

Advantages and Disadvantages of Modular Distance Learning in Learning Mathematics: Perception of Grade 9 Students

Joan I. Tombaga¹, Carl Jonas B. Egipto², Mary Rose F. Corpuz³, Mildred M. Temporosa⁴, Denielle B. Tumbaga⁵

Abstract— This study presented the advantages and disadvantages of modular distance learning among Grade 9 students of President Ramon Magsaysay State University.

This study used a descriptive research design that aims to describe the demographic profiles of the respondents and determine the difference in the advantages and disadvantages of modular distance learning. Findings revealed that the majority of the respondents were male and belong to poor families. It is also revealed that modular distance learning has advantages and disadvantages in learning mathematics and the prevalent advantages include having time to rest, being safe at home, and using other references to study while the predominant disadvantages include needing to access the internet, getting frustrated, or stressed and getting distracted easily. It is further revealed that there is no significant difference in the advantages and disadvantages of modular distance learning in learning mathematics when grouped according to profile variables.

Given the findings and conclusions, the researchers recommend that students may wisely manage their time to read and understand their modules to expand their learning on their own and making their responsibilities at home, teachers may consider to improve and provide self-learning modules filled with examples as well as activities wherein the students do not need to access the internet for further understanding, and future researcher(s) who wish to conduct a similar study may use bigger population, other grade levels, other subjects and incorporate other variables.

Index Terms— advantages, disadvantages, mathematics, modular distance learning, perception

1 INTRODUCTION

With the pandemic happening, traditional classrooms are now replaced with different learning modalities and one of them is modular distance learning. Modular Distance Learning is new to numerous high school students in the Philippines as they are exposed to traditional learning where they attend classrooms and have a schedule to follow. Teachers are crucial part of a students' learning as they guide them along the process. But with the modular distance learning, teacher and student interaction have become limited. Aside from the lack of teacher participation, it is now the students' task to make their own schedule and study.

Teachers play an important role in students' perception about learning. Effective teaching is equivalent to effective learning. But with modular distance learning, the students are only provided with modules that they can study and answer the activities whenever they want and however, they want. In modular distance learning, a teacher's participation in students' learning is lacking.

Mathematics is an important subject and is essential in daily living as well as learning other subjects yet there is a general belief that mathematics is disliked by majority of students. One of the main challenges to a math teacher is to make a positive attitude in students toward learning mathematics. Gafoor & Kurukkan (2015) stated that with a negative perception, students may dismiss studying mathematics subject as with modular distance learning, the students hold their own time. [1] Though modular distance learning has a lot of advantages as it is flexible, it saves time and it is self-paced, there are also disadvantages. Not all students are fast-learners, and it might give them conflict in their schedules, and some does not have a

parent or guardian who are knowledgeable enough to guide them along the way.

Modular instruction is not suitable for every student. A study by Valderama revealed that students with low math ability have their achievement level deteriorated when exposed to modular-instruction while it has no effect on the achievement level of high math ability students. As a result, it is not advisable to use modular instruction for low math ability students, however, it could be adopted in teaching high math ability students. [2]

With these circumstances, this study focused to identify the perception of grade 9 students about the advantages and disadvantages of modular distance learning in learning mathematics. This study also aims to answer these specific questions: (1) What is the profile of the respondents in terms of sex and monthly family income? (2) What are the perceptions of the respondents in modular distance learning in terms of advantages and disadvantages? (3) Is there a significant difference on the advantages and disadvantages of modular distance learning when grouped according to profile variables? Furthermore, results of the study can be used to enhance the curriculum for distance learning.

2 METHODOLOGY

2.1 Research Design

In this study, the researchers used a descriptive research design that includes the sex, monthly family income, and the perception about modular distance learning of Grade 9 students of President Ramon Magsaysay State University

Laboratory High School for S.Y. 2020-2021.

The descriptive method of research is the kind of facts finding the technique with adequate interpretations. This type of research purpose is to present facts concerning the current status of prevailing conditions, processes, procedures, techniques and practices the researcher likes to study.

