



## EFFECTIVENESS OF CHATBOT AS AN INNOVATIVE MODALITY IN GRADE REPORTING IN THE NEW NORMAL

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### **Abstract:**

The study aimed to evaluate the effectiveness of Project E-PM Mo GradeR Chatbot to improve grade reporting in the new normal. This chatbot was made using Dialogflow, Google sheets, Google API, and Facebook Messenger. The sample was composed of 117 students who agreed to be part of the study. Due to COVID restrictions, activities pertaining to the research were done entirely online. The research instrument used in the study was a 15-item, researcher-made student's perceived effectiveness of chatbot in grade reporting. The study was conducted in the first and second quarters of the school year 2020-2021 the time the schools were locked down due to the pandemic. The instrument is implemented before and after the use of the chatbot in grade reporting. Data gathered were analyzed using mean, standard deviation, and a t-test with the p-value set at the 0.05 level of significance. Based on the gathered data results of the students' perceived effectiveness of the chatbot after the utilization of Project E-PM Mo GradeR were significantly higher than the results obtained before the implementation of the project. In conclusion, Project E-PM Mo GradeR Chatbot was effective in improving grade reporting in the new normal. The result of the study opens new ideas and opportunities for improving ways of sending grades.

**Keywords:** chatbot, grade reporting, innovation

### **1. Introduction**

The world's education halted at the onset of the COVID-19 pandemic. Based on United Nations Educational, Scientific and Cultural Organization (UNESCO), more than 190 countries opted to close schools on April 2020 due to the threat of COVID-19. Because of these closures 1.6 billion (90%) of the enrolled student population were compelled into distance learning or worse, left school indefinitely (UNESCO, 2020).

The Philippines, through the advice of Inter-Agency Task Force for the Management of Emerging Infectious Diseases (IATF) and the president, locked all its school from face-to-face instruction on March 15, 2020 (Department of Education, 2020).

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Roughly 27 million students were affected by the physical closure of schools in the Philippines (Wieland & Francia, 2021). The majority of these numbers are under the K-12 program.

Butuan City School of Arts and Trades (BCSAT) is the second-largest secondary school in the Division of Butuan City, with a total population of 2,959 students for the school year 2021-2022. Aside from the school's high enrollment, the school is located at the city's economic center making it most vulnerable to virus transmission. According to (CDRRMO) of the local government of Butuan, Barangay Tandang Sora, the barangay where the school is located, was registered as one of the highest in COVID infection incidence in 2020 (DOH, 2020). Because of the school's backdrop, closure is imminent.

School closure brought about a change in the educational setting. Educators devised measures to lessen the effect of these closures on students. The Department of Education (DepEd) formulated various learning modalities that will suit to learners' unique circumstances in the new normal (Department of Education, 2020). The learning modalities primarily aimed to lessen face-to-face contact among students, teachers, and school personnel. Because of this abrupt change in teaching and learning modalities, other activities associated with these processes are also significantly affected. Grade preparation and reporting for instance had never been difficult and challenging due to the change in the educational realm. Many teachers teaching in cities like BCSAT are in dilemma on how to report students' performance in an easy and safe manner.

There has been a rising demand for innovations that can help deliver the processes involved in teaching and learning in the most convenient and safe way possible. One possible solution educational technologists found to help teachers in teaching and learning is the use of chatbots (Hiremath et al., 2020). Chatbot is a computer program devised to simulate conversations with a human and perform basic tasks using Artificial Intelligence or AI (Hiremath et al., 2020; Rosruen & Samanchuen, 2019; Trivedi & Thakkar, 2019). Primarily, chatbots are used in the field to do business and e-commerce where it had found great success due to their practicality and accessibility. With the emergence of COVID-19, Chatbots had become promising in performing tasks such as giving instructions and answering frequently asked questions. Chatbot also has the potential of pulling data from a database and send it to a client. This way giving of grades to students without teacher's constant supervision is feasible with a chatbot.

