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Short Paper

The Effectiveness of Flipped Classrooms in Distance Education During the Covid-19 Pandemic

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Abstract

Purpose - COVID-19 brought a significant impact on Philippine Higher Education Institutions, the majority of the HEIs were compelled to switch over to remote education. This study aims to investigate the effectiveness of flipped classroom instruction in remote education.

Method - The study utilized two sets of validated questionnaires which contained numerical survey and open-ended survey responses adopting mixed-method from 122 students out of 166 who completed a course in a flipped classroom in a remote learning environment for a semester. The quantitative responses were analyzed using descriptive statistics and the qualitative responses was examined using a qualitative data analysis software.

Results - The research revealed that clear instructional design and distinct pedagogical strategies are substantial in online flipped classroom instruction. It also revealed that students believed that it improved their learning performance, provided flexible learning, and fostered high self-efficacy, which gathered a significant level of agreement. In addition, the study shows that the implications of creating video lectures have been beneficial during asynchronous and synchronous interactions. On the other hand, significant challenges, such as Internet accessibility and digital resources, a heavy reliance on student motivation, and the promotion of a careless learning environment were revealed.

Conclusion - The research revealed that students are generally satisfied with flipped classes in distant environments and student learning improved because of easy access to resources for self-paced learning.

Recommendations – Flip classroom instruction is an effective pedagogical approach in remote learning environments from a group to an individual learning space. A significant level of instructor involvement is required in course planning, preparation, and classroom management. It is significant to maintain constant communication with the students and keep track of their progress and prevent a careless learning environment.

Research Implications – Due to the Covid-19 pandemic, there was a significant shift towards digitalization, including the realm of education. Online classes and distance learning ceased to be mere trends and became a reality that everyone had to adapt to. However, the pandemic highlighted a deeper need beyond the use of technological devices. It underscored the importance of nurturing individuals who are emotionally intelligent and capable of leveraging digital transformation as a means for social transformation.

Keywords - flipped classroom instruction, disruptive education, pedagogical model, educational shift

INTRODUCTION

As the pandemic strikes the Philippines in mid-March 2020, the Laguna State Polytechnic University issued a memorandum committing to adapting to the new normal, beginning with the implementation of flexible education modalities such as online – synchronous and asynchronous, and a modular approach to accommodate a flexible learning environment suitable for the student's needs, guided by a clear guideline by the Academic Affairs. With these abrupt changes, faculty members were compelled to adhere to and determine various approaches to provide quality education and transfer knowledge in the new learning environment.

In recent years, many educators have explored instructional technology, specifically eLearning, to improve student outcomes. However, the efficacy of the eLearning application does not rely on technology alone. Teachers must also consider the learners and the appropriate approaches to delivering lessons. One of the drivers of these educational technology advancements is the millennials who are individuals born between 1982 and 2002. Millennials also known as digital natives have greater access than any previous generation to technology, knowledge, and digital media (Wilson & Gerber, 2008). Digital natives' traits include a preference for environments that support multitasking, a 24/7 information connection, a collaboration for group activities, and an understanding of the social components of learning (McMahon & Pospisil, 2005). Approaches to these

instructional technology integrations in an academic setting have elevated to a certain level wherein the education research has leaped, especially in this learner – digital natives.

The term "flipped classroom" refers to a teaching method and learning model where content learning takes place outside of class first, and then in-class idea application exercises were led by the instructor (Bergmann & Sams, 2014). The flipped classroom concept includes components such as allowing students to get a head start on learning before class, providing an incentive for students to prepare for class, assessing student understanding, and providing in-class activities that focus on higher-order thinking skills (Brame,2013). The utilization of teacher-created videos and interactive lessons is at the heart of all flipped classroom models, such that training that used to take place in a class may be accessed at home, ahead of time. Effective flipped classroom teachers agree that it is how the knowledge from the media should be integrated into face-to-face learning in the classroom, not the educational videos and other media that students see on their own, that makes this model so successful (Bergmann & Sams, 2012).

Jonathan Bergmann and Aaron Sams are considered the pioneer of the flipped classroom (Tucker, 2012). Research in the flipped classroom has exploded over the years and the term evolved as research grows. It has also been coined as Flipped Instruction (FI), Flipped Classroom Instruction (FCI), and Inverted Instruction Models on different subject matters mainly at a university level, has grown significantly in the past few years. Lage et al. (2000) mentioned that an inverted classroom implements a strategy of teaching that engages a wide variety of learners. In addition, new technologies help the instructors and engage the students. The research suggests that an inverted classroom is generally preferred by students rather than a traditional lecture.

