PEDAGOGY
for Online Learning

Theory and Practice

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editors

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Preface

During this unprecedented time, almost all educational institutions have shifted from traditional learning to online learning. When the COVID-19 hit the world, online teaching was no longer an option but a necessity. Due to government restrictions and other related protocols, schools, colleges, and universities opted to deliver academic instructions into online to ensure that students still receive quality learning they deserve. Online learning is a tool in which teaching and learning process still become student-centered, innovative and flexible. However, online learning can also become a disadvantage as there are many challenges associated with online teaching and learning. This e-book offers the different perspectives on online learning: framework, learning experiences both on students and teachers and its associated future management.

The introductory part of this book gives an overview and framework of online learning. It provides technical discussions of learning management systems and teaching and learning modalities used in online learning. It serves as guide in the development of the appropriate learning management system and modality relevant to the capacity and necessity of the academic institutions. The authors shared their actual experiences in the development and management of the systems and programs in online learning.

Part 2 of the book contains the efficacy of online learning experience as per the students' perspective. It highlights the attitude of students towards distance learning at the peak of

the pandemic termed as 'behavioral Coronaphobia.' This part also highlights the expectations of high school and higher education students on online learning and teacher-created videos as a tool in the online learning. The authors shared the results of their studies on the actual experience of their students which unveiled the various positive and negative facets of online learning.

In part 3, the efficacy of online learning as per teachers' perspective is presented. This part highlights the experience of the rural science teachers and the school administrator during the new normal in education. Recommendations outlined on this part serve as bases for further analysis in terms of online teaching-learning implementation. Meanwhile, the future of online learning is outlined in part 4, which can be a basis for further review. The model contained in the paper can be particularly applied in higher education where online platform may be adapted for long in the post-pandemic new normal.

This e-book offers major research results on the conduct and implementation of online teaching and learning in the context of COVID-19 pandemic. It provides a unique perspective on the research issues regarding the effects of online learning from many experts in this field.

Let us learn from the various personal experiences and perspectives of the researchers from various fields of specialization!

About the editors

Dr. Rodrigo M. Velasco has a multi-cultural perspective of education and research having worked as a professor and administrator in the Philippines, CNMI, USA and Sultanate of Oman. His orientation on multiculturalism and diversity trained him to cope with different cultural and geographical settings. He is currently an assistant professor of business management and accounting at Gulf College, Sultanate of Oman. As an academician, he has professional qualifications such as Doctor of Business Administration, Diploma in Strategic Management and Leadership from School of Business London, and Certified Human Resource Professional and Certified Marketing Professional from Qualifi, United Kingdom. As a researcher, he is the founding president of the Institute of Industry and Academic Research Incorporated as a platform for open access publications.
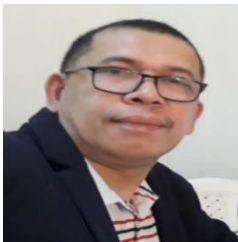
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Juliet C. San Luis is currently a fourth-year college education student at Calayan Educational Foundation Incorporated under the Bachelor of Secondary Education program major in Science. She is a 23-year-old aspiring teacher from Lucena City, Quezon, Province. She has been consistently an honor student leading her class academically with humility. She serves as a leader, being the Vice President for Internal Affairs of Young Educators' Circle in CEFI. She shows great interest in research events and conferences, particularly in the field of education, intending to raise awareness and empower others through knowledge that academic writing can provide.

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Part 4 – The Future of Online Learning

Part 1

The Framework of Online Learning

Source: http://clipart-library.com/clipart/2064412.htm

Learning Management System for Data Structures and Algorithm

Marco Paulo J. Burgos

Introduction

LMS is a boundless data framework utilized in numerous higher education institutions to encourage instructive challenges. The framework can be utilized for help in campus courses, courses directed on the Internet, and obviously a combination of these utilizations. It is a web-based innovation used to plan, execute, and evaluate a particular learning measure which furnishes an educator with an approach to make and convey content, screen student participation, and survey student performance.

Due to the effects of Covid-19 pandemic, the education system worldwide had to adjust to the existing new normal. Higher education institutions shifted to online class and modular learning. During this learning mode, the LMS benefits the students in terms of easily accessing the modules and answering examinations and quizzes through online enrichment and module assessment, hence eliminating the physical submission of paper requirements. In addition, students can get the frequently-asked information from the chatbot, an automated answering features of the LMS, which also supplements the communication gap or response time between the students and teachers. This can also be coded with a program in simulator inside the system. For the teachers, the broadcast of announcements is easier and much clearer as opposed to social media and e-learning platforms where messages are in the thread. Moreover, the computation of grades became easier because of the automated save features.

With the benefits of LMS, this study developed and evaluated the use of LMS at a particular higher education institution in the Philippines. It was particularly developed for the subject Data Structures and Algorithms offered in the second year of Bachelor of Science in Information Technology at the School X.

Literature Review

a. *Development of LMS through Waterfall Method*

According to Andersson (2019), LMS is a product application or web-based innovation used to plan, execute, and evaluate a particular learning measure. Ordinarily, it furnishes an educator with an approach to make and convey content, screen student participation, and survey student performance. It may likewise furnish students with the capacity to utilize intuitive highlights such as threaded conversations, video meetings, and conversation forums. When building up a data framework, various models can be utilized as help support for the development. The most customary methodology is the Waterfall Model of the Systems Development Life Cycle (SDLC).

According to Rainer et al. (2015), the model illustrates the advancement into six stages: requirements analysis, system design, implementation, testing/verification, deployment, and maintenance. The various stages have clear characterized tasks, and if challenges happen in one phase, the researcher needs to return to past stages to tackle the challenge. The (1) requirements analysis stage recognizes the genuine needs, utilizes a feasibility study, which looks at technical, economical, and social perspectives all together. Conversations on the different business challenges that the advancement should tackle, happen in the framework investigation stage, subsequently assembling data pretty much all the necessities and a final output of a bunch of framework prerequisites. In the (2) system design stage, the framework is set up and particulars of the arrangement is endorsed, where also the programming and testing happens. In the (3) implementation stage, the LMS is developed. In the (4) testing phase, the new framework is in a pilot adaptation to the groups of respondents while the (5) deployment phase which alludes to the actual implementation of the system to the benefactors' usage, where in this study pertains to the system of the Department of the Computer Education of the School X. The last stage is the (6) maintenance of the new framework, where

the identified challenges from the uploaded web application of LMS for Data Structures and Algorithms are addressed.

In a study by Muhard, et al. (2020), the Waterfall Model was utilized in designing a web-based LMS. It has been depicted how the plan of the framework in the advancement of LMS on this site. Subsequently, it was inferred that the teaching and learning process in a website permitted students to have materials downloaded straight through the site. Thu, the degree of connection among teachers and students increased the online correspondence media, where students and teachers can associate with one another through this LMS application.

b. *Software Evaluation and Quality Assurance*

According to Krouska et al. (2019), utilizing ISO 25010 international standard for the assessment of any software is fair and dependable. It also depends on the proper standard attributes to access the quality of educational software. The audit targets the indication of advancement of master frameworks in e-learning because of the rise of interpersonal interaction and the commitment of its qualities to the educational process. The development of high quality software is imperative because the learning networks nowadays are PC-educated and have rising expectations for the systems being used.

E-learning is generally alluded to the use of Information and Communications Technology (ICT) for conveying instructive educational programs. It is quickly developing because of the wide Internet use, the abilities of ICT to help the learning cycle and the diminished expense of online training. It gives electronic guidance through which students can get to online course materials. A conventional methodology of e-learning is the LMS. It is an amazing instructive programming for overseeing course substance and students and offers online mastering, appraisal and preparing asset and understudy management. Not only to convey course content, it gives a more student-focused guidance.

By utilizing an ISO-based model, the dependability of framework assessment is expanded as it depends on standard attributes legitimate to survey the nature of programming items or the potential quality being used. Additionally, this sort of assessment can demonstrate that a framework meets all the requirements and gives clients the affirmation of item quality. ISO 25010 is a broadly acknowledged and very much perceived quality standard that has been applied to an assortment of programming item assessment cases. Notwithstanding, there are just couple of uses of this model to the e-learning conditions.

Methodology

This study utilized the developmental research through descriptive design in developing a framework following the Waterfall Method. Part of gathering information is about the current and existing methods of teaching for Data Structures and Algorithms in School X. This assessed the current situation to gather necessary information and data for further understanding and investigation.

Figure 1
The Waterfall Model
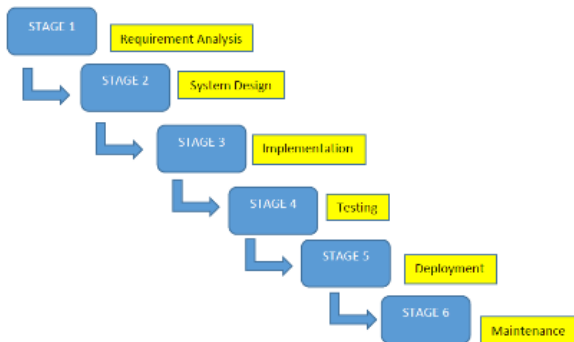
Source: Introduction to Information Systems. 5th ed. by Rainer, Prince, & Cegielski, 2015, John Wiley & Sons Singapore Pte. Ltd.

The Waterfall Method was utilized in creating the proposed system. Waterfall formulations are usually used in computer program improvement which reacts to irresoluteness changes. The

model illustrates the advancement into six stages: requirements analysis, system design, implementation, testing, deployment, and maintenance. These stages correspond as to how the first research objective was answered.

The population frame for this study were IT experts, faculty members, and former students enrolled in the subject Data Structures and Algorithms at the School X during the current semester. As a sampling scheme, the study used the convenience sampling method. It is an exemplification of non-random/non-probability sampling wherein sample individuals from the reference populace that meet a certain level of functional standards are incorporated for study purpose. Considering the present pandemic situation where everyone was required to stay at home, the study had to select the experts, teachers, and students who have active internet connection at home. The samples selected were then subjected to the new treatment method, utilizing the LMS.

The total respondents were ninety (90), composed of sixty (60) students, fifteen (15) faculty members, and fifteen (15) IT experts. The respondents were the former students enrolled in the subject Data Structures and Algorithms at the School X, faculty members who were teaching or have taught the subject, and IT professionals composed of experts from the industry and the IT administrator of Bachelor of Science in Information Technology in School X. The respondents were interviewed to gain understanding on their needs and to prove that the proposed system was needed for the school. A set of carefully prepared and logically ordered questions were used to collect data.

The study utilized a set of instruments in gathering the vital data. These were the adopted questionnaire, interview guide, and document analysis. The adopted checklist questionnaire in a Google Form was the standardized assessment tool based on ISO 25010. This is a significant tool to evaluate the respondents' perspectives on the current system or the new framework. The said tool was founded on ISO 25010:2011 standard for software development designed to evaluate and to determine the level of

acceptability of LMS for Data Structures and Algorithms with respect to functional suitability, performance efficiency, usability, and reliability. The questionnaire was answered by the students, faculty, and IT experts. The Likert scale was used to determine the level of acceptability which answered the second research objective.

The interview guide was utilized to determine the challenges experienced by the respondents during the assessment, different remarks, and recommendations that maybe considered for the improvement of the system. An interview was conducted through online messaging because of the limitation on the face-to-face meeting. The respondents were asked on the considerations in utilizing the developed program. The meeting principally comprised of the inquiries with respect to the usefulness of the created framework such as the adjustments in the functionalities and the challenges experienced in using the program. These data correspond to the fourth research objective.

There were documents analyzed which include outcome-based teaching and learning (OBTL) and the subject modules for Data Structures and Algorithms. Meanwhile, the ANOVA was used to answer the third research objective on the significant difference in the evaluation of the three groups of respondents. For the data analysis, Microsoft Excel and SPSS programs were used. The statistical techniques utilized were Weighted Mean and One-Way Analysis of Variance (ANOVA).

Results and Discussion

The waterfall methodology comprised of the following phases: requirements analysis, system design, implementation, testing, deployment, and maintenance phases as shown in Figure 1.

The E-Learning Platform denotes the significance of the theoretical framework to the study as it represents the overall principle of the operation of an e-learning LMS platform for Data Structures and Algorithms by introducing the key highlights

related with the primary benefactors: students, teachers, and administrators.