According to the Office of Human Research Protections (OHRP), a descriptive study is a study that is not truly experimental. It is also referred to as "correlational" or "observational" studies. Descriptive studies provide information on natural occurring health status, behavior, attitudes or characteristic of a particular group. [3]

2.2 Theoretical Framework

This study is grounded on its Transactional Distance Theory. Transactional distance, as defined by Moore is in relation to the interactions that exist within an instructional program and were referred to as functions of dialogue, structure and learner's autonomy (Aluko et. al, 2011). Dialogue is developed by teachers and learners as they interact and it occurs when one communicates information and the other responds. Structure refers to the ways in which the teaching program that is designed and usually reflects 'the rigidity or flexibility of the program's educational objectives, teaching strategies and evaluation methods, which in turn determine to what extent each learners' differences are taken into consideration. Learners autonomy is referred to as a state of affairs in which a person is no longer the object of educational guidance, influences, effects and obligation, but he or she is the subject of his or her own education. This theory highlights the 'distance' element of distance education. [4]

This study is also anchored on Wedemeyer's Theory of Independent Study. According to Charles Wedemeyer (1981) the roots of individual study theory is in the ideal of learner freedom. He also characterized independent study as one in which; (1) the student and teacher are separated, (2) the normal processes of teaching are carried out in writing or some other medium, (3) teaching is individualized, (4) learning takes place through student activity, (5) learning is more convenient for the student in his or her own environment and (6) the learner takes responsibility for the pace of his or her own progress with freedom to start and stop at any time. (Bachetta, 2013) This theory highlights the students' independence and responsibility when it comes to learning as it is carried out through another medium. Since the students are in distance learning, this means that they have their own freedom to learn on their own time. [5]

2.3 Conceptual Framework

The major concept of this study is focused on the perception of junior high school students about modular distance learning in mathematics learning. Figure 1 shows the paradigm of the study.

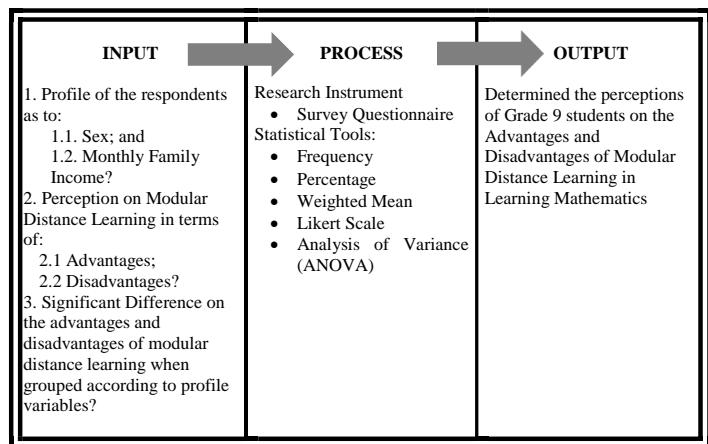


Fig. 1. The Paradigm of the Study

In the Input frame, it deals with the profile of the respondents as to their sex and monthly family income, and the perception of the respondents about modular distance learning approaches to its advantages and disadvantages in learning mathematics. The process frame deals with the gathering of data through distributing questionnaires to the respondents and retrieving the questionnaires from the respondents. The questionnaire provided the needed data for the study and was quantified using statistical tools such as percentage, weighted mean, and Likert scale. The quantified data was then analyzed using Analysis of Variance (ANOVA) and interpreted.

For the Output frame, it is the result of the study which is determined the perceptions of Grade 9 students on the Advantages and Disadvantages of Modular Distance Learning in Learning Mathematics at President Ramon Magsaysay State University.

2.4 Population and Sampling

The research respondents were the thirty-nine (39) Grade 9 students from President Ramon Magsaysay State University Laboratory High School. The grade level consists of only one section with 39 students.

The convenience sampling technique was used in the selection of the respondents. Convenience sampling is also known as available sampling. It relies on data collection from population members that are conveniently available in participating in the study. Also, convenient sampling is where the participants are easy to reach out like in universities. It is also a non-probability sampling which doesn't include a random selection of participants. [6]

2.5 Research Instrument

The instrument used to gather the needed data was a researcher-made questionnaire. The questionnaire was researcher-made and was designed to answer the main problem of the study. The draft of the questionnaire was made based on the researcher's readings, previous studies, and published studies relevant to the study. The first part of the questionnaire includes the demographic profile of the respondents. It includes their name (optional), sex, and family income. The second part contains statements about the

advantages and disadvantages of modular distance learning in learning mathematics. In the preparation of the instrument, the requirements in the designing of the data collection instrument were considered. For instance, a statement describing the situations or issues pertaining to the study was toned down to accommodate the knowledge preparedness of the respondents. In this way, the instrument is authorized to obtain valid response of the students. Reference for the use of structured questionnaire is premised on several research assumptions such as a) avoidance of bias, and b) less pressure for despondence for answering questionnaire.

