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Undergraduate students' modular experiences in learning mathematics in the new normal education

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ABSTRACT

The modular approach has been proven to be an effective tool in mathematics learning. However, this approach presents challenges regarding students' learning. Hence, this study was conducted to determine and compare the modular experiences of 55 Bachelor of Secondary Education (BSED) Math students of Eastern Samar State University (ESSU) Salcedo based on gender, age, and year level. The study utilized a descriptive-comparative design and a survey questionnaire. Percentage, mean, t-test, and analysis of variance (ANOVA) were used to treat the data. The study revealed that respondents were satisfied with their modular experience in learning mathematics in the new normal education. Specifically, the respondents rated their experience satisfactory in good teaching, high in clear outcomes, manageable in appropriate workload, moderate in appropriate assessment, and average in generic skills. Furthermore, the study found a significant difference in good teaching, clear outcomes, appropriate workload, appropriate assessment, generic skills, and satisfaction with modular learning across the respondents' year level, but insignificant across age and gender. Based on the findings, it is recommended that teachers should attend intensive seminars and training on current trends in math teaching and module development. Modules' quality must be improved considering the workload, assessment, outcomes, and skills development.

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1. INTRODUCTION

The coronavirus outbreak COVID-19 obstructed every aspect of life, and the Philippines were among the countries affected. It severely impacts the travel and tourism industry [1], politics [2], racism [3], the global economy [4], and even the global education systems [5], [6]. Academic activities and professional goals have been disrupted [7]. As part of international efforts to contain COVID-19, home teaching for students from early childhood to tertiary education was implemented [8]. Other schools have been shut down in many countries, which has become a communal tactic in several nations [9]–[12]. Many government or public schools were closed for several weeks and even months [12].

Higher education institutions (HEIs) have also adjusted to the new environment where face–to–face engagement and large-scale meetings are no longer possible. Because of commitment to the mandates, HEIs found innovative ways to realize their significant functions or task, including instruction. As they shifted to new teaching modalities, professors were tasked to revise their course syllabi and requirements [6]. Some students and teachers opted to go online teaching, using electronic devices and reliable internet connections.

However, the implementation of online learning posed different risks, problems, and challenges to both the teachers and students [13]. Hence, some opted to undergo a modular approach to learning.

As an HEI in the Region and the Province of Eastern Samar, the Eastern Samar State University-Salcedo Campus produced package course handouts for its flexible delivery modes. Concerned professors prepared modules or course handouts for all subjects offered following the essential parts of a handout: introduction, learning outcomes, discussion of the topics, and exercises. Furthermore, these handouts were then given out to the students.

According to Capinding [14] and Nardo [15], a modular approach is an instructional design that utilizes developed instructional materials based on the needs of the learners. Modules are printed out for learners to complete it at his own pace independently or in small groups and submit to teachers for grading. It is usually accompanied with learning tasks at the end of the topic [16]. Moreover, modular approach is based on the principle of separating the curriculum into small units that are independent, nonsequential, and typically short in duration [17].

The modular approach in mathematics learning has proven to be an effective and efficient tool to help students learn mathematics. However, the modular approach is very challenging for both students and teachers, especially in teaching and learning mathematics subjects for knowledge and skills are required for this course [14] such as regulation skills among students. Thus, students who are not regulated will face difficulty overcoming the obstructions or challenges they face while learning.

The study of Dargo and Dimas [18] reported that there was a decrease of 2.25% in the learners' general weighted average (GWA) after the implementation of modular distance learning (MDL) which denotes a significant difference in the academic achievement of the learners. The study also revealed that a limited interface between the learner and the teacher and too many tasks/activities required in the modules were the main problems that appeared in MDL implementation. In support, Salamuddin [19] found that Mindano State University-Sulu students agreed face-to-face approach gives significant and had much influence their learning than the modular distance learning. However, the study of Lim [20] found that modular learning as an approach to teaching mathematics specifically word problem solving, is more effective than the traditional method. Students learn at their own pace and have a free self-learning style where reinforcement and practice exercises feedback are immediately provided were some of the advantages seen by the learners. In addition, the study of Aksan [21] revealed that students have positive perceptions of using MDL in mathematics amidst the COVID-19 pandemic. Students performed very satisfactorily indicating a good quality performance in mathematics. Tugano, Tria, and Tonio [22] also reported in their study that college students' level of satisfaction with modular learning during the pandemic varied from very satisfied to satisfied along the indicators covered in the study.