LITERATURE REVIEW

At Miami University, the inverted model of instruction was adopted in Economics, Marketing, and Computer Science classes (Gannod et al., 2008). This article presented a model for using an inverted classroom for software engineering-related courses and described the instructor and student experiences during its pilot implementation which suggests that podcast supplements class lectures instead of replacing them. The digital native students benefited from the collaborative learning resulting in an increase in students' attendance and the total number of students passing the courses.

Muir and Chick (2014) adopted a flipped classroom approach to senior secondary mathematics classes. The findings indicate that the teacher and students were positive about the practice and perceived it as sustainable and transferable to other classes. Zappe et al. (2009) integrated flipped classroom approach into an undergraduate architectural engineering course which determined that the teaching style had a beneficial influence on students' learning and performance. As a result, the students increased their understanding of the subject material and the assigned project's efficacy. The study also

concluded that flipped classroom approach is an effective strategy to incorporate active learning while maintaining the necessary amount of class time for subject coverage.

Gonzales (2019) studied flipped classroom approach in the Philippine setting conducting focus group discussions focusing on the 49, 2nd-year pre-service teachers' participants lived experiences which resulted in the effective delivery of Child and Adolescent Development and Action Research in Mathematics. The study highlighted several challenges including the availability of the technology.

Chaves (2021) conducted an exploratory study focusing on remote learning readiness and student experiences during the Covid-19 pandemic. The study found that unreliable internet connectivity significantly challenges student experiences. The study also suggests faculty training in remote pedagogical strategies and learning technologies. Tang et al. (2020) examined the effectiveness of various online teaching methods and a suggested combined model of online and flipped learning is being compared to other online and traditional models. Students were unsatisfied with online learning in general, and they were particularly unsatisfied with the communication and Q&A modes, according to the study's findings. Additionally, the flipped learning paradigm in combination with online instruction increased student learning, attention, and course evaluation.

Generally, the study intends to characterize several dimensions of the flipped classroom instructions in distance education during the COVID-19 pandemic. Specifically, this research intends to assess the effectiveness of flipped classrooms in remote education, focusing on online class preparedness, students' perceptions of flipped classrooms, LMS evaluation and course evaluation relating to instructional design, and pedagogic strategies the flipped classroom on remote classroom setup perception focusing on its advantages, disadvantage.

The purpose of this study is to assess students' experiences following a successful eighteen-week implementation of the flipped model of instruction in a System Integration and Architecture class for third-year BS Information Technology students at Laguna State Polytechnic University's Santa Cruz campus's College of Computer Studies. Specifically, this focuses on online class preparedness, students' perceptions of flipped classrooms, LMS, and course evaluations related to instructional design and pedagogic strategies the flipped classroom on remote classroom setup perception focuses on its benefits, drawbacks, and other issues and challenges to improve the pedagogical strategies for an online class.

METHODOLOGY

The research study utilized a descriptive design acquiring mixed method to collect the data. Descriptive survey research employs questionnaires to elicit information about a variety of subjects. The mixed method was employed in this research to validate the convergence of the data sources. The study used two sets of validated questionnaires that included both open-ended and numerical survey responses using a

mixed-method approach. Both the quantitative and qualitative responses were evaluated using descriptive statistics and qualitative data analysis tools, respectively. In addition, document analysis specifically the official report of grades was utilized to establish the student performance. The crucial stage in this research is the preparation of integrating the flipped model in a remote learning environment.

Flipped Model Implementation in a remote learning environment.

The conduct of the flipped class is the most crucial in the conduct of the study. Dunn (2014) has written a short piece on the 6-step to implementing a flipped classroom planning, recording, brainstorming, modifying, grouping, and regrouping.

(1) Plan: The instructor explored FCI pedagogical approached prior to the preparation of the instructional materials. A complete instructional material such as self-paced modules, pre-recorded video lectures, presentations, assessment tasks – summative and formative, and examinations for the lecture. For the laboratory, Open Education Resources videos were utilized in the class, laboratory exercises and machine problems, and other pertinent materials were developed. All materials were assessed and undertaken and approved for distribution by the Curriculum and Instruction Department.