To test the validity of the instrument, the instrument was checked by the research adviser and panelists. The corrections and suggestions made by research adviser and panelists were incorporated in the draft and were subjected to the Cronbach test which has a result of 0.88 interpreted as Good. The researchers conducted a pilot testing for the questionnaire by distributing it to Grade 8 students from Coto High School.

2.6 Data Collection

The researchers made a request letter to the Principal of Junior High School to seek permission to distribute the questionnaire to the Grade 9 respondents of President Ramon Magsaysay State University. Due to the pandemic, and the need to follow the Health Protocol by the Department of Education the researchers distributed the questionnaires to the Grade 9 respondents through online technology which is the Google Form.

The collected results were checked by the researchers ensuring that all of the questions was answered by the respondents and was treated with utmost care and confidentiality by the researchers. The data gathered from the respondents was then analyzed and interpreted.

2.7 Data Analysis

To effectively interpret the gathered data, the researchers used statistical tools. The data collected were tallied, tabulated, and analyzed by the researchers using the following statistical tools: (1) Frequency was used to summarize the data into various classes or categories. (2) Percentage was used to determine the frequency counts and percentage distribution of profile of the respondents and the perception of modular distance learning as to its advantages and disadvantages. (3) Weighted Mean (WM) was used to determine the average of the perception of the respondents on modular distance learning as to its advantages and disadvantages. (4) Analysis of Variance (ANOVA) was used to determine if there is a significant difference in the advantages and disadvantages of modular distance learning when grouped according to profile variables. If the computed significant value is greater or higher than ($>$) 0.05 Alpha Level of Significance, accept the null hypothesis and reject the alternative. If the computed significant value is less or lower than ($<$) 0.05 Alpha Level of Significance, reject the null

hypothesis and accept the alternative. If the computed significant value is less than ($<$) 0.01 Alpha Level of Significance, reject the null hypothesis. There is a highly significant difference. (5) Likert Scale was used to interpret the perception of modular distance learning as to its advantages and disadvantages.

3 RESULTS AND DISCUSSION

3.1 Profile of the Respondents

TABLE 1

FREQUENCY AND PERCENTAGE DISTRIBUTION OF RESPONDENTS ACCORDING TO SEX AND MONTHLY FAMILY INCOME

	Profile	Frequency	Percent
Sex	Male	23	59%
	Female	16	41%
	Total	39	100%
Monthly Income	Below 9, 250	14	36%
	9, 521 – 19, 040	10	26%
	19, 041 – 38, 080	9	23%
	38, 081 – 66, 041	4	10%
	Above 66, 041	2	5%
Total		39	100%

The data showed that out of thirty-nine (39) respondents, there were twenty-three (23) or 59% males and there are sixteen (16) or 41% females.

It shows that the majority of the respondents were male than female. The male respondents dominated the female respondents.

Similar to the study of Awe (2015), modular learning in Africa is more likely to be preferred by male students. [7]

Out of thirty-nine (39) respondents, there were (two) 2 or 5.13% that has a monthly family income above 66,641, four (4) or 10.25% has a monthly family income of 38, 081 – 66, 640, nine (9) or 23.08% has a monthly family income of 19, 041 – 38, 080, ten (10) or 25.64% has a monthly family income of 9, 521 – 19, 040 and fourteen (14) or 35.90% has a monthly family income of below 9, 520. The data demonstrates that most of the respondents have the lowest monthly family income which is below 9, 520.

This table shows that most of the respondent belongs to the poor family and due to the unequal value of the class size it affects the computed average monthly family income of the respondents and is not applicable to identify the average monthly family income of the respondents. Similar to the study of Li and Qiu (2018) socio-economic status can affect the academic performance of the students. In addition, a study by Zhao and Hong (2012), as cited by Li and Qiu found out that socio-economic status can affect children's behavior and academic performance in relation to parent's educational expectation towards their children and their educational

participation. [8]

3.2 Respondents' Perception towards the Advantages and Disadvantages of Modular Distance Learning in Learning Mathematics

Table 2 shows the responses of the respondents on the advantages of modular distance learning in learning mathematics.