In this context, the researchers wanted to conduct this study to explore the experiences and determine the specific factors that explain the success and failure in mathematics learning among the learners under the modular approach. This study obtained information about the student's academic journey, their best and unpleasant experiences, emotions, hardships, dedication and commitment, and the problems they met while learning mathematics. Besides, determining students' experiences will guide the schools, teachers, parents, and other concerned individuals in gaining awareness and avoiding situations, events, people, and circumstances that lead to learners' difficulties. Also, this study is significant to give a clear insight or picture into the effectiveness of the current system of educating students in mathematics and eventually provide positive actions to address the needs of the students and the teachers.

Therefore, the study answered the following questions: i) What is the demographic profile of the math learners in terms of gender, age, and year level?; ii) What are the undergraduate students' experiences in learning mathematics using a modular approach in terms of the scales good teaching, clear outcomes, appropriate workload, appropriate assessment, generic skills, and satisfaction with the modular learning?; and iii) Is there a significant difference on the undergraduate students' experiences in learning mathematics using a modular approach when grouped according to their demographic profile?

2. RESEARCH METHOD

A descriptive-comparative research design was employed in this study. The study was descriptive because it describes the respondents in terms of their demographic profile (gender, age, and year level) and their modular experiences in learning mathematics in the new normal education. Likewise, the research was comparative for it compares the respondents' modular experiences when grouped according to their demographic profile. The study included all 55 students from the first year to third-year level enrolled in Bachelor of Secondary Education (BSED) major in Mathematics at Eastern Samar State University (ESSU)-Salcedo Campus. These respondents were exposed to the modular approach in learning their major subjects. An adapted and a modified 24-item survey questionnaire, The course experience questionnaire (CEQ) from

the Graduate Careers Council of Australia [23] was used to gather the data. Accordingly, all dimensions were reliable (values more than 0.70). Table 1 presents the internal consistency reliability of the instrument.

Table 1. Internal consistency reliability of the Instrument

Indicator	Cronbach's alpha	No. of items
Good teaching	.880	6
Clear outcomes	.780	6
Appropriate workload	.710	4
Appropriate assessment	.720	3
Generic skills	.780	4
Overall satisfaction		1

In terms of interpreting the mean score, the following rating scale was used: 1.00-1.80=strongly disagree; 1.81-2.60=disagree; 2.61-3.40=neutral; 3.41-4.20=agree; and 4.21-5.00=strongly agree. The data were analyzed using frequency, average, and percentage for the descriptive part of the study and utilized t-test and analysis of variance (ANOVA) for the inferential part since data were found to be normal. The level of significance was set to 5%.

3. RESULTS AND DISCUSSION

3.1. Demographic profile of the respondents

The descriptive analyses of the study are given in this section. It begins with the respondents' profiles in terms of gender, age, and year level. Figures 1 to 3 show the demographic characteristics of the BSED-Mathematics students. Figure 1 presents the respondents' gender. As reflected, 38 or 69.10% of the respondents were female and 17 or 30.90% were male. The result implies that the BSED-Math program of ESSU-Salcedo Campus is dominated by female students more than their male counterparts.

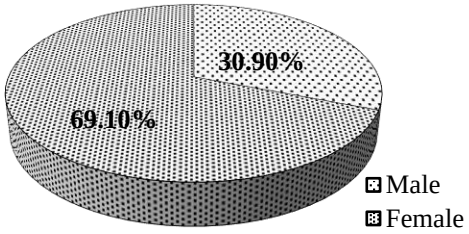

Figure 1. Gender of bachelor of secondary education-mathematics students

The age of the respondents is presented in Figure 2. It can be noted that of the 55 students, 41 or 74.55% are aged 18-21 years old, and 14 or 25.45% are aged 22-34 years old. This result implies that the program is subjugated by students who are in the late adolescent stage but at the right age of their level of education.