The problem of having a safe, convenient, up-to-date, and accurate grade reporting tool is evident in Butuan City School of Arts and Trades (BCSAT) as it faces the consequences of the pandemic. With the school's high-risk status of COVID transmission and lack of an easy and practical way of grade reporting, the proponent developed a chatbot that can report student grades. The Chatbot is created using Dialogflow and Facebook Messenger App.

## 2. Materials & Methods

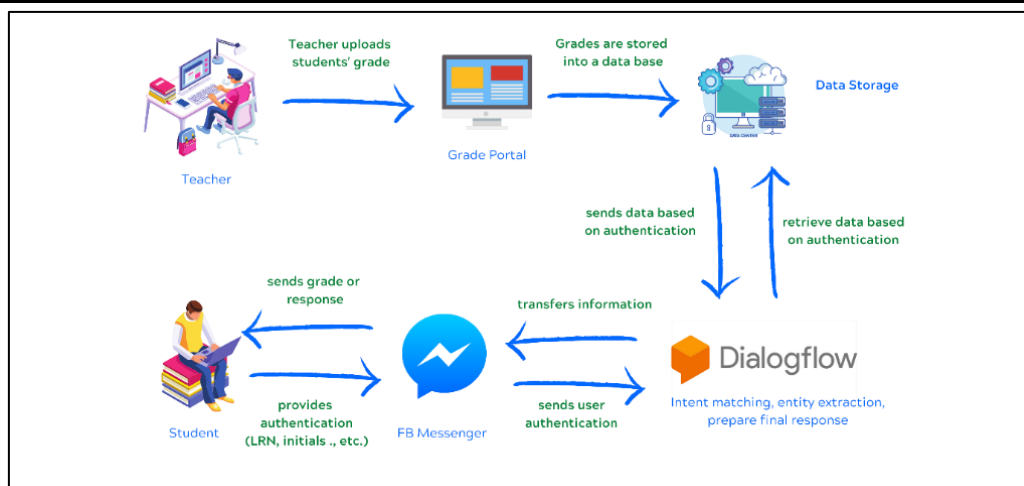
The research was conducted under the premise of pretest–posttest research design. A Pretest measure of the outcome of interest prior to administering some treatment, followed by a posttest on the same measure after treatment occurs. In the study, a pretest was given to students after the first quarter of the school year 2020-2021, prior to the use of the chatbot. The same test was again given as a posttest to the same students at the end of the second quarter during which the intervention was implemented.

### 2.1 The Innovation

The proponent developed an innovation called Project E-PM GradeR or Electronic Personal Messaging Modality in Grade Reporting. The project mainly aimed to produce a chatbot that could lessen personal contact among learners, teachers, and parents in the process of grade reporting. Specifically, the project aimed to: (1.) Make a zero-contact and cost-effective platform for students and parents in viewing learners' grades per quarter. (2.) Ease the burden teacher's task of personally giving cards to parents during consultation meetings. (3.) Make card reporting fast and accurate.

Chatbot, as defined by Google, is a computer program designed to simulate conversation with human users, especially over the internet. Chatbot carries out its function through Artificial Intelligence (AI). Over the course of time, Chatbot had been widely used in a variety of fields like marketing, medical, education, banking, and finance (Priadko et al., 2019; Ranoliya et al., 2017; Rosruen & Samanchuen, 2019). In recent days due to the outbreak of the COVID-19 pandemic, Chatbot has been viewed to carry out tasks that are regularly done by a real-life teacher which include teaching, follow-up, giving instructions, providing materials, sending grades, or even evaluating performance (Trivedi & Thakkar, 2019).