TABLE 2

PERCEPTION OF THE RESPONDENTS TOWARDS THE ADVANTAGES OF MODULAR DISTANCE LEARNING

Advantages	WM	Descriptive Equivalent	Rank
1. I can pursue a job along with studying my mathematics module.	2.67	Agree	11
2. I can save money by studying the mathematics modules at home.	2.82	Agree	5
3. I can learn the mathematics module at my own pace.	2.59	Agree	14
4. I can study my mathematics module to any place I want.	2.64	Agree	13
5. I am self-motivated when it comes to studying my mathematics module.	2.59	Agree	14
6. Studying my mathematics module fits with my schedule.	2.67	Agree	11
7. I can use other references in studying my mathematics module.	2.95	Agree	3
8. I can focus in studying my mathematics module because there are limited to no distractions from my classmates.	2.74	Agree	8
9. I can ask a 'More Knowledgeable Other' (MKO) for help about the lessons I don't understand in my mathematics module.	2.77	Agree	6
10. There is no fixed schedule in answering the activities in my mathematics module.	2.74	Agree	8
11. There is no pressure to quickly understand the lessons in my mathematics module.	2.77	Agree	6
12. I can practice other skills while studying my mathematics module.	2.69	Agree	10
13. I can take a break whenever I feel tired from studying my mathematics module.	3.21	Agree	1
14. I am safe at home while studying mathematics module.	3.1	Agree	2
15. I don't need to travel to go to school and study mathematics.	2.92	Agree	4
Overall Weighted Mean	2.79	Agree	

Rank 1 was Indicator 13 "I can take a break whenever I feel tired from studying my mathematics module" with a weighted mean of 3.21 interpreted as Agree. Rank 2 was Indicator 14 "I am safe at home while studying mathematics module" with a weighted mean of 3.1 interpreted as Agree. Indicator 7 "I can use other references in studying my mathematics module" ranked 3rd with a weighted mean of 2.95 interpreted as Agree. While Indicator 3 "I can learn mathematics module at my own pace" and Indicator 5 "I am self-motivated when it comes to studying my mathematics module" ranked 14th with a weighted mean of 2.59 interpreted as Agree. The overall weighted mean was 2.79 interpreted as Agree.

The results imply that the students agree that modular distance learning has advantages like, they can take a break whenever they feel tired, feels safe in answering their modules at home and using other references to study their mathematics module. The prevalent advantages of modular distance learning in learning mathematics include having time to rest, being safe at home and using other references to study. Similar to the study of Korolkov et. al. (2020), it revealed that 72% of the respondents considers the advantages of distance learning directly affect their personal life and convenience; 41% saving time and money and 31% comfortable living conditions. [9]

In a study by Rodeiro and Nadas (2012), some advantages of modular learning include students having better motivation in studying, students can study at their own pace and they can have a sense of ownership that can lead to lesser dissatisfaction. [10]

Table 3 shows the responses of the respondents on the disadvantages of modular distance learning in learning mathematics.

TABLE 3

PERCEPTION OF THE RESPONDENTS TOWARDS THE DISADVANTAGES OF MODULAR DISTANCE LEARNING

Disadvantages	WM	Descriptive Equivalent	Rank
1. I easily get distracted while learning my mathematics module.	2.69	Agree	3
2. There is a minimal to no physical interaction with my classmates while learning mathematics.	2.56	Agree	5
3. I have no self-motivation when it comes to learning my mathematics module.	2.41	Disagree	12
4. I end up getting frustrated or stressed when I can't understand my mathematics module on my own.	2.87	Agree	2
5. I can't study the mathematics module on my own.	2.49	Disagree	8
6. I can't manage my time in learning mathematics.	2.51	Agree	7
7. I still need to access internet if I can't understand the lesson in my module	3.21	Agree	1
8. I can't fit learning the mathematics module with my schedule.	2.28	Disagree	15
9. My leisure activities come first more than studying my mathematics module.	2.38	Disagree	13
10. I dislike learning mathematics module on my own.	2.54	Agree	6
11. I don't have time studying my mathematics module because of household chores.	2.46	Disagree	10
12. There is no 'more knowledgeable others' (MKO) in my learning environment to help me in studying my mathematics module.	2.38	Disagree	13
13. I can't focus in studying my mathematics module because of the noisy environment.	2.46	Disagree	10
14. The references are not enough to understand the lesson in my mathematics module.	2.49	Disagree	8
15. I lack discipline in studying my mathematics module that I end up doing the activities in a rush.	2.59	Agree	4
Overall Weighted Mean	2.55	Agree	