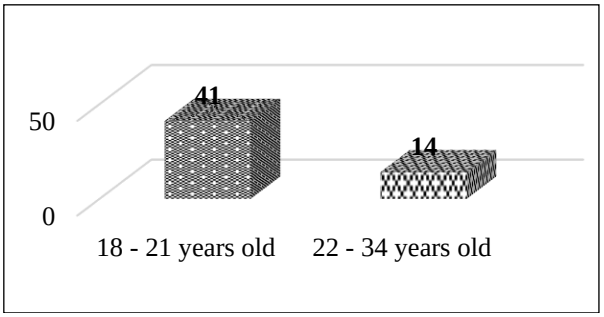

Figure 2. Age of bachelor of secondary education-mathematics students

Figure 3 shows the year level of the respondents. The graph reveals that 25 or 45.45% of the BSED-mathematics students were in their first-year level, 16 or 29.09% were in the second year, and there were 14 or 25.46% in the third year. This result implies that first-year students majorly manned the BSED-mathematics program.

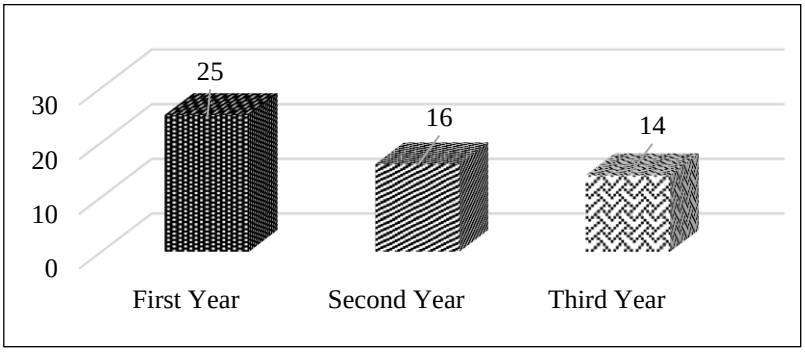

Figure 3. Year level of bachelor of secondary education-mathematics students

3.2. Modular experiences in learning mathematics

The new study looked into the modular experiences of the respondents. As presented in this section, dimensions good teaching, clear outcomes, appropriate workload and assessment, generic skills, and overall satisfaction were considered. Table 2 reflects the experiences in learning mathematics using a modular approach of the BSED-mathematics students.

Table 2. Experiences of BSED-mathematics students in learning mathematics using modular approach in the new normal education

	Statement	Mean	Interpretation
Good teaching	My professors usually give me helpful feedback on my progress	3.15	Neutral
	My professors made a real effort to understand any difficulties I had	3.47	Agree
	My professors in the modules are extremely good at explaining things	3.05	Neutral
	My professors worked hard to make the subject interesting	3.27	Neutral
	My professors put much time into comments (orally/writing) on my works	2.91	Neutral
	My professors in the modules motivated me to do my best work	3.42	Agree
	Weighted mean	3.21	Satisfactory
Clear outcomes	I had a clear idea of where I was going and what was expected	4.26	Strongly agree
	It was always easy to know the standard of assignments expected	3.43	Agree
	It was made clear right from the start what was expected from me	4.55	Strongly agree
	It was always easy to discover what was expected of me in the modules	3.42	Agree
	Weighted mean	3.92	High
Appropriate workload	There is less academic pressure on me as a student	2.80	Neutral
	The workload in the modules is not too heavy	3.26	Neutral
	I was generally given enough time to understand the things I had learned	3.82	Agree
	The volume of work in the module is not too much to understand thoroughly	3.20	Neutral
	Weighted mean	3.27	Manageable
Appropriate assessment	The tests and exams assessed what I understood and not what I memorized	3.27	Neutral
	There were fewer purely factual questions being asked	3.04	Neutral
	To do well on the modules, all you need is a good understanding	3.21	Neutral
	Weighted mean	3.17	Moderate
Generic skills	The modules helped me develop my ability to work as part of a group	3.04	Neutral
	The modules helped sharpen my analytical skills	3.16	Neutral
	By doing the modules, I feel more confident about tackling problems	2.96	Neutral
	The modules improved my communication skills	2.22	Disagree
	The modules helped me to develop the ability to plan my work	3.84	Agree
	The module developed my problem-solving skills	4.14	Agree
	Weighted mean	3.23	Average
Satisfaction with the modular learning	Overall, I am satisfied with modular learning	3.37	Satisfied