(2) Record: Created a video-lecture rather than discussing the lesson during synchronous classes. To ensure that all of the lesson's essential components are covered and that students can easily view and comprehend the underlying ideas, the video lecture should be brief and concise.

(3) Share: The instructional materials were uploaded in the LMS (Google Classroom) for asynchronous learning in advance to allow students to access it anytime to watch, read and comprehend the subject matter. The learning management system was beneficial for both asynchronous (student-led) and synchronous (instructor lead) interactions. Course orientation was vital in explaining the new classroom set-up. Before attending the synchronous class, the students were instructed to watch the video, read the module and other instructional materials during asynchronous class.

(4) Change: During the synchronous class students are familiar with the new topic. Formative assessment such as classroom discussion, recitation and quizzes using online interactive quiz applications are the methods in verifying that the students view the instructional materials prior to the online class.

(5) Group: One of the requirements of the course is a system development project. Each group was given a distinct problem to solve, and the group leaders allocated specific tasks. The instructor offered the students with consultation as well as time to work on their projects.

(6) Regroup: During online class, the students discuss the group's efforts with everyone and establish inquiries to examine deeper into the subject. Following these six processes, it is necessary to repeat, revise, and review.

Survey Tools

The researcher used two sets of questionnaires: the first questionnaire, which contains demographic information and technology resources, contains the following variables: gender, age range, and the number of courses enrolled; the second questionnaire, which contains the actual survey, contains questions about online preparedness, student perceptions of flipped classrooms, and LMS evaluation. The Online Preparedness, a thirty-item questionnaire developed by Penn State University based on related literature and prior studies (Cholifah et al., 2020), measures response using three-point Likert items and level of agreement. This section contains information regarding the student's e-readiness and technological usage. The Students' Perceptions of Flipped Classrooms contains two domains: student perceptions of course activities and the flipped classroom instructional model. The flipped classroom instructional model was adapted from (Pierce & Fox, 2012) and resulted in 11 items measured using the five-point Likert item, level of agreement for response measurement. The LMS Student Assessment was derived from the system usability scale (Ventayen et al., 2018), expanded from ten to twenty items, encompassing LMS features and functions, and evaluated using a five-point Likert level of agreement for response measurement.

The second questionnaire is 20-item open-ended questions emphasizing the course evaluation relating to instructional design and pedagogic strategies in the flipped classroom on remote classroom setup perception focusing on its advantages, disadvantages, and other issues and challenges. The survey questionnaire went through various stages of checking its consistency and reliability regarding the structure and content of the questions. First, the questions were adapted from various survey tools and drafted based on the research objectives and relevance. Second, the researcher formed a team or group of 2 faculty members – ICT specialists and development communication specialists- whose responsibility was to review and evaluate the appropriateness of the questions since most items were adapted from foreign scenarios. The researcher incorporated all the suggestions, feedback, and comments of concerned reviewers and the final survey questionnaire. A sample survey was conducted with thirty 4^{th} year students outside of the sample of the study which took the course face to face and at the time taking another course online class but does not implementing the FCI.

After the questionnaire was validated, it has distributed again for the actual online survey using Google Forms. It is noteworthy that during the distribution of the questionnaire Data Privacy Agreement was considered and instigated in the Google Form. Systems Integration and Architecture class which 3rd Yeas BS Information Technology Students took for the Academic Year 2020-2021. The researcher utilized simple random sampling was used in this study. The sample population of the study consisted of 122 students out of a total population of 166. Before distributing the questionnaire, the researcher conducted an orientation to the participants to clearly

explain and elucidate the conduct and process of the study. The 1st survey tool was distributed online after the semester ended, while the 2ndsurvey tool was distributed online after online grade distribution.

Statistical Data Analysis

The survey produced both quantitative and qualitative data. The quantitative data were processed in a Spreadsheet acquiring the descriptive statistics - Mean and Standard Deviation. The qualitative data, precisely the open-ended question responses were analyzed in MaxQDA code and themes like a flipped classroom in distance education advantages issues, and other challenges (Akçayır & Akçayır, 2018) and disadvantages (Du et al. 2014). The following steps were accomplished: Step 1: Prepare, organize, and explore the data, Step 2: Develop categories for the analysis, Step 3: Code the interviews ("basic coding"), Step 4: Develop the category system further and the second coding cycle ("fine coding"), Step 5: Analysis options after coding, Step 6: Write the research report and document the analysis process.