Rank 1 was Indicator 7 "I still need to access internet if I can't understand the lesson in my module" with a weighted mean of 3.21 interpreted as Agree. Rank 2 was Indicator 4 "I end up getting frustrated or stressed when I can't understand my mathematics module on my own" with a weighted mean of 2.87 interpreted as Agree. Indicator 1 "I easily get distracted while learning my mathematics module" ranked 3rd with a weighted mean of 2.69 interpreted as Agree. Indicator 8 "I can't fit learning the mathematics module with my schedule." was rank 15 with a weighted mean of 2.28 interpreted as Disagree. The overall weighted mean is 2.55 interpreted as Agree.

The results indicate that the students agree that modular distance learning has disadvantages like, they need to access internet if they can't understand the lesson, they end up getting frustrated or stressed when they can't understand the lesson and they are easily distracted while studying their lesson in learning mathematics. The predominant disadvantages of modular distance learning in learning mathematics are need to access the internet, getting frustrated or stressed and getting distracted easily. Similar to a study by Korolkov et. al. (2020) where it aims to identify the advantages and disadvantages of

distance learning, the findings revealed that students agree that the disadvantages of distance learning include lack of communication with fellow students and teachers, technical problems and increase in academic load. [9]

A study by Rodeiro and Nadas (2012) showed that some of the disadvantages of modular learning consists of poor development of module and that it limits the teacher. [10]

3.3 Difference on the Advantages and Disadvantages of Modular Distance Learning according to Profile Variables

Table 4 shows the difference on the advantages of modular distance learning according to profile variables.

TABLE 4

DIFFERENCE ON THE ADVANTAGES OF MODULAR DISTANCE LEARNING ACCORDING TO PROFILE VARIABLES

Source of Variation	Df	F	Sig.	Decision/ Interpretation
Sex	Between Groups	1		Accept Ho Not Significant
	Within Groups	37	2.17	
	Total	38	0.15	
Monthly Family Income	Between Groups	4		Accept Ho Not Significant
	Within Groups	34	1.39	
	Total	38	0.26	

The computed significant value for sex (0.15) and monthly family income (0.26) were both greater than (0.05) alpha level of significance, therefore, the null hypothesis was accepted. There is no significant difference on the advantages of modular distance learning in learning mathematics as to profile variables. The results imply that sex and monthly family income does not affect the perception of students towards the advantages of modular distance learning in learning mathematics.

In contrast to the study of Ismail et. al. (2015) where they determine the relationship of gender in distance learners' perception, it is revealed that there is a significance difference between males and females' perception towards the advantages of e-learning. [11] Such contrast may happen due to the respondents' difference of countries and the mode of delivery in distance education.

Also, contrary to the study of Villanueva & Nuñez (2020) it is found out that socio-economic status indirectly affects the experience of students learning. [12] Such contradictions may happen due to the difference in grade level of the respondents and mode of delivery in distance education.

Table 5 shows the difference in the disadvantages of modular distance learning according to profile variables.

TABLE 5
DIFFERENCE ON THE DISADVANTAGES OF MODULAR DISTANCE LEARNING ACCORDING TO PROFILE VARIABLES

Source of Variation	Df	F	Sig.	Decision/ Interpretation
Sex	Between Groups	1		Accept Ho Not Significant
	Within Groups	37	0.55	
	Total	38	0.47	
Monthly Family Income	Between Groups	4		Accept Ho Not Significant
	Within Groups	34	1.14	
	Total	38	0.35	

The computed significant value for sex (0.47) and monthly family income (0.35) were both greater than (0.05) alpha level of significance, therefore, the null hypothesis was accepted. There is no significant difference in the disadvantages of modular distance learning in learning mathematics as to profile variables. The results imply that sex and monthly family income do not affect the perception of students towards the disadvantages of modular distance learning in learning mathematics.

Contrary to a study by Dabaj (2008) results revealed that gender affects the perception of students regarding online distant education. [13] Such contradictions may arise due to the respondents are from different countries and the mode of distance education differs.

Also, opposed to the study by Amir et. al. (2020) the study revealed that financial income can play a role in disadvantages of distance learning such as extra financial burden for internet costs, time management, and difficulty to focus. [14] Such contradictions may occur since the respondents are from different countries and in different grade levels.