*1.00–1.80=Strongly disagree; 1.81–2.60=Disagree; 2.61–3.40=Neutral; 3.41–4.20=Agree; 4.21–5.00=Strongly agree

3.2.1. Good teaching

Table 2 reveals that in terms of good teaching, respondents rated their experience satisfactory with a weighted mean score of 3.21, indicating that best practices expected from their professors are practiced occasionally. Respondents agreed that their professors made a real effort to help them understand their math difficulties and in giving motivational comments to improve their work. However, giving feedback or comments on the works and progress of the learners, making the subject interesting, and expounding on the lessons were some of the indicators that need to be improved.

Sobaih, Hasanein, and Elnasr [24] emphasized that the coronavirus pandemic changed higher education institutions' teaching-learning process. Faculty members were not adequately prepared for the new normal setting, which dramatically affected the interaction between the teachers and students. Moreover, Coman *et al.* [25] argued that teachers did attempt to find solutions, provide support to students, and adapt their teaching style to the new teaching conditions, in which most of them were successful in overcoming the difficulties but still require improvement to fully adopt the new normal education.

3.2.2. Clear outcomes

The respondents gave their experience a mean score of 3.92 in terms of clear outcomes indicating that they understood and had a good understanding of what was expected of them in their courses. Mahajan and Singh [26] emphasized that learning outcomes of a course are essential to visibly display what the learners are to achieve at the end of the course. Likewise, it serves as the success indicator of an academic course. The course orientation given by the faculty members of ESSU-Salcedo at the beginning of the sessions, which places focus on the program objectives and learning outcomes of all the disciplines taught, is one factor that clearly demonstrates this finding and further explains it.

3.2.3. Appropriate workload

On the appropriateness of workload, the BSED-Math students yield a weighted mean score of 3.27, implying that the activities and exercises available in their modules are still manageable. The respondents agreed that they are given sufficient time to process what they learned from the module. They likewise felt neutral towards academic pressure, the volume of work, and the understanding of these works in the module completely. According to Dargo and Dirmas [18], a large number of tasks in each module is one of the significant problems arising from modular distance learning. Aristovnik *et al.* [27] highlighted that higher work prevents students from seeing their improved performance in a new teaching environment. Therefore, educational institutions should consider this problem, reduce the activities, and take out unnecessary topics to attain mastery as much as possible. In the case of ESSU-Salcedo, the practice of the faculty members deviates from the findings where faculty members usually give only enough activities for every chapter but cover the essential learning outcomes. Similarly, the deadlines for submission of outputs are set before the midterm or final examination. Students are given enough time to work on their tasks without pressure.

3.2.4. Appropriate assessment

As indicated in Table 2, the computed weighted mean for the appropriateness of assessment is 3.17, which means that assessment focuses more on high-quality learning processes rather than remembering factual information. Murniarti, Sirait, and Sihotang [28] emphasized that implementing higher order thinking skill (HOTS)-based learning and problem-solving learning during epidemic has become more important in teaching and is no longer focused on teachers on students. The teacher is integral to using HOTS-focused learning to invite students to think creatively and critically. Kusuma *et al.* [29] state that measuring high-level thinking skills indicators includes analysis, evaluation, and construction which requires the ability to remember, and other advanced skills that include the ability to analyze, evaluate, and create.

3.2.5. Generic skills

Respondents' experiences in improving their general skills are also included in the table. A weighted mean score of 3.23 was recorded, indicating that respondents increase their abilities and traits on an average level when utilizing the modules. The students were able to develop their problem-solving skills and ability to plan for their work. However, the communication skills of the respondents failed to be honed. Dejene and Chen [17] emphasized that a modular approach to education allows students to take charge of their learning and assume greater responsibility. It necessitates a higher level of maturity on the side of the student. Furthermore, Ambayon [30] stated that utilizing modules to teach language and mathematics, as opposed to the conventional technique of using textbooks, is intended to promote students' active learning, critical thinking, and problem-solving abilities.