RESULTS

The figure presented in the survey results focuses on the criteria such as Online Preparedness, Instructional Strategy, LMS Evaluation, and Factors Influencing the Use of a Learning Management System. The latter figure represents the open-ended question responses that characterize the flipped classroom in distance education advantages, disadvantages, issues, and other challenges.

Table 1 shows the mean responses of 122 students regarding online class preparedness, it shows that the item A4: which pertains to the statement." ***I do not quit just because things get difficult***" garnered the highest mean of 2.68 and was preceded by the 2nd highest mean of 2.65 A3: "***I finish the project I start***" which can be interpreted that e-learning readiness precisely learner control is significant in the s success of a Flipped-Classroom supporting the researchers flipped classroom experiments in terms of the learning environment, and students self-efficacy beliefs, intrinsic and extrinsic motivation, and self-regulation (Chuang et al., 2018; Hernández et al., 2018; Zheng et al., 2018; Hsieh et al., 2017; Yilmaz, 2017). Previous research indicated that the factors related to e-learning readiness such as learner control and self-directed learning, technology self-efficacy, and communication self-efficacy are significant for both online courses and flipped classroom courses (Hao, 2018).

As for the researchers, students' e-learning readiness is essential completing e-learning classes (Adams et al., 2018). The lowest is A26 which focuses on the availability of printer which is not a factor in the effectiveness of flipped classroom in conducting the online class for this course since all materials and output is digitized. These results suggest that the students are prepared mentally and digitally for online class. On the other hand, A27. ***"I am connected to the Internet with a fairly fast, reliable connection such as DSL or***

cable modem." garnered a mean of 1.98 with a standard deviation of 0.67 which can be interpreted as the responses have moderate amount of variability around the mean which implies that stable and reliable internet connection is a common problem for the students.

Table 1. Online Class Preparedness Result (n=122)

Criteria	MEAN	SD
A1. I am good at setting goals and deadlines for myself.	2.34	0.57
A2. I have a good reason for taking an online course.	2.42	0.50
A3. I finish the projects I start.	2.65	0.48
A4. I do not quit just because things get difficult.	2.68	0.50
A5. I can keep myself on track and on time.	2.3	0.54
A6. I learn easily.	2.16	0.47
A7. I can learn from things I hear, like lectures, audio recordings, or podcasts.	2.34	0.54
A8. I have to read something to learn it best.	2.52	0.60
A9. I have to watch video lectures and other video clips to learn it best.	2.63	0.48
A10. I learn best when I table things out for myself and developed good ways to solve problems, I run into.	2.58	0.50
A11. I like to learn equally well in a group or on my own.	2.50	0.55
A12. I am willing to send e-mails to or have discussions with people I might never see.	2.23	0.56
A13. I have a dedicated study space where I can read and work on assignments without distraction.	2.19	0.62
A14. I can ignore distractions around me when I study.	1.94	0.63
A15. I can spend 8.5+ hours a week on a 3 credits course online.	2.10	0.50
A16. I keep a record of what my assignments are and when they are due.	2.40	0.57
A17. I plan my work so that I can turn in my assignments on time.	2.36	0.55
A18. When I study, people around me will help me work and not try to distract me.	2.19	0.66
A19. I can dedicate a specific time of day or night to work on my studies.	2.49	0.53
A20. I am fairly good at using the computer.	2.49	0.50
A21. I am comfortable surfing the Internet and I can download files and add attachments.	2.61	0.54
A22. I am comfortable conducting searches, setting bookmarks, and downloading files.	2.52	0.52
A23. I am comfortable installing software and changing configuration settings on my computer.	2.25	0.61
A24. I know someone who can help me if I have computer problems.	2.33	0.67
A25. I have a computer that runs reliably on Windows or Mac OS.	2.30	0.73
A26. I have a printer.	1.49	0.78
A27. I am connected to the Internet with a fairly fast, reliable connection such as DSL or cable modem.	1.98	0.67
A28. I have virus protection software running on my computer.	2.24	0.78
A29. I have headphones or speakers and a microphone to use if a class has a video-conference.	2.49	0.63
A30. My browser will play several common multimedia (video and audio) formats.	2.50	0.56