The proponent used Facebook's messenger app, Google's Dialogflow, and Google Drive API cloud applications in this project. The said applications are readily available and offer easy access and free-to-use facilities at this moment. The proponent being the school ICT coordinator, initiated the project with the help of school administrators, subject teachers, and class advisers. The innovator made the project entirely online with the use of solid internet connectivity. In building the database, the proponent, with the supervision of the School Principal, collected and consolidated grades from the advisers and stored them in Google drive. After its completion, the chatbot was launched in the second quarter of the school year 2020-2021. To measure the effectiveness of the chatbot in improving grade reporting, the teacher-innovator created a student-perceived effectiveness questionnaire. The said questionnaire was submitted for evaluation to the district research coordinator.



**Figure 1:** Schematic Diagram of the Chatbot

## 2.2 Participants and Other Sources of Data and Information

The number of respondents who agreed to answer the pretest and posttest was 117 students. They are composed of 17 Grade 7 students, 11 Grade 9 students, 64 Grade 10 students, 3 Grade 11 students and 22 Grade 12 students. These students agreed to participate in the study and answered the pretest and posttest willingly.

## 2.3 Data Gathering Methods

The identified students were made to answer a validated questionnaire prior to the start of the second quarter. The test was a student-perceived questionnaire composed of 15 items on a 5 Likert scale basis (1 = very low to 5 = very high). The evaluation criteria of average scores were established at a level of 4.50-5.00 as the highest, 3.50-4.49 as higher, 2.50-3.49 as average, 1.50-2.49 as lower, and 1.00-1.49 as lowest.

The same questionnaire was implemented at the end of the second quarter after the implementation of the innovation. The results of the tests were recorded and tabulated.

## 2.4 Data Analysis

Generally, the data collected were analyzed using mean, standard deviation, and a t-test with the p-value set at the 0.05 level of significance. A 5 Likert scale basis (1 = very low to 5 = very high) was utilized to evaluate the student perceived effectiveness of grade reporting before and after the implementation of the chatbot. Moreover, the study used a paired t-test to analyze the means of the student's perceived effectiveness of grade reporting before and after the use of the intervention.

### 3. Results & Discussion

#### 3.1 Students' Self-perceived Effectiveness of Grade Reporting Before the Implementation of Project E-PM Mo GradeR Chatbot

**Table 1:** Mean and Standard Deviation of Student-perceived Effectiveness of Grade Reporting Before the Implementation of Project E-PM Mo GradeR

Student Perceived Effectiveness	Mean	SD	Interpretation
<b>Contactless grade reporting</b>			
1. I was able to access my grade without the help of my adviser.	2.79	1.55	Average
2. Viewing my grades is easy and comfortable.	2.76	1.54	Average
3. My grades are easy to access even at home.	2.76	1.54	Average
4. My parents were able to see my grades at home.	2.79	1.53	Average
5. My grades are available anytime, anywhere.	2.78	1.53	Average
<b>Timeliness of grade reporting</b>			
6. I was able to access my grades as soon as it is available for viewing.	2.79	1.53	Average
7. Viewing my grade is easy and fast.	2.78	1.54	Average
8. It took me less than 2 minutes just to view my grades.	2.76	1.54	Average
9. Accessing my grades has never been this fast.	2.78	1.53	Average
10. I can just quickly review my grades with no hassle.	2.77	1.54	Average
<b>Accuracy of grade reporting</b>			
11. My grades are accurate and based on my teacher's rating.	2.76	1.54	Average
12. I am satisfied with my grades.	2.80	1.53	Average
13. I did not complain about my grades.	2.79	1.53	Average
14. My grades are equivalent with my efforts.	2.78	1.54	Average
15. I did not observe any mistakes in my grades.	2.80	1.54	Average
<b>Total</b>	<b>2.8</b>	<b>1.54</b>	<b>Average</b>

As observed in the table above, the mean of student-perceived effectiveness of grade reporting before the intervention is 2.78 and a standard deviation of 1.54 which is interpreted as average. Furthermore, most of the statements that scored the lowest belong to the first category which is contactless grade reporting. This proves that the traditional way of reporting basically offers more human contact.