4 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the investigations conducted, the researchers have arrived to conclude that: (1) Most of the respondents are males and belongs to poor families, (2) The respondents agreed that modular distance learning has advantages and disadvantages in learning mathematics. The advantages include taking a break when tired from studying, being safe at home while studying, and using other references to study. The disadvantages include needing to access the internet when the lessons are hard to understand, getting frustrated or stressed when lessons are hard to understand, and getting easily distracted while studying, and (3) The advantages and disadvantages of modular distance learning have no significant difference in their profile variables showed that age and monthly family income have no connection with the advantages and disadvantages of modular distance learning.

In light of the results of the investigation conducted and the conclusions arrived at, the researchers have advanced the following recommendations: (1) Students may wisely manage

their time to read and understand their modules to expand their learning on their own and making their responsibilities at home, (2) The teacher may consider to improve and provide self-learning modules filled with examples as well as activities wherein the students do not need to access the internet for further understanding, and (3) Conduct a follow-up study about the advantages and disadvantages of modular distance learning by using a bigger population, other grade levels, and other subjects and incorporate other variables.

REFERENCES

- [1] Abdul Gafoor, K., & Kurukkan, A. (2015). Why high school students feel mathematics difficult? an exploration of affective beliefs. *Why High School Students Feel Mathematics Difficult? An Exploration of Affective Beliefs*, 1–6.
- [2] Valderama, J. S. (2012). The effect of Online-Modular instruction to mathematics achievement of high and low math ability group of students. *IAMURE International Journal of Mathematics, Engineering & Technology*, 4(1). <https://doi.org/10.7718/iamure.ijmet.v4i1.417>
- [3] Module 2: Research design - section 1 | ORI - the office of research integrity. (n.d.). The Office of Research Integrity. Retrieved January 20, 2021, from <https://ori.hhs.gov/content/module-2-research-design-section-1>
- [4] Aluko, R. F., Hendrikz, J. & Fraser, W. J. (2011). Transactional distance theory and total quality management in open and distance learning. *Africa Education Review*, 8(1), 115-132, DOI: 10.1080/18146627.2011.586155
- [5] Bachetta, S. (2013, January 17). Instructional Design Hub. Retrieved from Instructional Design Hub: http://instructionaldesignhub.blogspot.com/2013/01/on-wedemeyers-theory-of-independet_17.html?m=1
- [6] Glen, S. (2015). Convenience sampling (accidental sampling): Definition, examples. Statistics How To.
- [7] Awe, A. B. (2015). Learners characteristics and preference. Research Gate. Retrieved from <https://www.researchgate.net/>
- [8] Li, Z. (2018). How does family background affect children's educational achievement? Evidence from Contemporary China. *The Journal of Chinese Sociology*.
- [9] Korolkov, A., Germanov, G., Langueva, O., Shevyakova, A., & Poskrebysheva, N. (2020). Advantages and disadvantages of distance learning on students' and teachers' of the physical culture faculty opinion. *BIO Web of Conferences*, 26, 00058. <https://doi.org/10.1051/bioconf/20202600058>
- [10] Rodeiro, C. L., & Nadas, R. (2012, January 16). Effects of Modularity, Certification Session and Re-sits on Examination Performance. *Assessment in Education: Principles, Policy and Practice*, 411-430. Retrieved from tandfonline.com
- [11] Ismail, I. B., Gunasegaran, T., Siti, N., & Azizan, S. N. (2015). Distance learners' perception towards E-Learning portal: Does gender really matters? ResearchGate
- [12] Cusia-Villanueva, M. C., & Nuñez, J. (2020). A study on the impact of socioeconomic status on emergency electronic learning during the coronavirus lockdown. *A Study on the Impact of Socioeconomic Status on Emergency Electronic Learning during the Coronavirus Lockdown*, 3–10.
- [13] Dabaj, F. (2008). The Role of Gender and Age on Students' Perception Towards Online Education. Case Study: Sakarya University, Vocational High School. *Turkish Online Journal of Educational Technology*.
- [14] Amir, L. R., Tanti, I., Maharani, D. A., Wimardhani, Y. S., Julia, V., Sulijaya, B., & Puspitawati, R. (2020). Student perspective of classroom and distance learning during COVID-19 pandemic in the undergraduate dental study program Universitas Indonesia. *BMC Medical Education*, 20(1).