Table 2. Students' Perceptions of Flipped Classrooms Result (n=122)

Criteria	MEAN	SD
B1. I view the course video lecture before the scheduled virtual class prepared me for the class activity.	**3.84**	**0.75**
B2. Viewing the pre-recorded lecture was essential to participate in the class activity successfully.	**4.13**	**0.72**
B3. I enjoyed being able to view the course video lecture before the scheduled virtual class as opposed to the living class lecture.	**3.96**	**0.74**
B4. It is extremely helpful to view the course video lecture even after the scheduled virtual class as opposed to a live class lecture.	**4.21**	**0.76**
B5. I am more motivated to learn the course using the instructional materials uploaded.	**4.03**	**0.79**
B6. The instructor made meaningful connections between the topics in the pre-recorded lecture and the class activity.	**4.28**	**0.78**
B7. The instructional materials are a flexible resource that can be adapted to different classroom settings (face-to-face and online) and motivates me as a learner.	**4.11**	**0.76**
B8. The instructor required student participation in the in-class activity and discussion forums.	**4.18**	**0.77**
B9 I regularly use the resources provided online such as YouTube videos, journal papers, and other online materials.	**4.36**	**0.77**
B10 I regularly watch the course video lecture and laboratory video assignment, these materials helped me in accomplishing the performance tasks and machine problems	**4.16**	**0.74**
B11 The instructional materials are accessible and intuitive to navigate (arranged in an organized manner).	**4.29**	**0.75**

Table 2 shows the mean responses of 122 students regarding instructional strategy, it shows that item B9: which pertains to the statement." ***I regularly use the resources provided online such as YouTube videos, journal paper, and other online materials.***" garnered the highest mean of 4.36 and preceded by the 2nd highest mean of 4.29 B11: "***The instructional materials are accessible and intuitive to navigate (arrange in an organized manner)***" it shows that the application of instructional strategy must be considered to the characteristics and students' culture to get an optimal learning result (Leonard, 2018). Previous research shows that flipped classroom instructional strategy is thought to be an effective way to structure learning experiences to improve student learning outcomes (Cheng et. al., 2019; Pierce, 2012). The lowest is B1 which pertains to the statement "***I view the course video lecture before scheduled virtual class prepared me for the class activity***." with a weighted mean of 3.84 which shows that a student's willingness to learn is crucial in engaging in the flipped classroom in distance education and it should provide a beneficial strategy to motivate the students as mentioned in the paper of Chaves (2021).

Table 3. LMS Student Assessment Result (n=122)

Criteria	MEAN	SD
C1 I think that I would like to use LMS frequently	3.84	0.75
C2 I found LMS unnecessarily complex	3.39	0.82
C3 I thought LMS was easy to use	3.70	0.77
C4 I think that I would need the support of a person with technical knowledge to be able to use LMS	3.39	1.06
C5 I found the various functions in LMS were well integrated	3.81	0.68
C6 I thought there was too much inconsistency in this system	3.26	0.84
C7 I would imagine that most people would learn to use LMS very quickly	3.82	0.80
C8 I found LMS very cumbersome to use	3.25	0.91
C9 I felt very confident using LMS	3.74	0.70
C10 I needed to learn a lot of things before I could get going in browsing LMS	3.52	0.87
C11 I liked using the interface of the LMS system	3.84	0.75
C12 Overall, this system was easy to use	3.96	0.81
C13 It was easy to learn to use the system	3.88	0.80
C14 I believe I could become productive using this system	3.83	0.71
C15 The system gave error messages	3.11	1.05
C16 Whenever I made a mistake using the system, I could recover easily and quickly	3.68	0.81
C17 I can access the learning activities at times convenient to me	3.99	0.76
C18 The online material is available at locations suitable for me	3.94	0.87
C19 LMS enables me to interact with other students and the instructors asynchronously	3.89	0.80
C20 I am confident in using this technology	3.99	0.81

Table 3 shows the mean responses of 122 students regarding LMS Evaluation, it shows that the items C17: "I can access the learning activities at times convenient to me" and D20: "I am confident in using this technology" garnered the highest mean of 3.99, followed by the statement C12: "Overall, this system was easy to use" with a mean 3.96. A previous article system can help instructors to select the best LMS appropriate to their educational needs and their type of usage in the shortest possible time, with little effort, without any specialized technical knowledge/training, and by following simple, user-friendly steps (Jordan & Ducket, 2018). The lowest is C3: "I thought LMS was easy to use".

