

Research Article

Students' Perspective on Instructional Module in Astronomy amidst Pandemic

Jonathan Lord R. Aquino

College of Education, Isabela State University, Cauayan City, Philippines
Email: jonathanlord.r.aquino@isu.edu.ph

Received: June 8, 2022

Accepted: June 19, 2022

Published: June 25, 2022

Abstract: As the COVID-19 Pandemic runs its course, the higher education institutions scrambling to adapt curricula to distance modalities. As an emergency response, students were provided learning modules based on the course syllabus learning competencies in Astronomy. This research study determine the students' perceptions and experiences on the instructional Module in Astronomy. As such, 34 third year Bachelor of Secondary Education major in Science were sampled. The study employed the survey research design. Specifically, the mean was used to present the data gathered from respondents. The study reveals the perceptions of students for instructional module as it provides them much freedom to connect with their teachers, fellow students and engage with their study materials at the comfort and flexibility of space and time. Therefore, necessary measures should be adopted for improving the quality of the instructional module for better learning of students during the phase of Covid-19 pandemic. This study recommends the topics must be simplified, and teachers must give more examples. Moreover, all the printed pictures in the modules should be clear and the Instructional Material Development Unit (IMDU), subject specialist, and faculty should re-evaluate the modules, and they must make sure that all the lessons or activities are appropriate to the needs of the students.

Keywords: Students' Perspective, Instructional Module, Astronomy, Pandemic.

Introduction

The coronavirus pandemic has generated changes in the teaching-learning process in higher education institutions and has influenced the interaction between teachers and students. As a consequence of the pandemic, universities were constrained to carrying out their activity with students exclusively online [1]. In this regard, many governments took measures in order to avoid spreading the virus and to ensure the continuity of the educational process, and universities worldwide adopted online learning [2].

With the coronavirus spreading rapidly across Asia, Europe, the Middle East, and the United States, countries have taken swift and decisive actions to mitigate the development of a full-blown pandemic. In the past two weeks, there have been multiple announcements suspending attendance at schools and universities. As of March 13, the OECD estimated that over 421 million children are affected due to school closures announced or implemented in 39 countries. In addition, another 22 countries have announced partial "localized" closures [3].

The Covid-19 pandemic brought interruption in all sectors of the society causing a chain reaction of economic and psycho-social impacts affecting every Filipino citizens. For the Philippine higher education sector, the learning environment has been severely disrupted campuses were closed and face-to-face classes were suspended to protect the health and safety of students. But despite these

interruptions, CHED ensured the continuity of learning by enjoining higher education institutions (HEIs) to implement flexible learning modalities. [4].

The CHED Memo Order have led millions of students into temporary ‘home-schooling’ situations, especially in some of the most heavily impacted our country. These changes have certainly caused a degree of inconvenience, but they have also prompted new examples of educational innovation. Although it is too early to judge how reactions to COVID-19 will affect education systems around the world, there are signs suggesting that it could have a lasting impact on the trajectory of learning innovation and digitization [5].

Most schools in affected areas are finding stop-gap solutions to continue teaching, but the quality of learning is heavily dependent on the level and quality of digital access. After all, only around 60% of the globe’s population is online. Moreover, the less affluent and digitally savvy individual families are, the further their students are left behind. When classes transition online, these children lose out because of the cost of digital devices, data plans and poor signals [3].

Pursuant to the CMO No. 08 series of 2021, the Isabela State University implemented the Flexible Teaching and Learning Modalities (FTLM) which brings to our students to experience a combination of online and offline learning. Flexible Teaching and Learning Modalities (FTLM) should be the norm of our teaching minimizing in-campus presence of students and face-to-face learning.

The faculty is setting up their Group Chat, Video Conference via zoom, Google Meet, Microsoft meeting, and Learning Management System platforms such Edmodo, Google Classroom, Moodle, etc. as needed and necessary. The faculty set initial meeting (video conferences) with their students based on their synchronized schedules issued by the Registrar or any convenient LMS platforms, to discuss with them the following: a) contents of the syllabus, course guide, policies and guidelines to be followed both online and offline classes, b) requirements and grading system, c) how and where to pick up assignments and drop off location for the submission of outputs, and d) affix signature in the distribution list found in the designated drop off point [6].

Flexible Learning is a combination of both online and offline learning methodologies with the use of technology. Synchronous or online is when the students study with their teacher and classmates through an application that uses a webcam while asynchronous or offline is when the teacher provides the students with the lesson, seatwork or assignment in the module that they can finish at their own pace, within the deadline. All works are submitted and graded via online [7].