3.2.6. Satisfaction with the modular learning

In general, despite having limitations in the implementation of modular distance learning, the respondents were still satisfied 3.37 with the modular approach to studying mathematics. Thus, respondents viewed modular learning as an effective tool in mathematics learning. This result concurred with Tugano, Tria, and Tonio [22] that students' level of satisfactions varies in the different indicators covered by the study but still satisfied with the modular learning.

3.3. Difference between the respondents' profile variables and their modular experiences in learning mathematics

The study also looked into the difference between students' profile and their modular experiences in learning mathematics. The results are reflected in the succeeding tables. The data in Table 3 reflects that female students were more satisfied than male students as reflected by the mean scores. However, the overall satisfaction with modular learning in mathematics showed no significant difference p=.059. Moreover, the data found no significant differences in the respondents' modular experiences across gender in terms of good teaching p=.374, clear outcomes p=.505, appropriate workload p=.445, and appropriate assessment p=.523, and generic skills p=.747.

Capinding [14] emphasized that modules distributed amidst the pandemic did not fully cater to the learning needs of both the male and female students. Modules had a stronger positive impact on female students, but a more negative effect on male students because females are more eager to learn mathematics than males. In support, Adamma, Ekwutosim, and Unamba [31] highlighted that the female group is more intrinsically motivated than their counterparts. Furthermore, male students were less satisfied with their academic work during the COVID-19 pandemic [27].

Table 3. Difference between gender and modular experiences in learning mathematics

Scales of modular experiences in learning math	Gender	Mean	t-value	p-value
Good teaching	Male	3.27	.901	.374
	Female	3.14		
Clear outcomes	Male	3.99	.674	.505
	Female	3.85		
Appropriate workload	Male	3.19	.773	.445
	Female	3.35		
Appropriate assessment	Male	3.10	.645	.523
	Female	3.24		
Generic skills	Male	3.27	.326	.747
	Female	3.18		
Satisfaction with the modular learning	Male	3.22	1.995	.059
	Female	3.52		

Table 4 demonstrates no significant difference in respondents' satisfaction with modular learning across their age groups p=.320. But it can be noted that younger students felt a higher level of satisfaction in the modular approach to learning mathematics compared to the older ones. The analysis likewise revealed no significant differences in the respondents' modular experiences across their ages in terms of good teaching p=.525, clear outcomes p=.532, appropriate workload p=.059, and appropriate assessment p=.420, and generic skills (p=.088).

Table 4. Difference between age and modular experiences in learning mathematics

Scales of modular experiences in learning math	Age	Mean	t-value	p-value
Good teaching	18–21 years old	3.29	.642	.525
	22–34 years old	3.13		
Clear outcomes	18–21 years old	4.01	.631	.532
	22–34 years old	3.83		
Appropriate workload	18–21 years old	3.52	1.955	.059
	22–34 years old	3.02		
Appropriate assessment	18–21 years old	3.27	.817	.420
	22–34 years old	3.07		
Generic skills	18–21 years old	3.49	1.758	.088
	22–34 years old	2.97		
Satisfaction with the modular learning	18–21 years old	3.50	1.010	.320
	22–34 years old	3.23		

Kamarianos *et al.* [32] highlighted that during a crisis, younger students had a little difficulty adapting to a new approach to learning than the older students. Hence, older students find it harder to learn mathematics during the pandemic. In addition, intrinsic motivation is higher in younger college students than in older students [33] so they are much more interested to learn. In support, Capinding [14] found that the pandemic greatly affected the older students' interest and attitude toward learning mathematics more than the younger students.

The data in Table 5 shows a significant difference between the respondents' satisfaction with modular learning when grouped according to their year level p=.007 indicating that students in the lower year level were more satisfied than those in the higher year level. The study also found a significant difference between good teaching p=.003, clear outcomes p=.000, appropriate workload p=.000, appropriate assessment p=.026, and generic skills p=.000 which led to the rejection of the null hypothesis. These findings conform with the study of Tugano, Tria, and Tonio [22] where they found that the level of satisfaction of students towards the modular approach of learning is significantly different across year levels. Students in lower year classes had a higher level of positive emotions and were more eager to study compared to higher year level students [34]. However, the current finding is in contrast with the study of several researchers [35], [36] where they found no significant difference in the level of satisfaction across the college student's year level.