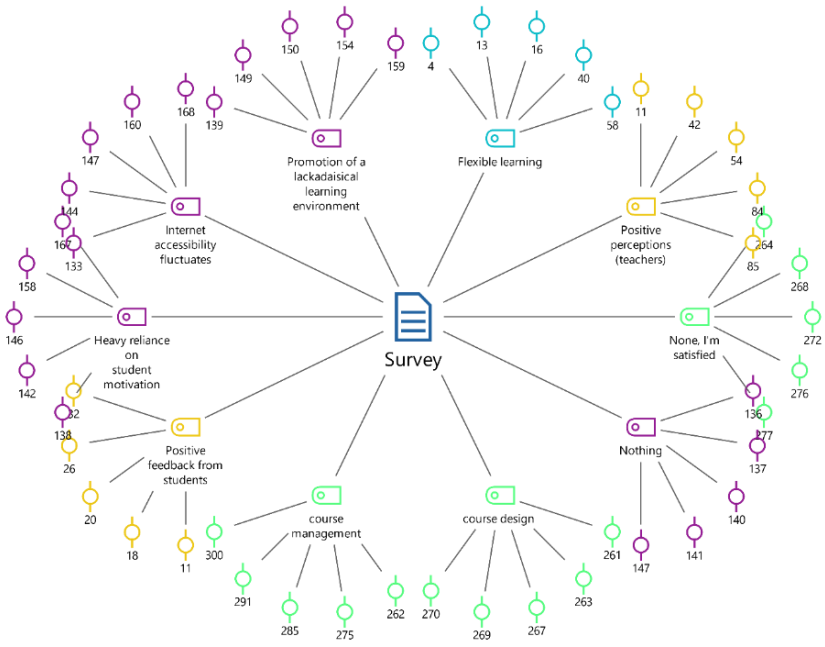

Figure 1. Single-Case Model Results

Figure 1 illustrates the single case model generated by MaxQDA, which depicts the frequency of sub-themes covering themes in flipped learning in remote classrooms (Akçayr & Akçayr, 2018) and (Du et al., 2014), such as the advantages related to Q1: What are the advantages of your instructor's instructional methodology? and Q7: What did this course teach you about your learning strategies? Have you changed as a learner because of this course? Which represents the responses "***positive instructor perception***," "***positive student feedback***," and "***high satisfaction rate***." The respondents' responses to question Q6 show their difficulties and concerns. Have you met the course's learning objectives? It is reflected in the sub-themes "***Internet accessibility varies***," "***strong reliance on student motivation***," and "***promotion of a lackadaisical learning atmosphere***."

Additionally, the figure displays good responses to Q17: What changes would you make to this course? which both pertain to pedagogical improvement, with the majority of respondents responding "***Nothing***," but with substantial responses such as "***reduced task***," "***time duration for submission***," and "***simplify the teachings.***" In response to question Q18, what recommendations would you give to prospective students enrolled in this course? The software frequently generated the words "***focus***, ***patience***", "***diligent***", and "***time management***". The generated theme reveals significant findings of the study such as positive feedback and high satisfaction rate with regards student satisfaction to the pedagogical approach and instructor level of involvement implemented during the course. The official report of grade revealed that out of 166 students enrolled in 4 sections 5 (3.01%) of the students were unofficially dropped while 9 (5.42%) of the students were marked as incomplete due to final project which means that 152 (91.57%) of the student successfully completed the course and developed a system as a final project. Figure revealed focus,

patience, persistence, and time management were the traits developed during the flipped class that contributed to improved learning performance.