Figure 2

The e-learning platform
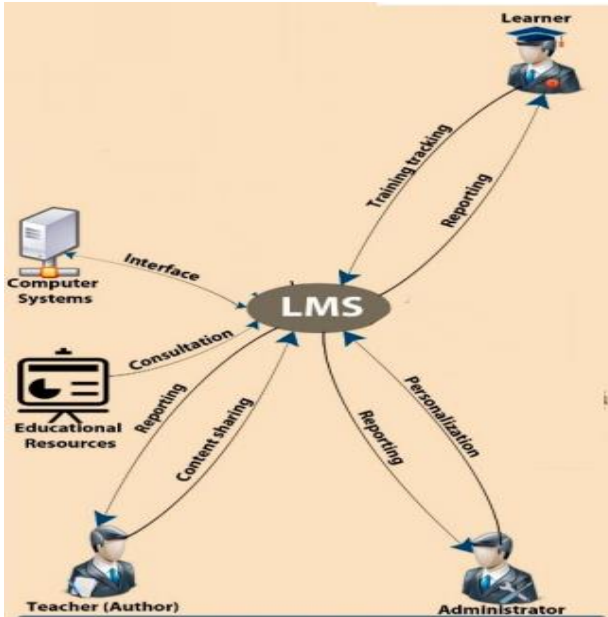
As shown in Figure 3, the flowchart reflects the process of LMS development for Data Structures and Algorithms. All users are prompted to the login page of the system which serves as the security. Depending on the users' profile, the system has different menu features based on the user's role in the LMS. For example, the administrator has control of all the accounts. The Module & Assessment is saved to the cloud server where the teachers and students basically interact. The chatbot was added to help teachers and students adapt the system and learn the subject Data Structures and Algorithms.

Figure 3

LMS Flow Chart for Data Structures and Algorithms
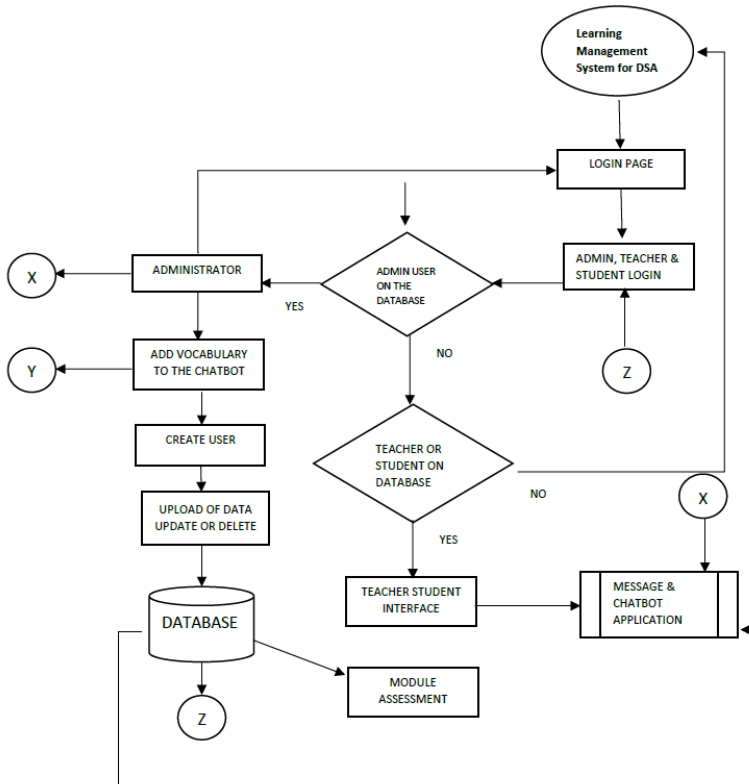
Level of LMS Acceptability

The LMS for Data Structures and Algorithms was evaluated by the three groups of respondents – the students, faculty members, and IT experts. Table 1 shows the functional suitability as perceived by the students, faculty members, and IT experts.

Table 1

The Functional Suitability of the LMS

Functional Categories	Students		Faculty		IT Experts		Overall	
	WM	VI	WM	VI	WM	VI	WM	VI
Functional completeness. Degree to which the sets of functions covers all the specified tasks and users objectives	4.53	HA	4.5	A	4.40	A	4.5	A
Functional correctness. Degree to which system provides the correct results with the needed degree of precision.	4.67	HA	4.60	HA	4.40	A	4.6	HA
Functional appropriateness. Degree to which the functions facilitate the accomplishment of the specified tasks and objectives.	4.58	HA	4.5	A	4.47	A	4.5	HA
Overall Mean	4.59	HA	4.5	HA	4.42	A	4.5	HA

Legend: WM- Weighted Mean, VI- Verbal Interpretation, HA- Highly Acceptable, A-Acceptable, MA-Moderately Acceptable, U Unacceptable, HU-Highly Acceptable

The overall mean gathered from the three functional categories was 4.51. This indicates that in terms of functionality, the respondents perceived the LMS as highly acceptable. The students perceived that the system operates according to its desired functionality as the calculated mean is 4.59 which is interpreted as 'highly acceptable'. Additionally, the faculty members has the same 'highly acceptable' perception of functional suitability with a mean of 4.51. Moreover, the IT experts perceived that the developed system was able to provide its intended function with a mean of 4.42 which is acceptable. Functional suitability is used to determine if the product provides functionalities that meet all the stated or implicit requirements when used under specific conditions. According to ISO 25010, it is a collection of characteristics that lean on the beingness of a set of purposes and their nominative characteristics. The purposes are those that fulfill explicit or implicit conditions.

Table 2 shows the evaluation of the LMS in relation to performance efficiency. It indicates that the developed system is interpreted as 'acceptable' with an overall mean of 4.32. Henceforth, the respondents reckoned that the LMS for Data Structures and Algorithms is efficient to use and it meets the requirements.

Table 2

The Performance Efficiency of the LMS

Functional Categories	Students		Faculty		IT Experts		Overall	
	WM	VI	WM	VI	WM	VI	WM	VI
Time Behavior. Degree to which the response and processing times and throughput rates of the system, when performing its functions, meet requirements.	4. 60	HA	4.3	A	4.40	A	4.44	A
Resource utilizations. Degree to which the amounts and types of resources used by the system, when performing its functions, meet requirements.	4.42	A	4.40	A	4.27	A	4.36	A
Capacity. Degree to which the maximum limits of the system parameter meet the requirements.	4.37	A	4.2	A	4.33	A	4.32	A
Overall Mean	4.46	A	4.3	A	4.33	A	4.37	A

Legend: WM- Weighted Mean, VI- Verbal Interpretation, HA- Highly Acceptable, A-Acceptable, MA-Moderately Acceptable, U Unacceptable, HU-Highly Acceptable

The students evaluated that the developed system was able to meet the requirements in time behavior, in utilizing its resources when performing tasks and it met its maximum limit of the system parameter required. The faculty members perceived that the developed system was able to perform efficiently with a mean of 4.23. Lastly, the IT experts perceived the developed system as acceptable with a 4.33 mean for all categories.

As for the interview organized after the evaluation, the respondents observed that the system was able to act in response to requests in an apt and judicious manner. It was also derived from the interview that the system was able to serve several users at the any one particular point in time. Performance efficiency is dictated by how an application carries on under expressed condition. It influences consumer loyalty, labor force profitability, application adaptability, reaction time debasement, and insufficient utilization of preparing or capacity assets. Despite the fact that the general performance efficiency of an application is wanted, the individual parts execution of an application influences the general presentation proficiency of the created framework just as the interconnectivity of these individual segments. According to ISO 25010, it is a collection of characteristics that lean on the connectedness between the level of performance of the product and the mensuration of possession utilized, under explicit stipulation.

The table 3 presents the assessment on the usability of the system.

Table 3
The LMS Usability

	Students		Faculty		IT Experts		Overall	
Functional Categories	**WM**	**VI**	**WM**	**VI**	**WM**	**VI**	**WM**	**VI**
Appropriateness Recognizability. Degree to which users can recognize whether the system is appropriate for their needs.	4.53	HA	4.67	HA	4.33	A	4.51	HA
Learnability. Degree to which the system can be used by specified users to achieve specified goals of learning to use the system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use.	4.65	HA	4.67	HA	4.53	HA	4.62	HA
Operability. Degree to which the system has attributes that make it easy to operate and control.	4.62	HA	4.53	HA	4.53	HA	4.56	HA
User error protection. Degree to which the system help users against making errors.	4.33	A	4.20	A	4.20	A	4.24	A
User interface aesthetics. Degree to which a user interface enables pleasing and satisfying interaction for the user.	4.32	A	4.40	A	4.40	A	4.37	A
Accessibility. Degree to which the system, can be used by people with the widest range of characteristics and capabilities to achieve a specific goal in a specified context of use.	4.47	A	4.40	A	4.40	A	4.42	A
Overall Mean	4.49	A	4.48	A	4.40	A	4.45	A

Legend: WM- Weighted Mean, VI- Verbal Interpretation, HA- Highly Acceptable, A-Acceptable, MA-Moderately Acceptable, U Unacceptable, HU-Highly Acceptable

In terms of suitability, users recognize that the LMS is acceptable as the overall mean from the three groups of respondents for the six usability categories is 4.45. Respondents reiterated during the interview that the framework is genuinely simple to use without specialized foundation as well as it is good for a wide range of clients.

The students recognized that the system is easy to use and always accessible receiving a mean of 4.49 which is 'acceptable'. Meanwhile, the faculty members acclaimed that the system operates according to their usage requirements with a mean of 4.48. Lastly, the IT experts identified that the system is appropriate for their usage requirements with a mean of 4.40. Usability refers to the ease of usage and the learnability of the

created framework. It additionally alludes to the time distributed to play out an undertaking, blunders made and the span it takes for the client to be equipped in utilizing the framework. According to ISO 25010, it is the amount a component or model can be used by known clients to do bespoken goals with practicality, competency and consummation in a predefined background of utilization.

Table 4 reports the assessment of the LMS reliability.

Table 4
The Reliability of the LMS

	Students		Faculty		IT Experts		Overall	
Functional Categories	WM	VI	WM	VI	WM	VI	WM	VI
Maturity. Degree to which the system, product or component meets the needs for the reliability under normal operation.	4.52	HA	4.33	A	4.33	A	4.39	A
Availability. Degree to which a product or system is operational and accessible when required for use	4.60	HA	4.53	HA	4.53	HA	4.56	HA
Fault Tolerance. Degree to which the system operates as intended despite the presence of the hardware or software faults.	4.17	A	4.27	A	4.27	A	4.23	A
Recoverability. Degree to which the system can recover the data directly affected and re-establish the desired state of the system	4.37	A	4.40	A	4.40	A	4.39	A
Overall Mean	4.41	A	4.38	A	4.38	A	4.39	A

Legend: *WM- Weighted Mean, VI- Verbal Interpretation, HA- Highly Acceptable, A-Acceptable, MA-Moderately Acceptable, U Unacceptable, HU-Highly Acceptable*

The respondents appraised the LMS as 'acceptable' in which it worked dependably under ordinary working conditions and updates with a weighted mean of 4.39. The students remarked that the program addressed the challenges for reliability since it accumulated a mean of 4.41. The faculty members and the IT experts assessed the system with an acceptable reliability (WM - 4.38).

The interview revealed that the framework is accessible and has the option to offer assistance whenever the user requires. The reliability of a product framework is a proportion of how well clients are furnished with the services required. It is characterized as the likelihood of mistake free activity for a particular time in a particular climate and for a particular reason. According to ISO

25010, it is a collection of constructs that lean on the ability of the program to keep its steady execution under declared premises for an expressed time period.