Table 5. Difference between year level and modular experiences in learning mathematics

Profile	Scales of modular experiences in learning math	Mean	Sum of squares	df	Mean square	F	Sig.
Year level	Good teaching	Between groups	3.335	2	1.668	6.604	.003
		Within groups	13.132	52	.253		
		Total	16.468	54			
	Clear outcomes	Between groups	5.303	2	2.651	11.661	.000
		Within groups	11.823	52	.227		
		Total	17.125	54			
	Appropriate workload	Between groups	7.824	2	3.912	20.527	.000
		Within groups	9.910	52	.191		
		Total	17.734	54			
	Appropriate assessment	Between groups	1.866	2	.933	3.912	.026
		Within groups	12.404	52	.239		
		Total	14.271	54			
	Generic skills	Between groups	10.401	2	5.201	24.190	.000
		Within groups	11.179	52	.215		
		Total	21.581	54			
	Satisfaction with modular learning	Between groups	2.640	2	1.320	5.465	.007
		Within groups	12.560	52	.242		
		Total	15.200	54			

4. CONCLUSION

The researchers conclude that students were satisfied with the modular approach to learning mathematics. It helps them to answer their learning needs during this new normal education. However, to make modular learning more effective, it is recommended that faculty members attend intensive seminars, training, and workshops on the current trends of math teaching and module development to fully prepare them for the new normal education. To increase students' satisfaction, particularly at the higher year level, teachers should improve the modules' quality and consider the workload, assessment, outcomes, and development of skills in preparing the modules. Teachers also should always be open to communication and feedback so that students are directed in their performance. Likewise, it is recommended that teachers not just rely on modules to teach the topic, mainly because mathematics is often seen as time-consuming and challenging. Online classes may be used as a complement. Lastly, the students should reach out to their professors or peers to better understand mathematics.

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REFERENCES

[1] M. Škare, D. R. Soriano, and M. Porada-Rochoń, "Impact of COVID-19 on the travel and tourism industry," *Technological Forecasting and Social Change*, vol. 163, p. 120469, Feb. 2021, doi: 10.1016/j.techfore.2020.120469.

[2] J. M. Barrios and Y. V. Hochberg, "Risk Perception Through the Lens of Politics in the Time of the COVID-19 Pandemic," University of Chicago, Becker Friedman Institute for Economics Working Paper No. 2020-32, Apr. 2020. doi: 10.2139/ssrn.3568766.

[3] R. Habibi *et al.*, "Do not violate the international health regulations during the COVID-19 outbreak," *The Lancet*, vol. 395, no. 10225, pp. 664–666, Feb. 2020, doi: 10.1016/S0140-6736(20)30373-1.

[4] N. Fernandes, "Economic effects of coronavirus outbreak (COVID-19) on the world economy," *SSRN Electronic Journal*, 2020, doi: 10.2139/ssrn.3557504.

[5] E. M. Onyema *et al.*, "Impact of Coronavirus Pandemic on Education," *Journal of Education and Practice*, vol. 11, no. 13, pp. 108–121, May 2020, doi: 10.7176/jep/11-13-12.

[6] K. A. Godber and D. R. Atkins, "COVID-19 Impacts on Teaching and Learning: A Collaborative Autoethnography by Two Higher Education Lecturers," *Frontiers in Education*, vol. 6, Jul. 2021, doi: 10.3389/feduc.2021.647524.

[7] X. Bonal and S. González, "The impact of lockdown on the learning gap: family and school divisions in times of crisis," *International Review of Education*, vol. 66, no. 5–6, pp. 635–655, Dec. 2020, doi: 10.1007/s11159-020-09860-z.

[8] R. Rasmitadila *et al*., "The Perceptions of Primary School Teachers of Online Learning during the COVID-19 Pandemic Period: A Case Study in Indonesia," *Journal of Ethnic and Cultural Studies*, vol. 7, no. 2, pp. 90–109, Jul. 2020, doi: 10.29333/ejecs/388.