Based on the study conducted by Ambayon [8], modular instruction is more operative in the teaching-learning method as equated to usual teaching approaches because in this modular approach the students learn in their own stride. It is unrestricted self-learning panache in which instantaneous reinforcement, a comment is provided to practice exercise, which stimulates the students and builds curiosity in them. Hence, this kind of learning modality increases the student-centered approach in learning. However, the implementation of modular instruction fostered various challenges to teachers, students, and parents [8].

The study of Dangle and Sumaoang [9] showed that the main challenges that emerged were lack of school funding in the production and delivery of modules, students struggle with self-studying, and parents’ lack of knowledge to academically guide their child/children. Hence, it is evident that there are struggles associated with the use of modular distance learning [9].

It includes the use of instructional modules among students. According to Carrillo and Flores, [10], learning modules is beneficial because it provides continuity of learning and that the students are safe at home. After all, they need not attend school for a face-to-face discussion with their respective professors [10].

With the present educational situation, there is a need to shift to a flexible learning modality. The university imposed the use of module to students most especially to students reside at far-flung areas with poor signals. The students can pick up the module from the designated drop off point like in the guard house.

The research study sought to determine students' perceptions and experiences on the instructional Module in SEd Sci 327 Astronomy during the COVID-19 pandemic at Isabela State University, Cauayan City, Isabela for the Midyear 2021. In addition, the purposes of the research study are:

- (1) To assess the experiences of third year Bachelor of Secondary Education Major in Science students amidst the COVID-19 pandemic and
- (2) To determine the perception of third year Bachelor of Secondary Education Major in Science students of Isabela State University, Cauayan City, Isabela on the use of Instructional Module.

Methodology

a) Research Design

The study employed the survey research design. A survey refers to the collection of information from a sample of respondents through their responses to a set of questions [11]. In addition, this type of research allows a variety of methods to recruit participants, collect data, and instrumentation. Survey research used quantitative research strategies.

b) Sampling Procedure

The respondents of the study were the third year Bachelor of Secondary Education major in Science students of College of Education (CEd) who were currently enrolled in SEd Scie 327 Astronomy Midyear 2021 at Isabela State University, Cauayan City, Isabela.

c) Methods of Data Collection

A questionnaire on the perception of students on modular learning was adopted for the research study to determine the experiences and perception of third year Bachelor of Secondary Education major in Science of College of Education at Isabela State University, Cauayan City, Isabela. Each item of the domains was rated in 5-point Likert scale: (1) Mostly disagree; (2) Definitely disagree; (3) Neither agree or disagree; (4) Definitely Agree; and (5) Mostly Agree.

Rating Scale	Descriptive Rating
4.21 – 5.00	Mostly Agree
3.41 – 4.20	Definitely Agree
2.61 – 3.40	Neither agree or disagree
1.81 – 2.60	Definitely disagree
1.00 – 1.80	Mostly disagree

d) Methods of Data Analysis

The data were exported into the Statistical Package for the Social Sciences (SPSS), which was used for data manipulation and analysis. The data were checked for accuracy. Descriptive statistics were used to organize and summarize the data. Specifically, the mean was used to present the data gathered from respondents [12].

Results and Discussion

Table 1 presents the mean results of the third year Bachelor of Secondary Education major in Science students to Instructional Module in Astronomy used by the researcher/instructor during the COVID-19 pandemic.

In the table, it seems that statement 19 (The learning materials provided in the module were helpful) obtained the highest mean score of 4.50 (Mostly Agree). This implies that modular approach helps to

maximize the chances of student involvement in classroom in respect to accomplish the given tasks at the spot. According to the research of Ambayon [8] that the modular teaching is more operational approach in order to teach university students. Modular approach is an inimitable way of teaching so the teachers should be provided adequate training about how to strategize and implement a module in classroom setting [8].

Table 1. Experiences of Students to Modular Learning (n = 34)

Social Media Use	Mean	Descriptive Rating
1) The way the module materials were presented helped to maintain my interest.	4.09	Definitely Agree
2) The study workload on this module fitted with my circumstances.	3.94	Definitely Agree
3) Resources I accessed through the library, internet or journals, books, help me to understand the core concepts of the module.	4.41	Mostly Agree
4) Collaborate with a classmate on an online document, using Google docs or something similar.	4.15	Definitely Agree
5) I was satisfied with the opportunities I had to attend online tutorials (either face- to-face or online).	4.15	Definitely Agree
6) Sufficient opportunities were provided to check my understanding of the module for example.	4.18	Definitely Agree
7) The instructions on how to complete the assessed task were easy to follow.	4.15	Definitely Agree
8) It was obvious how the module materials related to the assessed task on the module.	4.18	Definitely Agree
9) There was enough time in the study planner to prepare for the end-of- module assessment.	4.06	Definitely Agree
10) Contact my teacher at the start of the module helped me get started with my studies.	4.03	Definitely Agree
11) I could get in touch with my teacher when necessary.	4.00	Definitely Agree
12) I was satisfied with the support provided by my teacher on this modular learning.	4.38	Mostly Agree
13) My teacher encourages me in my studies.	4.47	Mostly Agree
14) My teacher used a friendly/ personal tone in feedback on my assessed task.	4.18	Definitely Agree
15) My teacher's feedback on my assessed task explained the mark that I received.	4.18	Definitely Agree
16) My teacher's feedback on my assessed task helped me prepare for the next assessment.	4.12	Definitely Agree
17) My teacher's feedback on the assessed task helped me to learn.	4.15	Definitely Agree
18) The aims and learning outcomes of the module were made clear.	4.44	Mostly Agree
19) The learning materials provided in the module were helpful.	4.50	Mostly Agree
20) The module was intellectually stimulating and stretched me.	4.26	Mostly Agree
21) Overall, I am satisfied with the quality of the module.	4.24	Mostly Agree
Grand Mean	4.20	Definitely Agree