LMS Implementation Plan

Table 6
The School X Knowledge Transfer Plan

No.	Task Name	Location	Owner	ETC (HRS)	Planned Start Date	Planned End Date
1	Knowledge Transfer for Learning Management System Learning Management System		School X	10 Days	Jan. 1, 2021	Jan. 10, 2021
2	Integration Testing Learning Management System		School X			
3	Interface Testing User Acceptance Testing (Learning Management		School X	10 Days	Jan 11, 2021	Jan. 20, 2021
4	System)		School X	5 Days		
5	Phase I- Implementation Admin Module User Training (Input Module) Installation and Pre-Production Run (Operationalize)		School X School X School X School X	2 Days 3 days	Jan. 21, 2021 Jan. 23, 2021	Jan. 22, 2021 Jan. 25, 2021
6	Phase II-Implementation Faculty/ Teacher Module User Training (Input Module) Installation and Pre-Production Run (Operationalize)		School X School X School X School X	2 Days 3 days	Jan. 26, 2021 Jan. 28, 2021	Jan. 27, 2021 Jan. 30, 2021
7	Phase III-Implementation Student Module User Training (Input Module) Installation and Pre-Production Run (Operationalize)		School X School X School X School X	2 Days 3 days	Jan. 31, 2021 Feb. 2, 2021	Feb. 1, 2021 Feb. 4, 2021
8	Cut Over		School X	1 Day		

The implementation plan denotes the scheduled plan of instruction for each group of users. This also contains the matters discussed and training method used. As shown in Table 6, the project targets and the Gantt chart for the implementation of the program were illustrated.

Conclusion

The Waterfall Model was used in the development of LMS for Data Structures and Algorithms. This method encompassed several methods which are requirements analysis, system design, implementation, testing, deployment, and maintenance phases. The overall assessment indicated that the system is 'acceptable' as supported by the weighted means of 4.49 for the students, 4.43

for the faculty members, and 4.38 for the IT experts. Furthermore, the weighted means for each component are 4.51 for functionality, 4.38 for performance, 4.45 for usability, and 4.39 for reliability. These numerical evidence prove that the LMS for Data Structures and Algorithms serves its purpose and greatly benefits the end users especially in terms of functionality, performance, usability, and reliability in accordance with the standards of ISO 25010. Meanwhile, the ANOVA showed no significant difference in the LMS evaluation of the three groups of respondents in terms of functional suitability, performance efficiency, usability, and reliability. Therefore, the null hypothesis is accepted.

An implementation plan was also developed for the use of the LMS. It shows comprehensive procedures that elucidate the distinct functionalities of the system. A Gantt chart was created to have an idea of the timeline for the implementation. The methods in the user manual have been evaluated and tested to facilitate the understanding of the detailed usage of the LMS.

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Collaborative Interaction Management System (CIMS) for Higher Educational Institutions

Dr. Salvacion M. Domingo

Introduction

In the traditional lecture-based method of teaching and direct instruction, learning is primarily perceived as involving the simple transfer of fixed knowledge from the teacher to the students. In this paradigm, the teacher's main responsibility is to cover as much course material as possible and deliver knowledge to their students. In such a setup, learning is conceptualized as a mere additive process where the minds of students are viewed as empty vessels in which knowledge can easily be poured into. As such, learning is simplistically presumed to have occurred when students have individually acquired the knowledge they received in their heads (Bloom, 1956). While such methodology and perspective has been around for a long time, and remains the most common form of instruction, it nevertheless has numerous disadvantages (Terenzini et. al., 2001; Baghcheghi et. al., 2011).

Today, spurred by the development of several learning principles, approaches on classroom instruction have evolved considerably. Educators have increasingly realized the inadequacy of the lecture-based approach and have started to view learning as a process that is based more on student's personal experiences. This realization has spurred the re-conceptualization of learning from an additive process to a developmental one wherein students are viewed to independently and continually re-organize knowledge and had created new representations for them. In this new paradigm, learning is defined as being context-sensitive and focused on self-discovery and exploration. Knowledge therefore is viewed as being created more within a group process where interaction between individuals and the sharing of experiences in the learning activities are the primary motivators. The teacher's

responsibility in this scenario is also shifted towards getting students to interact with each other in a productive and supportive manner rather than simply delivering course materials.

In light of the need to develop discussion support tools that can help improve the utility of educational forum discussions, the proponent sustains the idea that an environment (similar to LMS and CMS) specifically suited for implementing online forums and managing student's collaborative interaction are necessary precursors to promoting wide-spread utilization of this communication technology among higher educational institutions in the Philippines. In this research, such technology is referred to as Collaborative Interaction Management System (CIMS). The development of CIMS is the focal interest of this study. The general objective of this study is to explore the feasibility of developing a CIMS environment suitable for use by teachers and students in the Philippine settings. Specifically, it aims to design a framework that can be used to develop the CIMS environment and implement it in a prototype web-based software artifact.

Theoretical Framework

Jahng, Nielsen, and Chan (2010) provided a sample conceptual framework describing the new teaching paradigm as shown in Figure 1.

Figure 1
Conceptual Framework Describing a Collaborative Learning Paradigm

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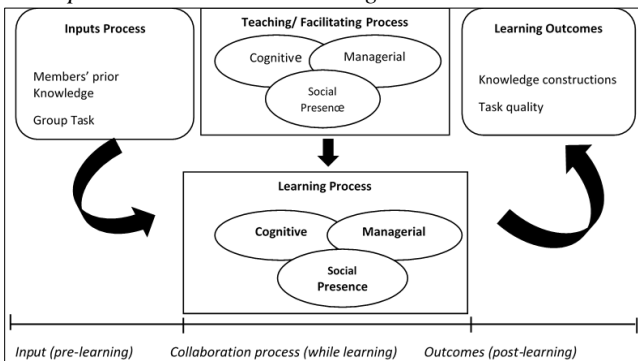
Learning environments that emphasize the social nature of learning are considered as valuable tools in this new paradigm. Tools like forum discussions that pay particular attention to promoting and encouraging communicative cooperation and collaboration are good examples of this kind of environment. In fact, in the e-learning panacea, both in the academia and the industry, discussion forums are gaining tremendous popularity as a mechanism for increasing learner interaction (Rosenfeld and Gregory, 2012).

Unfortunately, utilization of discussion forum in academic setting has been often problematic. The main culprit is the enormous amount of time and effort that it levies to implementing teacher-mediators in monitoring and guiding student interaction. Another factor is the high level of difficulty faced by the implementing teachers in evaluating the contributions of students in such online interactions (Roig and Rosales, 2012). In the field of eLearning, similar problems are being addressed through the development of specialized environments such as the Learning Management System (LMS) and Content Management System (CMS).

The work described in this study aims to adopt the same strategy by designing a framework that could be used to develop a management system that could potentially provide teachers some assistance in managing the student's collaborative interaction in forum discussions. Such environment can be referred to as a Collaborative Interaction Management System (CIMS). It also aims to propose a strategy for constructing and developing an application that implements and demonstrates the capabilities of the proposed framework.

The conceptual model, shown in Figure 2, of the three important components of an Educational Asynchronous Online Discussion environment proposed by Raga (2013) provides the paradigm guiding this study.

The model highlights the three components of an educational forum environment: (1) The Discussion Forum software, (2) The Interacting Students, and (3) The Teacher Moderator. It also

shows that there is a problematic relationship that exists between each of these components. The model also highlights the importance of discussion support tools. These tools can provide functions that can act on the problems specified in order to neutralize or at least minimize its occurrence. These functions are represented as α, γ, and β in the above model.

Figure 2
Components of educational asynchronous online discussion and the problematic relationship between them

Educational Asynchronous Online Discussion
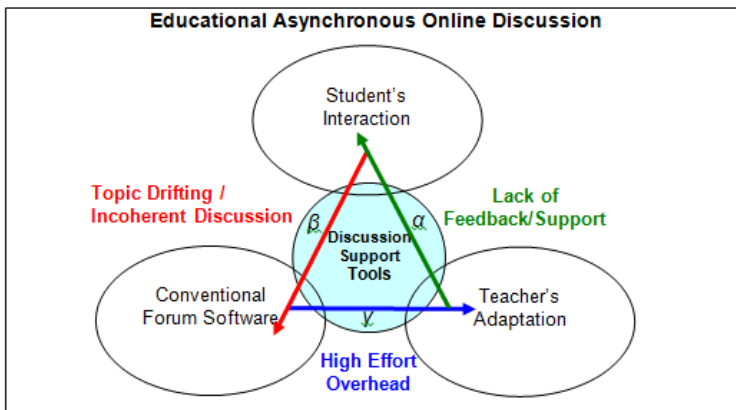
Source: Raga (2013)

For example, discussion support tools can provide information that can minimize the number of decisions that teachers have to make with regards the utilization of their time and attention and can also provide assistance with the assessment of individual student's performance (γ). Such functions can give teachers more flexibility in fulfilling their tasks as discussion moderators (α). At the same time, issues related to topic drifting and incoherent discussion can also addressed by allowing students some access to the interaction visualizations that automated support tools can generate (β).

Methodology

System Prototype Development

Figure 3 depicts the outline that was followed in the development process of the system.

Figure 3

Outline of prototype system development process
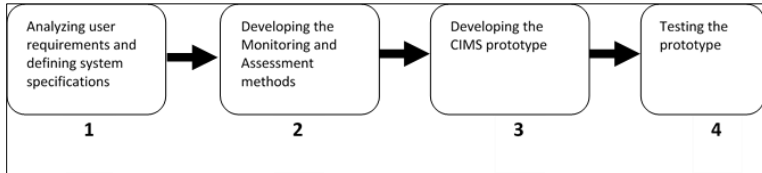
In general, problems associated with implementing educational forums can be summarized into two key issues: (1) Discussion moderation, and (2) Assessment and Feedback. As such, at the most fundamental level, the purpose of the CIMS environment is to monitor incoming message contributions of students in order to track the collaborative activity of student groups and automatically provide assessment reports on learning progress to moderating instructors. The context diagram in Figure 6 outlines some of the salient details illustrating the general applicability of the CIMS environment for this purpose.

For the activity monitoring to commence, the mediating instructor must first provide the system with reference texts/learning materials for the topic to be discussed along with other discourse parameters. The reference texts will be used as background domain knowledge by the system in generating numeric ratings of the topical relevance of each message contributions.

The numeric ratings of the message contributions, in turn, will be used to estimate the domain knowledge state of individual students, which will also form part of his/her participation profile. The participation profile will be made accessible to all students in order to ensure immediate participation feedback, allowing students to independently adjust their participation level/pattern.

Figure 4

Proposed architecture of the CIMS environment
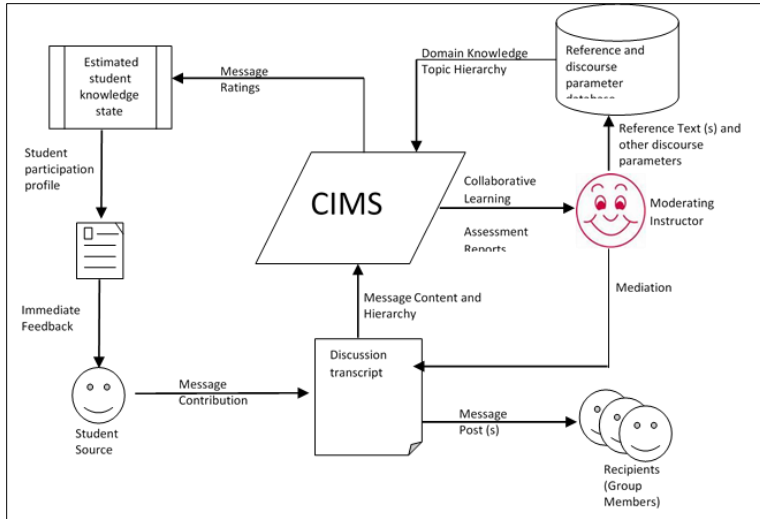
The technical skills utilized by the proponent that has an impact on the development of the CIMS environment included the following:

- programming skills for Java Server Pages (JSP), Javascript, and HTML;
- administrative knowledge of webserver, more particularly, resin-server
- database design and implementation using Microsoft Access

Utilization of these tools is described as follows:

- HTML (Hypertext Markup Language) was used to develop the front-end Web pages of the system
- JSP (Java Server Pages) was used to create a dynamic Web page interfaces that interact with the database;
- Javascript was used to write client-side validation scripts
- Resin Server was used as a proxy web server.
- The appropriate database structure was created to hold the system data and implemented in .mdb format
- Support data was stored either in XML format.