[9] S. Bhamani, A. Z. Makhdoom, V. Bharuchi, N. Ali, S. Kaleem, and D. Ahmed, "Home learning in times of COVID: experiences of parents," *Journal of Education and Educational Development*, vol. 7, no. 1, p. 9, Jul. 2020, doi: 10.22555/joeed.v7i1.3260.

[10] L. M. L. Lorente, A. A. Arrabal, and C. Pulido-Montes, "The right to education and ICT during covid-19: An international perspective," *Sustainability (Switzerland)*, vol. 12, no. 21, pp. 1–17, 2020, doi: 10.3390/su12219091.

[11] N. Haug *et al.*, "Ranking the effectiveness of worldwide COVID-19 government interventions," *Nature Human Behaviour*, vol. 4, no. 12, pp. 1303–1312, Nov. 2020, doi: 10.1038/s41562-020-01009-0.

[12] S. Hammerstein, C. Konig, T. Dreisorner, and A. Frey, "Effects of COVID-19-Related School Closures on Student Achievement-A Systematic Review," *Frontiers in Psychology*, vol. 12, Sep. 2021, doi: 10.3389/fpsyg.2021.746289.

[13] W. Bao, "COVID-19 and online teaching in higher education: A case study of Peking University," *Human Behavior and Emerging Technologies*, vol. 2, no. 2, pp. 113–115, Apr. 2020, doi: 10.1002/hbe2.191.

[14] A. T. Capinding, "Impact of modular distance learning on high school students mathematics Motivation, Interest/attitude, Anxiety and Achievement during the COVID-19 Pandemic," *European Journal of Educational Research*, vol. 11, no. 2, pp. 917–934, Apr. 2022, doi: 10.12973/eu-jer.11.2.917.

[15] M. Theresa and B. Nardo, "Modular instruction enhances learner autonomy," *American Journal of Educational Research*, vol. 5, no. 10, pp. 1024–1034, 2017, doi: 10.12691/education-5-10-3.

[16] E. Bustillo and M. Aguilos, "The challenges of modular learning in the wake of COVID-19: A digital divide in the Philippine countryside revealed," *Education Sciences*, vol. 12, no. 7, pp. 1–16, 2022, doi: 10.3390/educsci12070449.

[17] W. Dejene and D. Chen, "The practice of modularized curriculum in higher education institution: Active learning and continuous assessment in focus," *Cogent Education*, vol. 6, no. 1, Jan. 2019, doi: 10.1080/2331186X.2019.1611052.

[18] J. M. Dargo and M. Dimas, "Modular distance learning: Its effect in the academic performance of learners in the new normal," *JETL (Journal of Education, Teaching and Learning)*, vol. 6, no. 2, p. 204, 2021, doi: 10.26737/jetl.v6i2.2672.

[19] A. Salamuddin, "Comparative Analysis Of Students' Perceptions In Modular Distance Learning Approach Versus Face-To-Face Learning Approach Of Mindanao State University –Sulu," *Open Access Indonesia Journal of Social Sciences*, vol. 4, no. 2, pp. 331–344, Jun. 2021, doi: 10.37275/oaijss.v4i2.57.

[20] J. A. Lim, "Effectiveness of modular instruction in Word problem solving of BEED students," *IOSR Journal of Mathematics*, vol. 12, no. 5, pp. 59–65, 2016, doi: 10.9790/5728-1205075965.

[21] J. A. Aksan, "Effect Of modular distance learning approach To Academic performance in mathematics of students in Mindanao State University-Sulu Senior High School Amidst Covid-19 Pandemic," *Open Access Indonesia Journal of Social Sciences*, vol. 4, no. 2, pp. 407–430, Jun. 2021, doi: 10.37275/oaijss.v4i2.64.

[22] M. S. Tugano, J. Z. Tria, and J. Z. Tonio, "Modular learning amidst COVID-19 pandemic: Satisfaction among students in a higher education institution," *International Journal of Professional Development, Learners and Learning*, vol. 4, no. 2, p. ep2206, 2022, doi: 10.30935/ijpdll/12075.

[23] J. Ainley, "The course experience questionnaire," A report prepared for the Graduate Careers Council of Australia, Graduate Careers Council of Australia, 2000. [Online]. Available: https://www.nagcas.org.au/documents/item/488.