Likewise, statement 13 (My teacher encourages me in my studies) ranked the second highest with the mean of 4.47 described as mostly agree. This finding implies that students look to teachers for

approval and positive reinforcement, and are more likely to be enthusiastic about learning if they feel their work is recognized and valued. Teacher should encourage open communication and free thinking with students to make them feel important. Be enthusiastic. Praise your students often. Recognize them for their contributions. If your classroom is a friendly place where students feel heard and respected, they will be more eager to learn. Same as through with the study of Alawamleh [13] that instructors should encourage students to participate and study more by providing incentives, at the end of the day every student wants to gain good grades and without the motivation for it is hard to achieve, this can be fulfilled by giving extra marks through short quizzes [13].

Furthermore, statement 3 (The aims and learning outcomes of the module were made clear) was rated third with a mean of 4.44 described as definitely agree. This implies that the use of modules encourages independent study. Students engage themselves in learning the concepts presented in the module with corresponding parts such as the title, learning objectives, introduction, concepts, teaching and learning activities, assessment task and references that will help the learners to easily well understood in the absence of the instructors. They develop a sense of responsibility in accomplishing the tasks provided in the module. A module is a set of learning opportunities organized around a well-defined topic which contains the elements of ordinate dictation, categorical objectives, edifying cognition activities, and evaluation utilizing criterion-referenced measures [14]. Overall, the grand mean is 4.20 with a descriptive meaning of definitely agree. This implies that the respondents have positive views on the use of instructional module in astronomy. According to Amir *et al.*, [15] he discovered that students are satisfied with the learning modules they are accomplishing so long as there is discipline and understanding of the need to pursue learning [15].

Table 2. Things That Students Like Most About the Module (n = 34)

Indicators	Frequency	Percentage
1) Help me increase my knowledge.	30	88.24
2) Can spend more time answering the module, and you have a lot of time to make a review.	18	52.94
3) Modules help me to widen my understanding and vocabulary and also helps me to become a more creative and productive individual.	25	73.53
4) Modules help me to improve my understanding and skills and also helps to gather new knowledge.	27	79.41
5) It helps me to learn a lot of things that new to me and it helps me to improve my knowledge.	26	76.47
6) Recall my understanding from the past and help me to understand words.	20	58.82
7) It saves time and money.	24	70.58
8) I don't need to go to school every day. It saves my time. But seriously, I don't understand the lessons, without the help of my teacher.	10	29.41
9) Interesting and creative.	20	58.82
10) It enhances my critical thinking skills and widened my understanding.	24	70.59
11) Time-friendly and instructions were clearly stated.	28	82.35

Table 2 presents the things that students like most about the module among the third year Bachelor of Secondary Education major in Science students of Isabela State University Cauayan campus. As gleaned from the table above that statement number 1 (Help me increase my knowledge) obtained the highest frequency of 30 (88.24%). This denotes that the students consider the modules to be able to assist in increasing their knowledge, thus they participate and get involved to pursue their learning needs. Although the COVID-19 pandemic has greatly affected teaching and learning, this did not

deter the students to continue and that they continue to learn regardless of the modality or strategy of teaching and learning introduced by the professors. Furthermore, statement number 11 (Time-friendly and instructions were clearly stated) obtained the second-highest frequency (28 or 82.35%). This implies that one of the benefits of using modules for instruction is the acquisition of better self-study or learning skills among students and the benefits of modules as a way to provide them the needed learning outcomes. Likewise, statement number 3 (Modules help me to improve my understanding and skills and also helps to gather new knowledge) was rated third overall (27 or 79.41%). This finding suggests that it's important to have clear, achievable goals or outcomes for your module. We would usually call these aims learning outcomes or objectives. Learning outcomes are statements of what skills, knowledge, or learning a student will have once they have completed the module. According to the Madrazo and Dio [16] in learning modules can also clarify, vitalize, emphasize the instruction, and enhance learning in the process of transmitting knowledge, ideas, skills, and attitude among learners [16].