Figure 5
High level system overview of the system design
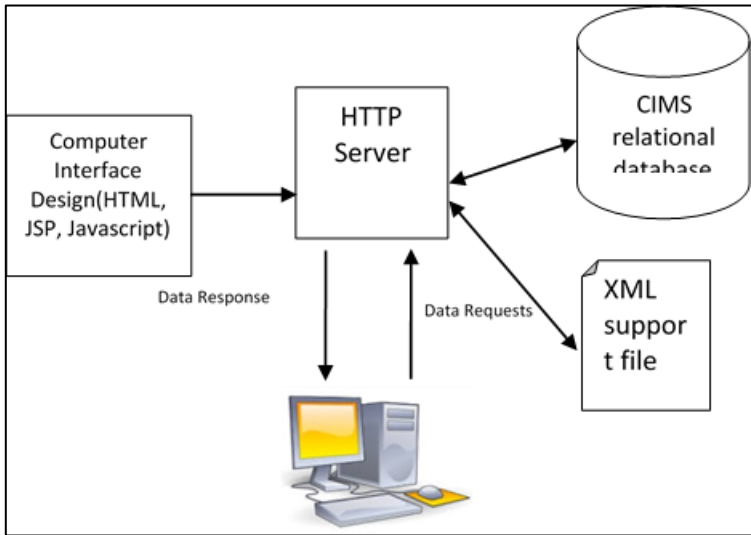
Due to the short span of development time allotted to this study, the design and behavior of the system was tested using only alpha testing and limited beta testing. To evaluate the system's compliance with the specified requirements and functionalities, the alpha testing was done as follows:

- Testing of all hyperlinks in the system Web-based interface;
- Entering of sample data via the Web-based interface to test database functionality and system displays;
- Testing of all input fields for JavaScript validation where relevant.

Two sets of forum transcript data will be used as dummy inputs follows:

1. Malfunction dataset. This dataset will be intentionally designed so that it may cause the system to malfunction or return incorrect information. The purpose of this is to cull out any unseen bugs in the system in order to fix it and improve the ability of the system to adapt and respond to incorrect input.

2. Performance dataset. This dataset will be designed to measure the system's implementation of the assessment methods along with the individual processes and data flows.

Assessment Issues

The approach developed by Raga (2013), a word space-based approach for measuring the topic relevance of message contributions in asynchronous discussions was adopted in this study. The approach implements an algorithm that combines two of the most important text signatures used in the representation of word semantics, (1) the lexical distribution similarity and (2) the statistical word regularities, in order to generate the topical relevance ratings of individual messages. Figure 7 specifies the basic schematic of this approach.

The approach consists of a two-stage process: (1) the training phase, and (2) the testing phase. The training phase requires a reference document input to be used for generating background domain knowledge of the system while the training phase processes incoming forum message contributions and measures the semantic proximity of its contents of the current domain knowledge of the system. Both phases heavily rely on Natural Language Processing Technologies (NLP).

The message ratings are addressed to the mediating instructor, wishing to distinguish the important contributions of a forum, for further examination, thus helping him/her to diminish the workload required with traditional methods (e.g. reading all the messages sequentially). Thus this approach is suitable for use in large forae, containing many threads, produced by many users, similar to the environment which is the context of this study.

Figure 6

The word-space based approach proposed by Raga (2013) for measuring the topic relevance of message contributions
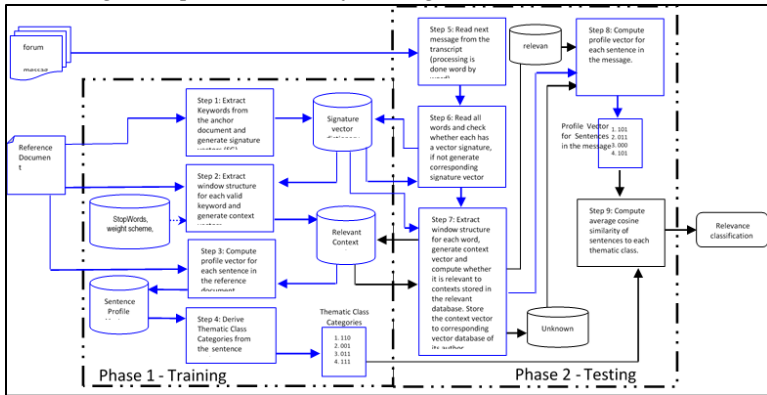
The word-space-based approach enables any system to visualize the topic structure of any forum discussion. However, it only generates numeric ratings for individual messages. For this reason, to model the collaborative learning interaction of students and generate numeric group ratings, the proponent suggests the following formula which simply averages the numeric ratings of all the messages over the total number of messages generated in a group.

A word-space model is a spatial representation that derives the meaning of words by plotting these words in an *n*-dimensional geometric space (Sahlgren, 2005). The process of plotting words in a word-space is similar to the way points are plotted in a two dimensional graphing paper. The main difference is that, in the case of a word-space, the dimension *n* can be arbitrarily large; the size of which is determined by the number of unique word type in the set of words to be plotted.

Usually, the coordinates used to plot each word depends upon the frequency of the contextual feature that each word co-occur with within a text. For example, words that do not co-occur with the word to be plotted within a given context are assigned a coordinate value of zero. The set of zero and non-zero values corresponding to the coordinates of a word in a word-space are recorded in a so-

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called *context vector*. Because most of the words in any text dataset will never co-occur with a particular word, the coordinates recorded in a context vector will often be sparse or full of zero values.

By itself, the position of a word in a word space does not indicate anything about its meaning. To deduce a certain level of meaning, this position needs to be measured relative to the position of other words. In this sense, a linguistic concept known as the "Distributional Hypothesis" is applied. This concept states that: "*words that occur in the same contexts tend to have similar meanings*". Having similar contexts means that words are surrounded or that they co-occur with same set of words, thus, if we plot these words in a word-space they would be positioned close with each other. The level of closeness of words in the word-space is often referred to as the spatial proximity of words. This spatial proximity is what is used to represent the semantic similarity of words. A common approach used to determine spatial proximity is to measure the cosine of the angle between the context vectors; this approach is known as the cosine similarity measure. The formula for computing cosine is as follows:

Equation 1 $$CoSim(Q, D_j) = \frac{\sum W_{Q,j} W_{i,j}}{\sqrt{\sum W^2_{Q,j}} \sqrt{\sum W^2_{i,j}}}$$

Where: Q is a vector representing one term or document, D is a vector representing another term or document related to Q, and *w* are term weights

Currently, there are three major approaches to implementing a word space. These include Latent Semantic Analysis (LSA), Hyperspace Analogue to Language (HAL), and Random Indexing (Sahlgren, 2005). For our purpose, we opted to use the Random Indexing approach.

Equation 2. $$\frac{\sum_{msg=1}^{n} tnr_{msg}}{n}$$

Where:
tnr is the topical numeric rating of each message
n is the total number of messages in the discourse transcript

Since this formula hinge on the numeric ratings generated by the word-space-based approach, validating its efficiency also hinges on the efficiency of the measures generated by the word-space-based approach. However, the only means of measuring the efficiency of any automated system is to compare it with the decisions generated by human analysis. Such inquiry will no doubt require a huge amount of data transcript, not to mention, manpower.

To go around this issue, this study resorts to experiments that compare the performance of the system on educational discourse transcripts downloaded from the Slashdot forum. Slashdot is a popular online technology-news and discussion site with a large membership. Its main feature is its community based moderation system that awards an explicit rating of between -1 and +5 for every message posted in its threaded discussion, where posts considered as less interesting are rated -1 and highly interesting and quality posts are rated 5. Studies show that this rating system can be used to separate particularly good and bad content from the average ones.

Figure 7
The SlashDot Discussion Board
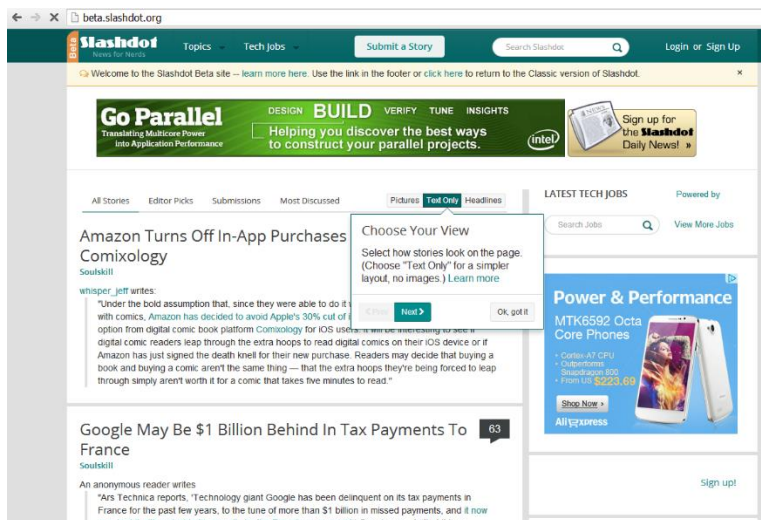
The message data from SlashDot was considered as providing a suitable proxy data for the assessment of CMIS's performance for two reasons:

1. The format of the Slashdot forum is fairly similar to an educational discussion type of interaction where a reference document is provided and the participants are asked to align the topic of their contributions to the topic represented by the reference document.

2. The ratings that Slashdot assigns to each message is fairly synonymous to a relevance rating since it (Slashdot) also uses these ratings to implement a recommender and reputation feature for participants that only want to read selected messages. This means that the message ratings can be interpreted and used as code tags (e.g., Relevant or Not Relevant) for the messages and this code tags can be compared to the ratings generated by CMIS.

A total of one thousand messages from SlashDot will be downloaded for this purpose and Cohen's kappa (Cohen, 1960) will be used to compare the decision of the system and the ratings of assigned by SlashDot. Cohen's kappa (K) measures the agreement between two raters who each classify N items into C mutually exclusive categories. The equation for K is:

$$\text{Equation 3.} \qquad K = \frac{P(A) - P(E)}{1 - P(E)}$$

Where: $P(A)$ = the number of judgments on which the coders agree
$P(E)$ = the number of judgments for which agreement is expected by chance.

After computing for the value of K, the magnitude guidelines shown in Table 1, as suggested by Landis and Koch (1977) can then be used to interpret this kappa value.

Table 1

Interpretation of the magnitude of Kappa values as suggested Landis and Koch

Kappa (K)	Strength of Agreement
< 0.00	Poor
0.00 – 0.20	Slight
0.21 – 0.40	Fair
0.41 – 0.60	Moderate
0.61 – 0.80	Substantial
0.81 – 1.00	Almost Perfect

To give an example of how Cohens Kappa is used. Consider a scenario where two coders are tasked to classify N items into one of two possible categories (e.g., Relevant (R) or not relevant (NR)), the format of the contingency table that will be generated will be as shown in Table 2.

Table 2

Contingency table used in computing Cohen's Kappa

		Coder 2		
		NR	R	Total
Coder 1	NR	A	B	G = A+B
	R	C	D	H = C+D
	Total	E = A + C	F = B + D	N = A+B+C+D

In this table, A is the number of items that both coders classified into the NR category, while B is the number of items that Coder 1 classified into the NR category but Coder 2 classified into the R category, etc. With this contingency table, computing for P(A) and P(E) are as follows:

Equation 4. $P(A) = \frac{(A+D)}{N}$

and

Equation 5. $P(E) = \left(\frac{E}{N}\right)\left(\frac{G}{N}\right) + \left(\frac{F}{N}\right)\left(\frac{H}{N}\right)$

To get an idea of how the kappa statistics work, consider the contingency tables provided in Table 3. Both tables describe the classification decisions of two coders on a 50 items set.

Table 3
Sample contingency tables for computing Cohen's Kappa

		Coder2	
		NR	R
Coder1	NR	2	
	R	4	37

Contingency table #1

		Coder2	
		NR	R
Coder1	NR	16	6
	R	8	20

Contingency table #2

Computing for the kappa of the two coders in the first contingency table, we get:

$$P(A) = \frac{(2 + 37)}{50} = 0.78$$

$$P(E) = \left(\frac{6}{50}\right)\left(\frac{9}{50}\right) + \left(\frac{44}{50}\right)\left(\frac{41}{50}\right)$$
$$P(E) = (0.12)(0.18) + (0.88)(0.82)$$
$$P(E) = 0.022 + 0.722$$
$$P(E) = 0.744$$
$$K = \frac{(0.78 - 0.744)}{1 - 0.744}$$
$$K = 0.14$$

On the other hand, if we compute for the kappa of the two coders in the second contingency table, we get:

$$P(A) = \frac{(16 + 20)}{50} = 0.72$$

$$P(E) = \left(\frac{24}{50}\right)\left(\frac{22}{50}\right) + \left(\frac{26}{50}\right)\left(\frac{28}{50}\right)$$
$$P(E) = (0.12)(0.18) + (0.88)(0.82) = 0.5$$
$$K = \frac{(0.72 - 0.5)}{1 - 0.5} = 0.44$$

Findings and Discussion

The CIMS Software Prototype

Viewed from the perspective of its main feature, the system is composed of five blocks: the Text Processing, the Rating Generator, the Profile Generator, the Group Assessment Generator, and the main Coordinator module. Figure 9 shows the block diagram of the system and the items below describe the corresponding modules and interfaces.