[24] A. E. E. Sobaih, A. M. Hasanein, and A. E. A. Elnasr, "Responses to COVID-19 in higher education: Social media usage for sustaining formal academic communication in developing countries," *Sustainability (Switzerland)*, vol. 12, no. 16, p. 6520, Aug. 2020, doi: 10.3390/su12166520.

[25] C. Coman, L. G. Țîru, L. Meseșan-Schmitz, C. Stanciu, and M. C. Bularca, "Online teaching and learning in higher education during the coronavirus pandemic: Students' perspective," *Sustainability (Switzerland)*, vol. 12, no. 24, pp. 1–22, Dec. 2020, doi: 10.3390/su122410367.

[26] M. Mahajan and M. K. S. Singh, "Importance and benefits of learning outcomes," *IOSR Journal of Humanities and Social Science*, vol. 22, no. 03, pp. 65–67, Mar. 2017, doi: 10.9790/0837-2203056567.

[27] A. Aristovnik, D. Keržič, D. Ravšelj, N. Tomaževič, and L. Umek, "Impacts of the COVID-19 pandemic on life of higher education students: A global perspective," *Sustainability (Switzerland)*, vol. 12, no. 20, pp. 1–34, Oct. 2020, doi: 10.3390/su12208438.

[28] E. Murniarti, S. Sirait, and H. Sihotang, "Implementation of HOTS-based learning and problem based learning during the pandemic of Covid-19 in SMA Budi Mulia Jakarta," *Advances in Social Sciences Research Journal*, vol. 8, no. 2, pp. 296–305, Feb. 2021, doi: 10.14738/assrj.82.9727.

[29] M. D. Kusuma, U. Rosidin, A. Abdurrahman, and A. Suyatna, "The development of higher order thinking skill (HOTS) instrument assessment in physics study," *IOSR Journal of Research & Method in Education (IOSRJRME)*, vol. 07, no. 01, pp. 26–32, Jan. 2017, doi: 10.9790/7388-0701052632.

[30] C. M. Ambayon, "Modular-based approach and students' achievement in literature," *International Journal of Education and Literacy Studies*, vol. 8, no. 3, p. 32, 2020, doi: 10.7575/aiac.ijels.v.8n.3p.32.

[31] O. N. Adamma, O. P. Ekwutosim, and E. C. Unamba, "Influence of extrinsic and intrinsic motivation on pupils academic performance in mathematics," *SJME (Supremum Journal of Mathematics Education)*, vol. 2, no. 2, pp. 52–59, Jul. 2018, doi: 10.35706/sjme.v2i2.1322.

[32] I. Kamarianos, A. Adamopoulou, H. Lambropoulos, and G. Stamelos, "Towards an understanding of university students' response in times of pandemic crisis (Covid-19)," *European Journal of Education Studies*, vol. 7, no. 7, Jun. 2020, doi: 10.46827/ejes.v7i7.3149.
[33] M. Próspero, A. C. Russell, and S. Vohra-Gupta, "Effects of motivation on educational attainment: Ethnic and developmental differences among first-generation students," *Journal of Hispanic Higher Education*, vol. 11, no. 1, pp. 100–119, Jan. 2012, doi: 10.1177/1538192711435556.
[34] V. W. Vongkulluksn, A. M. Matewos, G. M. Sinatra, and J. A. Marsh, "Motivational factors in makerspaces: a mixed methods study of elementary school students' situational interest, self-efficacy, and achievement emotions," *International Journal of STEM Education*, vol. 5, no. 1, p. 43, Dec. 2018, doi: 10.1186/s40594-018-0129-0.
[35] R. O. Abu Hantash, M. Abu Younis, and M. Assaf, "Online learning satisfaction and acceptance among Al-Quds university dental students," *Creative Education*, vol. 11, no. 10, pp. 2002–2013, 2020, doi: 10.4236/ce.2020.1110146.
[36] A. Sulaiman and A. Dashti, "Students' satisfaction and factors in using mobile learning among college students in Kuwait," *Eurasia Journal of Mathematics, Science and Technology Education*, vol. 14, no. 7, pp. 3181–3189, May 2018, doi: 10.29333/ejmste/91669.

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