### 3.2 Students' Self-perceived Effectiveness of Grade Reporting After the Implementation of Project E-PM Mo GradeR Chatbot

**Table 2:** Mean and Standard Deviation of Student-Perceived Effectiveness of Grade Reporting After the Implementation of Project E-PM Mo GradeR

Student Perceived Effectiveness	Mean	SD	Interpretation
<b>Contactless grade reporting</b>			
1. I was able to access my grade without the help of my adviser.	3.62	1.05	High
2. Viewing my grades is easy and comfortable.	3.29	0.97	Average
3. My grades are easy to access even at home.	3.39	1.03	Average
4. My parents were able to see my grades at home.	3.55	1.03	High
5. My grades are available anytime, anywhere.	3.32	1.01	Average
<b>Timeliness of grade reporting</b>			
6. I was able to access my grades as soon as it is available for viewing.	3.62	1.03	High
7. Viewing my grade is easy and fast.	3.34	1.01	Average
8. It took me less than 2 minutes just to view my grades.	3.24	0.89	Average
9. Accessing my grades has never been this fast.	3.25	0.97	Average
10. I can just quickly review my grades with no hassle.	3.32	1.07	Average
<b>Accuracy of grade reporting</b>			
11. My grades are accurate and based on my teacher's rating.	3.56	0.88	High
12. I am satisfied with my grades.	3.60	1.00	High
13. I did not complain about my grades.	3.53	1.00	High
14. My grades are equivalent with my efforts.	3.76	0.95	High
15. I did not observe any mistakes in my grades.	3.45	0.96	Average
<b>Total</b>	<b>3.5</b>	<b>0.99</b>	<b>High</b>

Based on the table above, the mean of students' perceived effectiveness of grade reporting is 3.5 or translated as high with a standard deviation of 0.99. If you look closely, the category accuracy of grade reporting garnered the highest mean with 4 statements scoring high. This means that with the use of the intervention, the accuracy of grades is observed. It can also be noted that the category contactless reporting scored second highest. It can be inferred that with the use of the intervention, students observed that Chatbot offers a contactless feature ( Isotani, et al., 2019).

### 3.3 Significant Difference in the Student's Self-perceived Effectiveness of Grade Reporting Before and After the Implementation of Project E-PM Mo GradeR Chatbot

**Table 3:** T-test Result of the Student's Perceived Effectiveness of Grade Reporting Before and After the Implementation of Project E-PM Mo GradeR

	N	mean	SD	t-stat	df	p-value	Interpretation
Before	117	2.779487	1.54	-5.0859	116	0.000	Difference is Significant
After	117	3.45698	0.99				

From the data given above, the difference of students' perceived effectiveness in grade reporting before and after the application of Project E-PM Mo GradeR Chatbot is significant. As reflected in the table, the p-value is smaller than the set level of significance of 0.05, which means that the null hypothesis is rejected.

#### **4. Conclusion**

The main findings indicated that the application of Project E-PM Mo GradeR Chatbot adds effectiveness to grade reporting of Butuan City School of Arts and Trades in the second quarter of school year 2020-2021. The result of this study is in consonance with the findings of several authors. According to Vanichvasin (2021), Chatbots are excellent tools in providing personalized support on task that demands one on one interaction. Likewise, it has also been highlighted in some studies that Chatbot using modern phones can increase the efficiency in getting students information; thus, reducing the waste of time that should have been focused on students' development (Priadko et al., 2019).

Through this study, the level of students' perceived effectiveness of grade reporting in the new normal has been significantly increased with the help of Project E-PM Mo GradeR Chatbot. I can conclude that Project E-PM Mo GradeR Chatbot is effective and can therefore be used as an innovative modality in grade reporting.

#### **Conflict of Interest Statement**

The author declares no conflicts of interest.

#### **About the Author**

Benedicto Mindajao has collective teaching experience of eight years in the Department of Education, a year in private education institutions, and two years in ecclesiastical service. He teaches science to junior high school students at Butuan City School Arts and Trades. Aside from his teaching duties, he is the head designate of the science department. His research interest is mostly in the application and effects of technology on education.

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