Figure 8
Low Level diagram of the CIMS main function
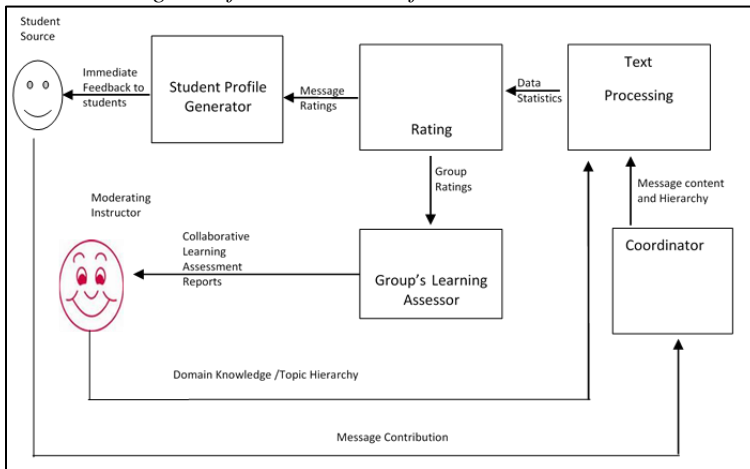
Almost the entire system (approximately 98% of all functions) was developed in JSP. The data manipulated by the system, i.e. Discussion text, participant's data, reference texts and message representations, are stored in a relational database using the .mdb format. Supporting data used by the word-space based algorithm, in turn, is stored in XML files. As the files are read, corresponding data structures and representations are created and loaded into memory by JSP functions. The web-based interface, which is responsible for the system's dynamic interaction with the users in the discussion forum environment, was developed using

combinations of JSP, HTML, and Javascript. Figure 10 shows the homepage interface of the CIMS prototype environment.

Figure 9
The CIMS Homepage
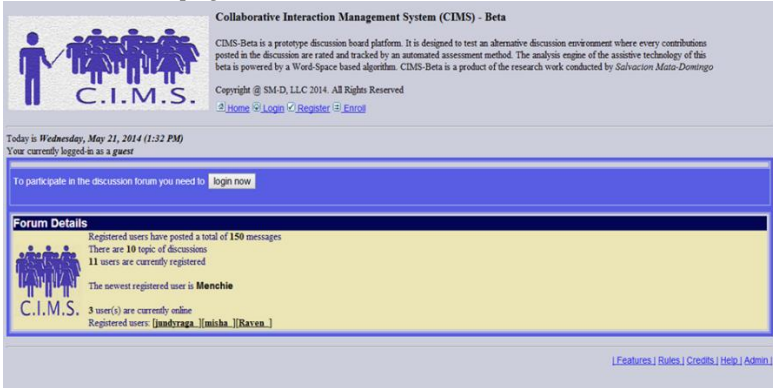
The Coordinator Module

The coordinator module acts as the glue of the system. It's the source of data for all the other modules because it manages the interface that implements the discussion environment enabling CIMS to collate message contents and its hierarchy. In addition, the coordinator module also handles and activates a large number of lateral functions, which represents the various features incorporated into CIMS, as illustrated in figure 10.

Figure 10
Varied Functions of the Coordinator Module
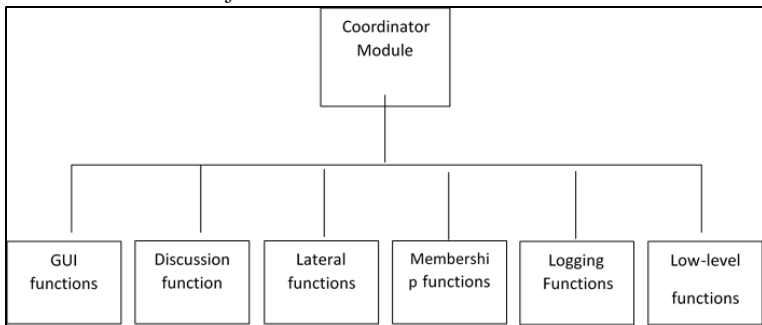
Many of these functions were designed to be conveniently accessed by the teachers through the CIMS Admin Dashboard shown in figure 11.

Figure 11
CIMS Admin Dashboard Interface
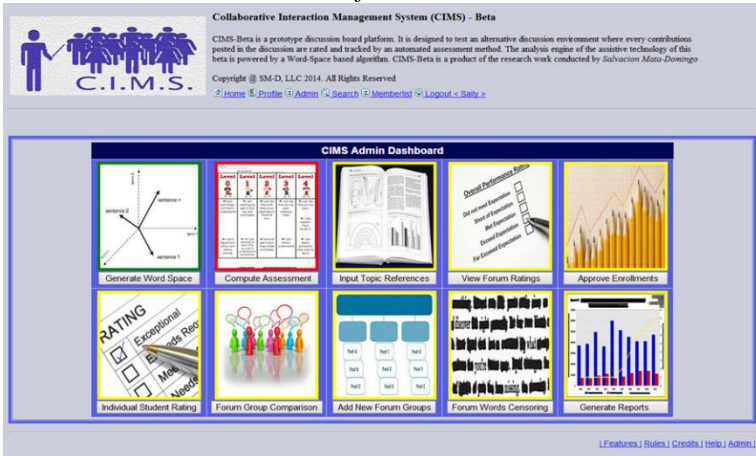
The GUI functions. These are the functions responsible for the low-level processing of text contributions such as adding/deleting/editing messages and managing the list of participants.

The Discussion functions. Functions that perform all actions required to launch a discussion, i.e. To distribute the issues among the participants and to build the initial configuration of the discussion environment.

The Lateral functions. These are functions that are not necessarily essential to the conduct of the forum discussion, but provide additional convenience to the users such as Spell Checking, Topic Display Options, Forum Statistics, Searching, etc.

The Membership functions. These are functions responsible for collecting and maintaining profiles of participants.

The Logging functions. These are functions that implement security in the system and the update of maintained log files.

The Low-level functions. These are the functions responsible for the low-level processing of text contributions such as

adding/deleting/editing messages and managing the list of participants.

The Text Processing Module

In order for CIMS to produce automated ratings of forum messages it needs a diagnostic engine that can analyze the text contents of each message. The analysis process, among other things, is responsible for manipulating the text component of messages and makes use of NLP technology to extract descriptive statistics from these texts and passes these to the rating generator module.

The Rating Generator Module

In order to generate ratings for the messages, the Rating Generator module compares the text statistics of the contents of each message to the overall text statistics generated in the reference text provided by the instructor. The measured amount of similarity is treated as the pedagogical value of the message. It then uses the formula provided in (2) to generate corresponding learning assessment for the group. Figure 16 displays the interface for converting text data into word space values which is used to compute for the ratings of the ,messages. This interface is available to the teachers through the admin interface of CIMS.

Figure 12
CIMS Interface for transforming text data into wordspace values
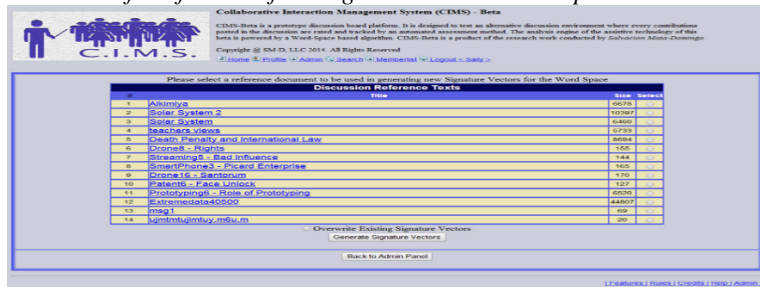
After the appropriate word-space have been generated, the second step of the rating process is to convert each message into its equivalent word space form and compare it numerically to the word-space of the reference text. The comparison is run through using the cosine-similarity measure which generates a value

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between -1 and 1. The values generated represent the degree of similarity between the reference text and the message contents. Figure 13 shows the interface for this process and it represents the second step of the rating generation process.

Figure 13
The second step of the rating generation process

The Student Profile Generator Module

The student profile generator is responsible for the low-level manipulation of the message ratings to generate a representation of the student's comprehension of the topic of discussion; this representation is referred to as the student profile. Figure 14 shows the main interface for generating a student profile.

Figure 14
Interface for generating student profile

In a nutshell, the process of generating the student profile involves collecting all the highly rated content-bearing keywords in the reference text and assigning a numeric value to each by comparing the context of how it is used in the message as oppose to the context of how it was used in the reference text. The teacher is responsible_for_configuring/selecting the final set of keywords to be used as profile templates of the students. Figure 15 shows a sample student profile generated by CIMS including the graphic representation of this profile automatically generated by CIMS.

The representation serves the purpose of providing immediate feedback to the students when interacting with each other, allowing them to self-assess and dynamically adjust their level of participation independent of their instructor.

The Group Learning Assessor Module

Along with the individual message ratings, CIMS was also designed to generate group ratings representing the perceived collaborative learning accomplishment of the group. The formula described in (1) was used to compute these ratings.

Figure 15
Summary of Group Appropriacy

Group Concept Appropriacy Profile

	SUMMARY TABLE		
Stud#	Student	# Messages	Average Cosine
1	Jay-jay DeGuzman	3	0.02804
2	Jundy	5	0.01265
3	Jundy Raga	1	0.14727
4	Katy Sotto Mancenido	2	0.00000
5	Khado Mercado	3	0.00000
6	Stud1	12	0.00000
7	Stud2	22	0.01959
8	Stud3	12	0.00760
9	StudA	1	0.13324
10	StudB	1	0.04273
11	Thea May Teñoso	3	0.00000

AVERAGE GROUP CONCEPT APPROPRIACY

Forum: **AntiCyberCrime**   # Students: **11**   Total # Msgs: **65**   Ave Grp Rating: **0.04**

Figure 17 shows the CIMS interface for activating the process for group assessment while figure 17 shows a sample output of this process.

Figure 17
CIMS Interface for activating the group assessment process
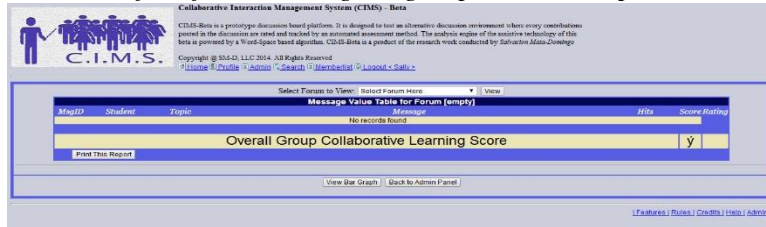
The accuracy and reliability of the performance of the system

The validity of the assessment analysis generated by CIMS depends on the quality of the numeric ratings assigned to each message by the rating generator module. The task of measuring the quality of numeric ratings automatically generated by a system can only be accomplished by comparing it to the decisions rendered manually by human judges. This, however, is not an easy task for several reasons. Firstly, a huge bulk of data must be used to ensure sufficient amount of examples. Secondly, there is the task of asking the human judges to read each message manually in order to render their judgment.

As such, in order to go around these problems, the assessment strategy adopted is to simply compare the ratings generated by the system to the ratings assigned to messages in the Slashdot forum. The objective of this strategy is to determine whether the numeric ratings assigned by CIMS will match the actual ratings assigned by human moderators of the SlashDot forum.

Table 2 summarizes the performance dataset used for this purpose. The number of discussion threads extracted from the SlashDot Forum along with the Thread topic and the number of messages extracted for each thread are also provided.