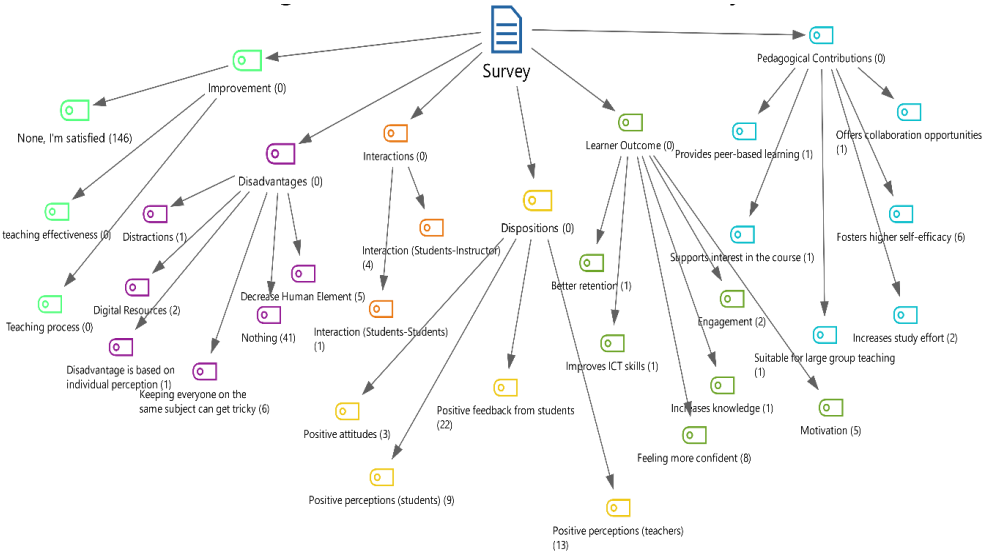

Figure 2. Single-Case Model (Code Hierarchy) Results

The figure illustrates a single case model (code hierarchy) which categorizes the themes and sub-themes (a) Improvement (b) Disadvantages, (c) Interactions, (d) Dispositions (e) Learner outcome, and (f) Pedagogical contributions. It shows that 41 responded to "***Nothing***" in the theme Disadvantages; however, it also reveals "***distractions***," "***digital resources***," "***Keeping everyone on the same subject can get tricky***," and "***decrease human element***." The theme Improvement reveals that 146 students were categorized in "***None, I am satisfied***." which suggest that the students are satisfied with the approach. Most importantly, the theme Learning Outcome shows the responses "***feeling more confident***" and "***motivation.***"

DISCUSSION

This study sought to determine the efficacy of flipped classroom instruction in remote education. The result revealed that students have self-efficacy beliefs, has intrinsic and extrinsic motivation, self-regulation and prepared for the learning environment. Several factors contribute to an effective of online learning students' preparedness is digital literacy. According to Cholifah et. al (2020), students are more open to adopting innovative technologies and are more willing to go from learning entirely offline to learning entirely online.

The study also revealed that the most students prefer to access additional instructional materials prior to the class over the curated video-lecture which was found to be accessed after the synchronous class. Nonetheless, the student generally recognized that by regularly watching the course video lecture and laboratory video

assignment, these materials helped them in accomplishing the performance tasks and machine problems and perform well during online class activity. In addition, it provided to catch up with the class and immensely helpful even after the scheduled virtual class as opposed to live class lecture. Moreover, the efficacy of the instructional strategy was reflected in the findings of the study and students were satisfied with the topic arranged in an organizer manner in the LMS and find it accessible and intuitive to navigate. It also revealed that the most students are motivated by the uploaded instructional materials in advance and believes that the approach promotes learning flexibility, improve learning experience, self-efficacy and motivation, and improve student learning outcome as reflected on the official report of grade.

The findings indicated that students were generally satisfied with flipped classroom training in a remote learning environment. When synchronous classes were combined with the FCI approach, students' learning and engagement appeared to improve. Asynchronous classes provided students learning flexibility corroborates prior studies emphasizing the value of streaming videos as an effective e-learning technology that leverages the Internet to deliver curriculum while allowing students to exercise control over their learning (Bridge et al., 2009). The study discovered a variety of benefits, including improved learning performance, increased learning flexibility, and the development of high self-efficacy.

However, it was also found out that the reliable and Internet access was a prevailing challenge for a student online class preparedness and as stated in the open-ended question survey result. Poor internet connectivity rampant challenge in an online class in the Philippines (Gonzales, 2019), Malaysia (Chung et al., 2020) Bangladesh (Al-Amin et al., 2021), Indonesia (Widodo et al., 2020) and Ghana (Agormedah et al., 2020). On the other hand, most of the students find it convenient that pre-recorded videos were already uploaded and can be watch at any times even if they cannot attend the synchronous class. In addition, some students encounter lack of motivation which can be translated to heavy reliance on student motivation and promotion of a lackadaisical learning atmosphere. These are various barriers for instructors who seek to experiment with new teaching approaches, and the transition to a flipped classroom is not easy for many.