Table 3. Priorities for the Improvement of the Module (n = 34)

Indicators	Frequency	Percentage
1) More drawings to be included in the modules to aid in understanding.	13	38.24
2) Some examples in every activity to quickly understand and to do.	10	29.41
3) Have a lot of examples like on the problem and use a simple word.	12	35.29
4) Images should be printed legibly.	15	44.12
5) It helps me to learn a lot of things that new to me and it helps me to improve my knowledge.	5	14.71
6) The topic or some activities should be connected with the student capacities.	7	20.59
7) The font of the text should bigger for those who have blurred eyesight.	4	11.76
8) Use simple and easy to understand words, and provide a lot of examples in discussion to understand them easily.	2	5.88
9) Conciseness of information.	1	2.94
10) We need teachers to explain the lessons more than modules.	4	11.76
11) Give more concrete examples and provide more sources of information.	8	23.53

Table 3 highlights the list of priorities for the improvement of the instructional module in Astronomy that third year Bachelor of Secondary Education major in Science students identified. Priority number 4 is the “images should be printed legibly” is the top priority in the module. Aside from the images in the modules, drawings can be an important feature of the modules that allows clear understanding from the students. According to Bukoye [17] that instructional materials included white board, pictures, images, maps, newspapers, audio-visual materials, tape recordings, computers, mathematics kits and science kits. It was also shown that the private owned schools also made effective utilization of the available instructional materials for teaching and learning effectiveness and for the enhancement of educational objectives [17]. Moreover, priority number 2 is that “more drawings to be included in the modules to aid in understanding” in the modules so that they will understand more. According to Wang *et al.*, [18] that by drawing on many different materials, this teacher could choose the lessons and texts that students would find most engaging and appropriately challenging [18]. Furthermore, priority number 3 is that “have a lot of examples like on the problem and use a simple word” including modules can be understood well if it is written in simple terms so as not to cause any misunderstanding among students. This is a clear example of feedback from the students, the need for the use of clear words for better understanding. Modules should be written for

the readers, thus, if it is written in simple terms or words, there is a better chance that learning and comprehension will occur. In teaching, giving examples is the key to learning. This is a fact in all subject matters especially if the topic is very abstract. In higher education, students get confused sometimes, therefore, it is very essential, that college professors provide their students' clear examples in their modules for better understanding. Data from Kaufman and Berglund [19] suggest that teachers' use of materials might be related to their perceptions of the extent to which the material is engaging and appropriately challenging for students and usable for teachers [19].

Conclusions

In the light of results drawn from statistical analysis and findings of the research following conclusions can be drawn.

- 1) The present study analyses the perception of university students towards instructional module amid the COVID-19 pandemic. The study reveals the perceptions of students for instructional module as it provides them much freedom to connect with their teachers, fellow students and engage with their study materials at the comfort and flexibility of space and time. The easy access of study resources is found to be one of the major reasons for the students to opt for online learning.
- 2) The study indicates that instructional module in Astronomy enables easy information access leading to positive attitude formation of students towards it. This finding is based on usefulness, self-efficacy, ease of use, and the behavior of students as regards online learning.
- 3) Furthermore, in the absence of face-to-face interaction, the modular instruction has also been well accepted by the students for the purpose of learning. Therefore, necessary measures should be adopted for improving the quality of the instructional module like Images should be printed clear, more examples in every activity, and use simple words to easily understand and help with better learning of students during the phase of Covid-19 pandemic.

Recommendation

In the light of above conclusions, following recommendations are made

- 1) The university must consider teaching integrating modules into their courses utilizing for the social media to a better impact among college students.
- 2) Instructors must continue to utilize motivation, inspiration, and encouragement to all college students to realize their dreams.
- 3) Modular approach is a unique way of teaching so the teachers should be provided enough training about how to design and implement a module in classroom setting.
- 4) The university should give autonomy and freedom to faculty to do their own modules. However, the modules must be validated for the quality assurance and the progress will be monitored.
- 5) The Instructional Material Development Unit (IMDU), subject specialist, and faculty should re-evaluate the modules, and they must make sure that all the lessons or activities are appropriate to the needs of the students.
- 6) The topics must be simplified, and teachers must give more examples. Moreover, all the printed pictures in the modules should be clear.

Conflicts of interest: The authors declare no conflicts of interest.

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Citation: Jonathan Lord R. Aquino. 2022. Students' Perspective on Instructional Module in Astronomy amidst Pandemic. *International Journal of Recent Innovations in Academic Research*, 6(6): 50-58.

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