Table 2

Summary of the results of the SlashDot Tests

Thread Topic#	Accuracy	Precision	Recall	Kappa	# of ref. docs	Total size of ref. docs used
1	0.95	1.00	0.94	0.77	3	1,732
2	0.92	0.90	1.00	0.71	2	1,176
3	0.86	0.88	0.88	0.70	13	5,373
4	0.85	0.93	0.72	0.69	5	1,745
5	0.84	1.00	0.76	0.68	7	2,941
6	0.87	1.00	0.83	0.68	7	3,387
7	0.84	0.90	0.86	0.66	6	3,170
8	0.93	0.93	0.96	0.63	6	2,597
9	0.82	0.87	0.83	0.63	6	3,942
10	0.84	0.88	0.90	0.63	9	4,239
11	0.81	0.69	0.92	0.62	5	7,735
12	0.80	0.70	0.93	0.61	6	2,711
13	0.81	0.75	0.94	0.61	6	2,342
14	0.84	0.86	0.90	0.61	4	2,666
15	0.89	0.97	0.90	0.60	8	4,224
16	0.80	0.77	0.89	0.60	4	1,938
17	0.78	0.78	0.88	0.58	3	4,558
18	0.83	0.91	0.85	0.57	1	3,959
19	0.79	0.58	0.85	0.54	3	836
20	0.81	0.83	0.91	0.54	3	1,144
21	0.81	0.87	0.87	0.53	2	856
22	0.79	0.77	0.93	0.51	11	7,084
23	0.73	0.61	0.90	0.48	6	5,054
24	0.74	0.74	0.82	0.47	5	3,102
25	0.72	0.61	0.91	0.46	5	2,643
26	0.69	1.00	0.58	0.41	1	336
27	0.70	0.62	0.87	0.41	5	2,353
28	0.71	0.74	0.83	0.34	4	6,022

The results of this test, to some extent, provided evidence of the ability of the prototype software to generate acceptable results. In addition, the experiment also offered some very interesting insights into the characteristics of the system's performance. The results, for example, revealed some evidence that increasing the

amount of training data also increased the reliability of the systems decisions if the additional training data also focused on topics covered by some of the messages.

Novelty of the Study

Currently, available discussion forum systems lend support to on-going discussions by merely storing messages and organizing the discussion transcript in some form of hierarchy (e.g., threaded or linear). Although these structures provide distinct advantages and have gained considerable success, they also tend to promote poor results from group interactions (Romiszowski, 1995) and levy considerable effort to teachers in identifying and mediating dispersed learners.

The study aims to provide a framework that can be used to extend the capabilities of in-place structures of current forum systems for supporting online discussions. The framework will need to incorporate features that monitor the discussion and alleviate the task of facilitating and mediating it by providing both the teacher-mediator and the student-participants with an automated means of measuring the quality of posted messages. This quality measurement in turn will serve as a basis for generating continuous evaluation that will provide:

(1) Hints to the student-participants, during message production, on the level of relevance of their contributions to the topical direction of the discussion

(2) Feedback to teacher-mediators regarding the current status of each individual student's exerted level of participation as well as the overall quality of the interaction.

For the teacher-mediator, the feedback will provide a clear indication of problems that could develop within the discussion atmosphere ahead of time. For the student-participants, the hints during message production will provide self-assessment capabilities.

Conclusion

This study developed a framework that can be used to build a forum environment, referred to as a Collaborative Interaction Management System (CIMS) that incorporates an automated method of assessing student's individual contributions and group collaborative learning. The framework was fine-tuned by conducting a survey that identified 20 major features that faculty and students from various universities mostly prefer to be included in a forum environment. A web-based prototype software was then developed that implements the framework along with the assessment method and the 20 top features. To determine the validity of the main feature of CIMS (i.e., The assessment method), sample forum data consisting of 28 threads with a total of more than 1000 messages spanning various topic domains was collected from the Slashdot forum and the numeric ratings assigned to messages in this data was used to measure accuracy and reliability of the numeric ratings assigned by CIMS by analyzing it using Cohen's Kappa. Using Grove et al's (1981) acceptable criteria of $K > 0.5$, results show that CIMS was able to achieve acceptable consistency with a Kappa rating $K>0.5$ among 78.57% of the threads while it was able to achieve the standard the standard acceptable kappa $K>0.6$ among 57.14% of the threads. Although not perfect, these figures indicate that the numeric ratings generated by the system can be dependable to some degree. Finally, while establishing the consistency of the assessment methods of the system, there is also a need to determine the quality level of its software characteristics. While the ISO 9126 software quality model defines several criteria to follow, the nature of the CIMS prototype dictates that Functionality, Reliability, and Usability were the primary criteria that is easily assessable by its user groups. In other words, these are the criteria that can be adopted to enable faculty and students to assess the prototype software. Based on the results of the survey, the overall means have identified that both faculty and students feel that the prototype software are functional, reliable, and usable enough.

During testing, it was found that the procedure for processing text data inside the system proved to be a lengthy process and may not

be feasible for implementation for medium-large sized classes. It is recommended that research can be done to try and improve the procedure by minimizing overheads processes. There is also plenty of space for optimization with regards to the time and space complexity requirements of the system. At the moment, based on experience, running the assessment method to compute assessment scores with some messages will already take a few minutes to complete. In a real-world application, this would also be unacceptable. There is also no complete report printing functionality implemented. This would prove to be very useful if a tool of this kind were to be used in a real-educational situation.

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The Teaching and Learning Modality in the 'New Normal'

Helen B. Ancheta

Introduction

The COVID-19 pandemic has resulted to lockdowns of academic institutions all over the world. The closure has drastically changed the teaching and learning process that opened the way to e-learning wherein teaching is undertaken remotely through digital platforms. With this sudden shift away from the classroom, the educational system has developed plans to continue the teaching and learning process away from the classroom. The teaching and learning in times of crisis assumed a different strategies. Most academic institutions have identified various means to continue the teaching-learning activities. One of the emerging reality is the adaptation of online learning modalities to lessen the risks of having face to face classroom interaction.

Considering the connectivity issues, the perception of flexible learning has emerged as an option for an online learning particularly in the higher education sectors in the Philippines. The flexible learning gives an option for the students as to the pace, place, and mode of learning (Gordon, 2014). On the other hand, in terms of flexibility, since face to face modality is restricted, teachers may consider flexible distance learning options particularly in the public schools in the Philippines. This flexible learning includes: module-based learning, project based, and television broadcast. For those with internet connection, a synchronous and asynchronous online learning may be considered.

This article evaluates the various teaching and learning modalities used in the Philippines. It presents the advantages and disadvantages of the modalities. In addition, the different aspects of the teaching and learning are given lights in order to successfully implement any teaching and learning modality.

Discussion

Teaching and Learning Modality

This is a clear statement on the flow of the learning delivery mode in the new normal. Private basic education institutions have an option on the teaching and learning modality. Since distance learning education (DLE) is encouraged, the online teaching is the most feasible option. However, not all academic institutions are prepared and have the resources to adopt the online teaching. Thus, the blended approach, a combination of synchronous and asynchronous teaching and learning modality, is the option of most of the private basic education institutions. Lawless (2019) describes blended approach as a learning modality that combines online learning where there is an interaction between teachers and students using specific platform and offline learning wherein students are given time to work on various performance tasks at their own pace.

    a. *Asynchronous Learning*

This type of learning is known as an independent learning where students learn at their own pace. Its premise is learning in different times and spaces (Finol, 2020). The students are provided with learning materials like modules, workbook, worksheet and textbook that aid in their independent learning process. Students in this learning modality have one common communication channel either email, learning management system (LMS), Moodle or any other social media platforms that give students access to the learning materials. This modality is based on constructivism theory where students are actively constructing their own knowledge through their own experiences (Elliott, 2000, p. 256). According to Gardiner (2020), this mode is specifically helpful for students with difficulty attending specific time schedules. It also allows peer collaboration through group assignments where students can work and review tasks together. Ultimately, this aids to those with no full access to the internet.

For academic institutions with their own LMS, management of the learning materials is easy for both the teachers and the students. All

quizzes, class works and other performance tasks including quarterly assessments can be made readily available. The user administrators can also create email accounts for students using Microsoft Office 365 for easy communication. However, schools with insufficient funds and resources make full use of the modular approach. If no available platform for the upload of the learning materials, parents can claim materials from the school observing proper protocols. In reality, this allows teachers to work at home while students learn at home at their own pace. However, a serious issue is on the online assessments. Online examinations through a 'trial and error' approach lead to uncertainty. Interruptions and internet glitches affect students' performance that might lead to increased failures. Results might not be favorable for both the teachers and the students. Gardiner (2020) shares best practices for asynchronous learning. One powerful way is through a record of any components of the syllabus. It is mandatory also to communicate with the students and provide specific instructions either through email or a discussion thread in a portal.

b. *Synchronous Learning*

This is a real time online learning with live interaction between teacher and students using specific online platforms. The learners and teachers are in the same place online at the same time for learning to take place (Finol, 2020).   It includes video conferencing, live-streaming lectures and chatting using Google classroom, Google meet, Zoom, MS Teams, and other platforms (The Best School, 2018). This allows similar face to face classes through a virtual room. For most of the learners, it gives opportunity for online interactions (Simonson et al., 2012), allows immediate question and answer session (Hrastinski, 2008) and offers personalized learning opportunities (Lorenzo & Ittelson, 2005). For example, in a study conducted by Park and Bonk (2007) in a synchronous graduate class found that there was no difference between the online and in-class students in terms of learning strategies for synchronous discussions. However, the case is very much different for the school children.

Hrastinski (2008) provided a clear view as to when, why and how to use asynchronous and synchronous e-learning as provided in table 1.

Table 1

When, Why, and How to Use Asynchronous vs. Synchronous E-Learning

	Asynchronous E-Learning	**Synchronous E-Learning**
When?	Reflecting on complex issues When synchronous meetings cannot be scheduled because of work, family, and other commitments	Discussing less complex issues Getting acquainted Planning tasks
Why?	Students have more time to reflect because the sender does not expect an immediate answer.	Students become more committed and motivated because a quick response is expected.
How?	Use asynchronous means such as e-mail, discussion boards, and blogs.	Use synchronous means such as videoconferencing, instant messaging and chat, and complement with face-to-face meetings.
Examples	Students expected to reflect individually on course topics may be asked to maintain a blog.	Students expected to work in groups may be advised to use instant messaging as support for getting to know each other,

Students expected to share reflections regarding course topics and critically assess their peers' ideas may be asked to participate in online discussions on a discussion board.	exchanging ideas, and planning tasks. A teacher who wants to present concepts from the literature in a simplified way might give an online lecture by videoconferencing.

Source: Stefan Hrastinski (2008)

    c.   *Blended Learning*

A survey has to be carried out prior to the selection of learning modality to be used. Taking the current situation in the country as rank 104 among 160 countries in internet connectivity, Salac and Kim (2020) admit that the internet infrastructures are behind the developing countries in Asia. It is also a fact that not all students have access to internet and technology. Since the learning modality entails the use of internet connection, situation presses for a blended approach, a combination of asynchronous (offline) and synchronous (online).

For Shank (2020), the use of synchronous sessions can be recorded as part of the asynchronous model. This allows students to access the recordings at any time during their independent learning hours. In a study conducted by Perveen (2016) in Pakistan among 1025 undergraduate students, it was found that the asynchronous learning was quite beneficial for second language learners with scaffolding by synchronous sessions. The author suggests for a blended approach as an ideal model for e-learning.

Curriculum Contents

The curriculum contents in the distance learning is based on the revised Most Essential Learning Competencies (MELCs) set by Department of Education. A clear statement of the quarter

calendar showing the learning areas to be covered each quarter is required to be stated in the Learning Continuity Plan (LCP). All private basic education institutions need to clearly present a statement indicating the learning areas students need to undertake for the whole year. Course requirements are indicated to ensure that the intended learning outcomes are met after every quarter. In the case of blended approach, a sample copy of prepared workbook and/or worksheet are presented or attached as part of the annexes.

To address the impact of Covid-19 in the Philippines, DepEd affirms its commitment on the delivery of quality education relevant to the basic education services anchored on its slogan "Sulong Edukalidad" framework (Pascua, 2020). It was also pointed out that the revised MELCs are part of the DepEd's response to develop resilient education system especially during emergencies to be rolled out for SY 2020 - 2021. Thus, the private basic education institutions are required to follow the MELCs to continuously produce holistic Filipino learners acquiring the 21st century skills despite the use of blended or distance learning.

Assessments

Learning outcomes in the form of knowledge, skills, attitudes, and values are the major measures of the teaching and learning in the basic education. This part needs a clear statement that the assessments are still in compliance with the DepEd's standard indicating the required percentage in each of the components including written work, performance task, and quarterly assessments. According to the DepEd Order No. 8, (2015), classroom assessment is an integral part on the implementation of the curriculum. It becomes the bases for measuring the performance and progression of the students. This also acts as parameter for the necessary adjustments on the teaching strategies as set in the policy guidelines.