CONCLUSION AND RECOMMENDATIONS

The four pillars of FLIP: flexible learning environment, learning culture, intentional content and professional educator (Bergmann & Sams, 2012) provided a clear guide in employing the flipped class. Dunn (2014) 6-step was immensely helpful in constructing and to implementing a flipped classroom. Flipped Classroom Instruction has transformed teaching into a dynamic and interactive learning environment. Its application can differ based on the characteristics of the level of participation the instructor requires, the class, and the needs of the students. Although, asynchronous class provides student led learning, instructors play a significant role in the success of

its implementation. Students' levels of focus influence how much they study and engage in learning. Students who struggle to focus during online learning present a unique set of challenges ranging from poor internet connections, distractions, and time management.

Additionally, the flipped classroom enables greater engagement between teachers and students throughout class time. This may give students with increased possibilities to integrate higher order cognitive skills in the classroom, with a stronger emphasis on applying, analyzing, and perhaps creating material (Anderson & Krathwohl, 2001). Nevertheless, the challenges of FCI in remote learning environment should be considered and apply various approaches such as constant communication and active online presence of the instructor is essential.

There are several weaknesses contained in this study, although the a qualitative data was learned from the open-ended questions capturing which resulted to less in-depth investigation. Significant qualitative data such as interviews, observations and focus group discussions.

Drawn from the findings and conclusion of the research, there are some recommendations offered. First, if instructors would like to implement flipped classrooms in remote learning environments match several course contexts. When identifying the most appropriate synchronous activities, instructors are advised to evaluate their strategy and methods aligned with the course objectives. It is vital to establish constant communication with the students and monitor their progress.

Second, flipped classroom provides the structure for students' out-of-class time by directing students' efforts. This is a difficult skill for certain students, who may struggle to determine what is most significant when assigned article or textbook readings. It is recommended to provide them materials besides course maps and guides to give them lessons about time management, and productivity tools and continuously boost their morale. Make sure that every activity submitted is rated, indicate remarks, and give them a chance to resubmit to improve their output for higher ratings and provide reasonable time for submissions.

Lastly, for further research, the researcher would like to conduct Flipped Classroom Instruction in remote learning executing Bite-sized learning. Moreover, to acquire more in-depth qualitative data responses on flipped classroom approach and correlate the student final grades and performance and assess if they carry out the learning behavior they have formed and applied in other courses.

RESEARCH IMPLICATIONS

The substantial research of this research is the effective use of flipped classroom instruction in a remote learning environment. Evidence of improvement of student engagement and learning outcomes, significant teacher roles and practices, teacher-student relationship, and effective technology integration. Furthermore, this study shows the effectiveness of flipped classroom instruction within bended learning environments. Given the widespread adoption of technology in education following the educational disruptions caused by the pandemic, researching the topic has become particularly relevant in recent times. In the transition to a post-pandemic education landscape, it is essential for learners and instructors to undergo a pedagogical shift to adequately prepare them for the transformative challenges of the Education 5.0.

Education 5.0 represents the utilization of emerging technologies to facilitate a more personalized and empathetic approach to teaching, placing emphasis on the social and emotional growth of students and the creation of solutions that enhance societal well-being. The recognition that technology can and should positively impact various aspects of life, including work, industry, and healthcare, has permeated across different social domains (Sydle, Education 5.0: What does it mean? how does it work? 2023). As the educational landscape evolves, educators must explore diverse pedagogical models that prioritize the preparedness of learners for Industry 5.0 and Society 5.0.

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DECLARATIONS

Conflict of Interest

I, Mia V. Villarica, I affirm that I have no personal or financial conflicts of interest that could compromise or influence the outcomes of this study. I also confirm that I have no affiliations or connections with any organization or entity that could potentially have a vested interest in the results or conclusions of this study.

Informed Consent

The respondents acknowledge and the research provided the declaration the Data Privacy Agreement instigated in the online survey. The data subject acknowledges that information will not be shared to anybody and will only be used for data analysis and data reports and for the research mentioned.

Ethics Approval

The research project underwent panel review and evaluation, resulting in its approval as an institutionally funded research project. The respondents participated voluntarily and agreed to the informed consent. The committee thoroughly reviewed and approved the project's implementation at the Laguna State Polytechnic University Santa Cruz Campus and the College of Computer Studies.

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