed a minimum score of 2 out of 20 and a maximum of 8 out of 20. The mean score was 6.08 and the standard deviation was 1.75. The pre-test scores of the grade 2 and grade 3 were found to have a minimum score of 2 out of 20 and a maximum of 10 out of 20. The mean score was 6.29 and the standard deviation was 1.86.

Table 2. Pre-test scores of the participants

<i>Indicator</i>	<i>Min.</i>	<i>Max.</i>	<i>Mean</i>	<i>Std. Deviation</i>
<i>Pre-test scores (Kinder and Grade 1)</i>	2.00	8.00	6.08	1.75
<i>Pre-test scores (Grades 2 and 3)</i>	2.00	10.00	6.29	1.86

The scores of the kinder and grade 1 showed a very little knowledge about basic counting and identifying figures. The minimum score is 2 and the maximum score is 8. Though the mean score is 6.08, the standard deviation is 1.75. This means that the distance away from the mean is wide, which showed some heterogeneity. Similar results were found in Grades 2 and 3. Their scores were heterogeneous as well, having a minimum score of 2 and maximum score of 10. The mean score is 6.29 and a standard deviation of 1.86. This also means that the distance away from the mean is wide, which showed some heterogeneity. It was observed that the range of scores is very high for a perfect score of 20. There was an indication that students under the tutorial program had minimal knowledge in Mathematics, especially for basic counting and formulation of mathematical operations.

Table 3 presents the post-test scores of the participants. The post-test scores of the kinder and grade 1 were found to have a minimum score of 6 out of 20 and a maximum of 16 out of 20. The mean score was 8.62 and a standard deviation of 1.04. Statistically, it was observed that the distance away from the mean is very close. Thus, the highest score is expected to be an outlier. In this case, only one student obtained this. The mean of 8.62 which was higher than the pre-test mean score, showed some increment. Also, the post-test scores of the grade 2 and grade 3 were found to have a minimum score of 6 out of 20 and a maximum of 16 out of 20. The mean score was 8.64 and a standard deviation of 3.73. Statistically, it was observed that the distance away from the mean is very wide. Thus, the highest score is expected to be an outlier. The scores of grades 2 and 3 showed some heterogeneity – an indication that very few students got higher scores and the majority belonged to the lowest scores.

Table 3. Post-test scores of the participants

<i>Indicator</i>	<i>Min.</i>	<i>Max.</i>	<i>Mean</i>	<i>Std. Deviation</i>
<i>Post-test scores (Kinder and Grade 1)</i>	6.00	16.00	8.62	1.04
<i>Post-test scores (Grades 2 and 3)</i>	6.00	16.00	8.64	3.73

Table 4 presents the test statistic of the significance of the difference in the pre-test and post-test scores of the participants. We used the Wilcoxon signed rank test because the number of participants did not meet the basic requirement for the paired t-test. The pre-test and post-test scores of the Kinder and Grade 1 got a Z – value of -2.225 and a p-value of 0.01. On the other hand, pre-test and post-test scores of the Grades 2 and 3 got a Z – value of -2.246 and a p-value of 0.01.



Table 4. The significance of the Difference between the Pre-test and the Post-test Scores

<i>Wilcoxon Signed Rank Test</i>	<i>Post-test – Pre-test (Grade 1 and Kinder)</i>	<i>Post-test – Pre-test (Grade 2 and 3)</i>
<i>Z – scores</i>	-2.225	-2.246
<i>Sig. (2-tailed)</i>	.01	.01

Statistically, the negative Z- scores showed increments in the difference between the pre-test and the post-test scores. The findings revealed that given a chance, the Badjao students could cope well with Mathematics and this was evident in their final achievement scores. The tutorial program became an instrument in increasing the level of understanding of the Badjao students in Mathematics significantly. The intervention program helped contribute in minimizing the discrimination felt by the participants in the classroom. As manifested by their teachers, the students now had minimized their aloofness and they started to actively participate in the discussions but still afraid of their teachers. The tutorial program became an avenue for them to ask their tutors about the lessons that they did not understand. An indication that the presence of the facilitators helped improve their academic atmosphere. Results suggest that the teachers who are handling the ‘minority’ students in the public schools, implement this undertaking.

The tutorial program had impacted on some of the lives of the Badjao children. Their teachers signified this improvement by seeing that some of the Badjao children had started to mingle with their classmates. In the FGD, these manifestations were evident. Their appreciation of the activity was excellent. The Badjao children in the study now can count and comprehend numerical figures from 1 to 100 without difficulty. They had also improved their knowledge on addition and subtraction and most importantly, they had utilized Mathematics in everyday living.

The tutorial program was an instrument to increase the level of understanding – as manifested by their post-test scores, of the Badjao students in Mathematics. This intervention program helped contribute also to minimizing the discrimination they got from the community they belong. The presence of the facilitators helped improve the academic atmosphere. This was the relevance of the individualized learning.

The result of the study became an eye-opener that a student regardless of color and race when given a chance to succeed, will excel in their little way. It was a true manifestation that everybody indeed is educable. The tutorial program of the BS Mathematics to the Badjao community was a manifestation of this reality.

### CONCLUSION AND RECOMMENDATIONS

The individualized learning processes and techniques utilized in the study were the results of several workshops and seminars applied to the tutorial program of the Badjao children in Matina Aplaya, Davao City.

The pre-test scores of the kinder and grade 1 were found to be at a very minimum. The mean score was below the standard but a very accepted spread. The pre-test scores of the grade 2 and grade 3 were found to be at a minimum also, and the mean score was below the standard, and the standard deviation is at the acceptable levels. Also, the post-test scores of the kinder and grade 1 were found to be high and a very acceptable standard deviation. Also, for the grade 2 and 3, the mean score was high but was very varied.

There is a significant difference in the pre-test and post-test scores of the Kinder and Grade 1 as well as the grades 2 and 3.

The tutorial program had impacted on the lives of the Badjao children. The findings revealed that given a chance, the Badjao students, in general, could cope well with Mathematics. The tutorial program was an instrument to increase the level of understanding of the Badjao students in Mathematics significantly. The intervention program helped contribute to minimizing the discrimination felt by the respondents in the academe and the community. The presence of the facilitators helped improve the academic atmosphere. This program is recommended to continue including other grade levels, i.e. 4 - 6 and deserved to have better funding from the University.

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