According to Russell (2001), there is no difference in the achievement of learning outcomes as measure in grades or exams between the face to face and e-learning modality. The same was

the results of the study conducted by Francescucci and Rohani (2018) on the 698 undergraduate students in North America. The specific statistical comparison between the face to face and the virtual, interactive, real-time, instructor-led (VIRI) showed same level of students performance in both methods. Given the results of the previous studies, the adaption of the e-learning at the current state may not be similar in the outcomes. There are various considerations such as the attention span of the children, the assessment mode, monitoring and supervision during assessment and other social and environmental factors.

Teacher's Role

The role of the teacher in the new normal plays a big part on the teaching and learning process using the chosen modality. The role is expanded as compared to the normal classroom setup. In the new normal, the teachers must be available at all times even though they are working at home. Although a bit burden for the teachers, they need to be available online at all times in case of queries from the students and parents. As Tarek (2016) emphasized that since distance learning entails high level of interaction between the teacher and students, the teacher must treat learning problems that students might encounter taking into account the individual needs of the students in terms of their learning styles. Teachers must initiate virtual learning activities such as collaborative work to motivate students to learn. They should be more creative, motivate their students to actively participate in the virtual learning and engage the students to a deeper learning so that the desired learning outcomes are met (Tuscano, 2020).

Saxena and Saxena (2020) developed a framework as to the role of teachers during the pandemic as shown in Figure 1. It highlights the teaching levels for effective learning which enable to unfold the fears and mysteries of immature learners.

Figure 1
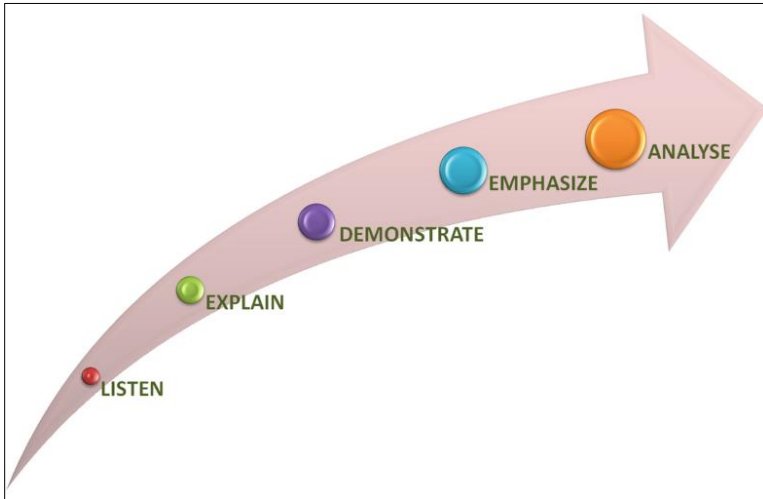
Teaching levels for effective learning

As the children have different nature and learning styles, teachers need to develop different teaching levels suitable to the students. Aside from the different teaching strategies, Warden et al. (2013) disclosed the result of the nine-year action research on 3630 students that the main source of problem in the synchronous learning is behavior. Thus, the virtual classroom management is a measure of success in the new normal of teaching. On the other hand, Bower et al. (2013) found that the main challenge in blended learning were communication and split attention. Given the current situation worldwide, it is the prime responsibility of the teacher to ease the fears and anxieties of the children. In reality, it will not be easy to educate the children something beyond their grasps such as the pandemic. For this, training of teachers on the facilitation of the new normal teaching and learning is indeed necessary requirement. Certification and training programs on the use of various platforms is required as well us preparation of modules and workbooks.

Learner's Role

In the new normal, learning on the part of the students is a drastic change be it online class using a platform or offline classes through independent learning. Since students are used to face to face interaction with the teacher, it will be quite difficult for them to suddenly adjust to the new system. It requires proper orientation and familiarization of the new normal. The learners need to be encouraged to adapt the new learning modality and understand the lessons at their own pace with the assistance of their parents and or guardian.

Parents' Role

The parents play a big role in the academic performance of their child in the new normal of teaching and learning. Their critical role is addressed at the beginning through a consultative session in the adaption of the learning modality. According to Kuruvilla (2020), the role of parents in the virtual learning is important. Since students are home-schooled, they have to monitor the development and performance of their child on their day-to-day activities during the independent learning hours. Without the help of the parents, teachers will not be able to meet the desired learning outcomes at the end of the day.

According to Rich (2020) parents should cast their children's fears of the situation. The stress and anxiety level of the children increase due to the challenging times. Their role intensifies as their children are home-schooled. They should be keen on the problematic reactions of their children as it increases their stress level. It is advisable to have reasonable distractions while doing independent learning. Saxena and Saxena (2020) suggest that parents control their anxiety first and be in stable mental health condition before facing their children. The support of the parents is critical to the learning development of the children in the absence of the teachers.

Communication Plan

Communication plays an important role in the implementation of the new teaching and learning modality. Haythornthwaite (2002) suggests the three types of communication in sustaining e-learning communities: content-related communication, planning of tasks and social support. It serves as a road map on how teachers, learners and parents connect with each other. To be transparent with the stakeholders, a statement on the medium to be used need to be stated clearly. There is a clear process on how important information, announcements and other updates reach the stakeholders. Everitt (2020) emphasizes that transparency to stakeholders is very important to maintain the two-way communication about the status of the newly implemented program.

Continuance

The school pledges that teachers have continuous learning and enhancement program on the use of technology and other platforms. For this, an explicit statement is needed in the LCP to ensure quality in the teaching and learning process. In addition, the school certifies the statement through a plan of continuous improvement of its quality services in terms of training and seminars before, during and after the delivery of the new modality. According to teacher.org (2020), professional development for teachers is very important as education is an ever growing and changing field. This means that teachers must be updated of the current trends in educational practice. However, teachers in the private schools cannot afford professional development due to high cost of the training programs. Much more depressing is that schools cannot finance their own teachers' professional development. As a solution, schools only give free in-house training for their teachers sponsored by some publishing book companies.

Monitoring and Evaluation

Under the new normal, efficacy of the monitoring and evaluation process is necessary. For example, learners who were given the learning resources need to be evaluated and monitored both for the learning process and the applicability of the learning modality. Support system is established for monitoring. In this case, feedbacks from students and parents are necessary to identify major gaps in the implementation and provide inputs for the improvement of the chosen platform. According to Kamalludeen (2020), alternative means of evaluation have to be used to monitor the students' progress and achievement. The evaluation must focus on the results of students' performance to measure the achievement of the learning outcomes.

Conclusion

To ensure teaching and learning continuity, it is concluded that academic institutions have to shift to a flexible teaching and learning modality and readjust the curriculum, train the faculty members to adapt the challenges of the new normal, upgrade the schools' infrastructures, and implement a strategic monitoring and assessment of the new approaches in teaching and learning. Teaching and learning modality during the pandemic needs to have thorough evaluation and analysis from its stakeholders to ensure better improvement.

The role of technology played is vital during the pandemic. It provides an innovative solutions to the problems faced by academic institutions during the school lockdown. It does not only help people to communicate and work virtually but also help our students to continue their education despite of the pandemic without the need of face to face classroom interaction. However, challenges and problems technologically are always the main issue in the conduct and implementation of the online teaching and learning especially for the academic institutions that opted to have online teaching-learning modality.

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Part 2

The Efficacy of Online Learning Experience – Students' Perspectives

Source: https://elhstalon.net/opinions/2020/09/04/the-struggles-of-online-learning/

The Japanese Students' Behavioral Coronaphobia

Hiroko Kanoh

Introduction

In the first half of 2020, most of the universities had all distance learning classes. Some of the first-year students had just entered the university, living alone for the first time far away from their parents with no opportunity to make friends as all classes were taught remotely as soon as they entered. Under such circumstances, some students, who strongly desired face-to-face classes, appealed for them on Twitter with the hashtag #大学生の日常も大事だ ("The daily life of a university student is also important"). Some are even asking for a full or partial refund of tuition, giving the impression that universities that offer distance learning have it easy. On the other hand, some faculty members have also exchanged opinions on the Internet, with 20,000 people joining a Facebook group for sharing wisdom and information on what university faculty members should do in the wake of the COVID-19 suspension of classes, and various discussions were held on the tools and methods of distance learning. Tips on how to create on-demand videos and how to discuss in the breakout room of Zoom were discussed with enthusiasm. Looking at the posts in the Facebook group, some faculty members seemed to be enjoying the distance learning, while others expressed grief, saying that they spend more than 10 hours every day to create on-demand videos and only get 3 hours of sleep every day when conducting Zoom classes.

The author mainly conducted real-time distance learning using Zoom and a textbook that had planned to use from the syllabus. In the beginning, concerns were raised about the ownership of PCs and internet connection, but with more than 90% of the students owning both a PC and internet connection, there were no psychical problems in terms of the environment (Kanoh, 2020). Considering that some students were temporarily unable to participate in the

class due to problems with their Internet connection, all the classes are recorded and made them freely available for viewing for about a week after the end of the class until the next week's video was uploaded. In addition to the hourly recorded videos, on-demand videos containing content taught are created that students can watch repeatedly while pressing the pause button at their own pace, such as the orientation, which include grading methods, and how to set up add-ins. On top of creating these videos, teachers also check submissions of students.

According to a survey on faculty members, the time spent preparing for classes increased by 14 hours per week during the COVID-19 pandemic while the time spent using the Internet increased by 14 hours per week. As a result, their research time has decreased by 7 hours per week, and their time for sleep, leisure, exercise, and television has also decreased. On the other hand, not all students wanted to take face-to-face classes. Some of the students were unable to go out and hence were lonely. In Japan, there is no lockdown nor restrictions such as fines for going out, so in reality, anyone who wants to go out can do so at any time. For instance, one of the students was so afraid of getting infected that he could hardly leave his room at the boarding house. He was so weak in body and mind that he was afraid to go to the ophthalmologist even if his eyes were bad, and he was afraid even when his parents recommended him to see a psychotherapist. He was not a student with a tendency to withdraw but a member of the baseball team in high school who was very active. Besides the fear of the virus, the "infodemic" of information on the Internet probably added to the stress, with many people who must have been frightened, albeit to varying degrees.

According to Dubey (2020), "coronaphobia" as a phenomenon created a large number of fearful people everywhere in society. He suggests interventions for positive patients, and health care providers. In other studies, coronaphobia is defined as an excessive triggered response of fear of contracting the virus causing COVID-19, leading to accompanied excessive concern over physiological symptoms, significant stress about personal and occupational loss, increased reassurance and safety seeking behaviors, and avoidance of public places and situations, causing

marked impairment in daily life functioning (Arora et al., 2020). The triggers involve situations or people involving probability of virus contraction, such as, meeting people, leaving house, travelling, reading the updates or news, falling ill or going for work outside. And they show the three elements of coronaphobia (Arora et al., 2020).

Physiological: The fight or flight response of fear is triggered, on being exposed to antecedent event. Constant worry can cause symptoms such as palpitations, tremors, difficulty in breathing, dizziness, change in appetite, and sleep (Wang et al., 2020).

Cognitive: Fear of virus would involve preoccupation with threat provoking cognitions (Chakraborty & Chatterjee, 2020), e.g. 'I will die if I contract the virus, 'I will not be able to go to my job and will be unemployed'; 'My family is under danger and they may die'. The cognitions may further trigger emotional responses, like sadness, guilt, and anger.

Behavioral: In order to prevent the consequences, individuals engage in avoidance behaviors. There is marked fear of using public transportation, touching any surface, being at open places (markets, beaches, stadiums) and at enclosed places (hotels, shopping malls, movie theatres, indoor stadiums), attending any public gatherings, and standing in queue (Tanner, 2020). The individual fears and/or avoids situations like meeting people or overindulges into health-related safety behaviors (like washing hands). Reassurance behaviors such as constantly checking body vitals, confirming absence of illness, self-medicating or rechecking sanitation perpetuates fear (Li et al., 2020), leading to phobia. Besides, the zoonotic origin of the virus (Andersen et al., 2020), may further lead to the fear of having exotic meat-based food. Though the fear is realistic, it can disturb the overall quality of everyday functioning of the individual.

There is a study investigating effect of coronaphobia on smoking habits through telephonic and face-to-face interviews with the patients during the outbreak, and inquired about the changes in their smoking habits (Ozcelik & Yilmaz Kara, 2020). Furthermore, scales focusing on physical symptoms such as dizziness, sleep disturbances and tonic immobility etc., have been

developed (Lee, 2020). However, these studies has not proposed a specific method to measure "behavioral coronaphobia". In this paper, it was attempted to propose a specific measure for "behavioral coronaphobia" and use it to analyze the relationship between coronaphobia and the attitudes of university students toward distance learning.

Methodology

A survey was conducted among 239 university students from 6 universities, with a response period from July 15th to August 31st, 2020. Due to the impact of COVID-19, the end of the first semester was different depending on the university. As the responses were asked at the end of classes from the previous semester, the response period lasted one and a half months. As for the faculties, the faculty of science and engineering was classified as science-related, the faculty of humanities and law as liberal arts, and the rest as others.

For survey items related to teaching methods, the responses relate on how many teaching methods were used in classes taken by the students during the six months. Furthermore, students were asked to rate their level and comprehension satisfaction of the class using a six-point scale from "1 low" to "6 high" for each teaching method. For attitudes toward distance learning, students were asked to rate based on a 6-point scale from "1–not applicable" to "6– applicable". IBM SPSS Statistics, Version 24 was used as the statistical analysis software, and a description field is also provided in addition to the multiple-choice items.

A part of this study has been reported in Kanoh (2021), but this is a continuation study of details that have not yet been analyzed. In this paper, the main analysis and report focus on the relationship between "the attitude of Japanese students toward distance learning" and the following "Behavioral Coronaphobia" 14 items (abbreviated as "the BeC scale") to assess coronaphobia. These items were extracted through discussions with 37 students in the "Introduction to Quantitative Analysis" class.

1) Going out to crowded places
2) Going out to a restaurant
3) Seeing people who are not wearing a mask
4) Riding public transportation
5) Meeting with people who came from areas with a large number of infected people
6) Meeting with people from other prefectures.
7) Seeing a crowded place
8) Approaching a crowded area
9) When having to pass a person up close
10) Receiving a courier or mail in person
11) When seeing news about the increase in cases
12) When no hand sanitizing is available at the stores.
13) When someone is sneezing or coughing
14) When touching something that must be used repeatedly, such as a supermarket cart

Findings and Discussion

Behavioral Coronaphobia

The mean and standard deviation of the 14 items are shown in Table 1, and the correlation coefficient is shown in Table 2. Cronbach's coefficient alpha was used to calculate the internal consistency coefficients of the items included in the questionnaire ($\alpha=0.96$).   The large number of items with an average of 4 or higher indicates that many students were afraid of Covid-19.

The mean value for "Seeing a crowded place" was the highest and showed a high correlation with all the items from 1 to 6, indicating that the students were all afraid of being crowded. From Table 2, we see moderate or high correlations among the items except for 10. Since receiving a courier or mail in person is an inevitable occurrence of daily life and a short action, they did not feel fear, resulting in a low correlation with the other items. Therefore, all items except 10) were added together and named the "BeC index" （M=60.12, SD=17.53).

Table 1

Mean and standard deviation of Behavioral Coronaphobia

	M	SD
1. Going out to crowded places	4.84	1.541
2. Going out to a restaurant	4.45	1.489
3. Seeing people who are not wearing a mask	4.42	1.636
4. Riding public transportation	4.55	1.564
5. Meeting with people who came from areas with a large number of infected people	4.74	1.631
6. Meeting with people from other prefectures.	4.16	1.561
7. Seeing a crowded place	4.28	1.616
8. Approaching a crowded area	4.71	1.519
9. When having to pass a person up close	3.98	1.532
10. Receiving a courier or mail in person	3.26	1.518
11. When seeing news about the increase in cases	4.45	1.545
12. When no hand sanitizing is available at the stores.	3.86	1.607
13. When someone is sneezing or coughing	4.45	1.569
14. When touching something that must be used repeatedly, such as a supermarket cart	3.98	1.627

Table2

Correlation of Coronaphobia

|	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)
1)	1													
2)	.785**	1												
3)	.725**	.687**	1											
4)	.795**	.718**	.746**	1										
5)	.806**	.686**	.765**	.795**	1									
6)	.656**	.652**	.674**	.674**	.789**	1								
7)	.667**	.623**	.669**	.630**	.691**	.677**	1							
8)	.845**	.724**	.746**	.803**	.826**	.700**	.775**	1						
9)	.502**	.624**	.593**	.539**	.552**	.592**	.640**	.560**	1					
10)	.244**	.416**	.344**	.327**	.287**	.403**	.436**	.287**	.640**	1				
11)	.668**	.618**	.638**	.635**	.655**	.651**	.654**	.662**	.512**	.375**	1			
12)	.486**	.500**	.593**	.507**	.535**	.544**	.617**	.548**	.640**	.564**	.621**	1		
13)	.657**	.606**	.676**	.653**	.729**	.667**	.650**	.731**	.579**	.401**	.598**	.572**	1	
14)	.478**	.531**	.545**	.542**	.532**	.552**	.571**	.518**	.680**	.587**	.539**	.640**	.624**	1

** Pearson's correlation coefficient is significant (both sides) at the 1% level.

BeC index and attitude toward distance learning

An analysis of variance was conducted on the BeC index and attitude toward distance learning. As a result, the higher the BeC index value, the more likely one thinks, "Distance learning will continue for a while" (F (5) =4.334(p<.01))[Figure 1]. The higher the BeC index, the more likely one thinks, " Distance learning allow me to concentrate on my studies" (F (5) =1.892 (p<.1))[Figure 2]. The higher the BeC index, the more likely one thinks, "I think it is appropriate to earn credits in distance learning" (F (5) =2.867 (p<.05))[Figure 3]. The higher the BeC index, the less likely one thinks, "I want to take classes in a classroom" (F (5) =2.138 (p<.05)) [Figure 4]. The higher the BeC index, the more likely one thinks, "As long as the COVID-19 pandemic continues, distance learning should continue" (F (5) =4.631(p<.01)) [Figure 5]. The higher the BeC index, the less apathetic the person tended to be (F (5) =1.915 (p<.1)) [Figure 6]. For the gender differences, the BeC index was higher for women than for men (F (2) =8.425(p<.001)). There were no significant between the BeC index and "I like distance learning", "I hate distance learning", "I can't understand the class in distance learning", "Study does not continue in distance learning", "Not tied to study time" (N.S.).

Figure 1

"Distance learning will continue for a while" and BeC index
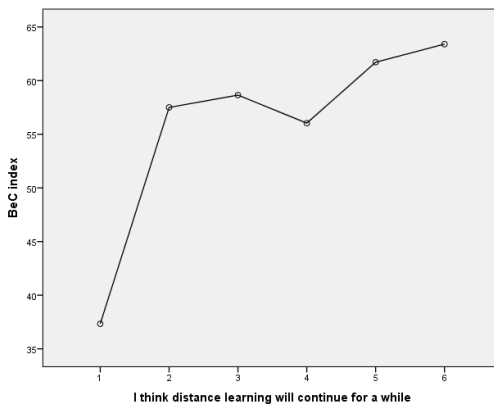
Figure 2

"Distance learning allows me to concentrate on my studies" and BeC index
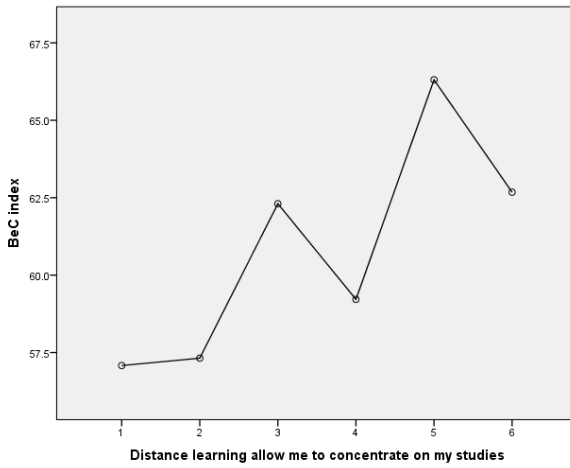
Figure 3

" I think it is appropriate to earn credits in distance learning" and BeC index
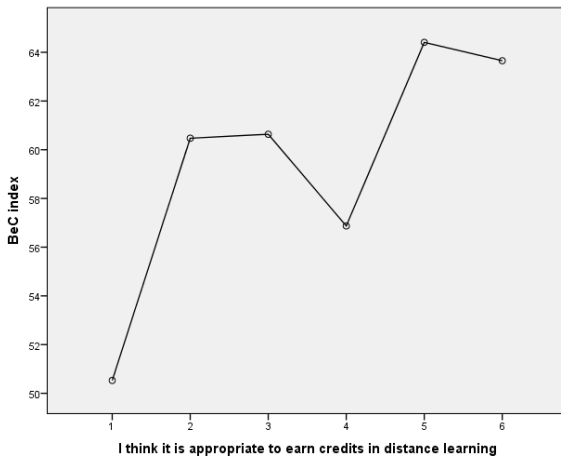
Figure 4

"I want to take classes in the classroom even if COVID-19 pandemic continues" and BeC index
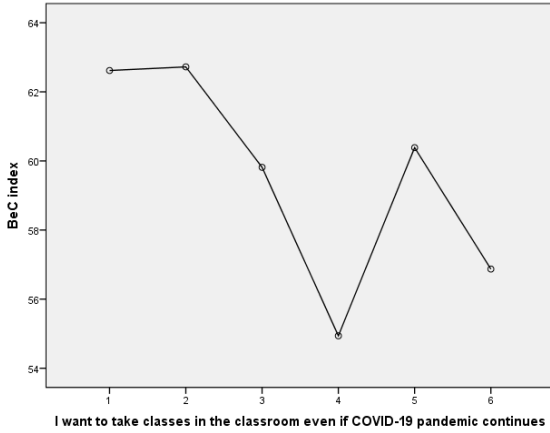
Figure 5

"As long as the COVID-19 pandemic continues, distance learning should continue" and BeC index
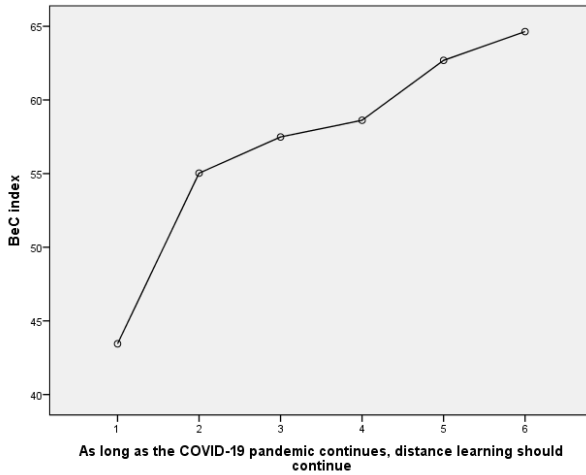
Figure 6

"Lethargic" and BeC index
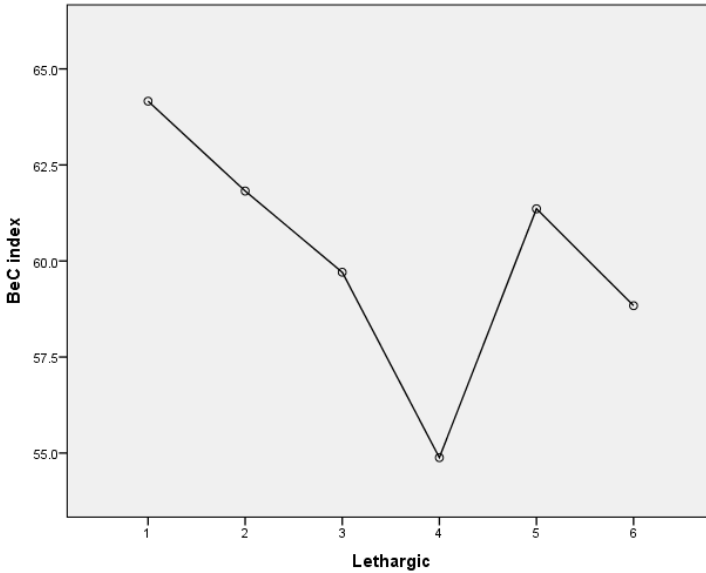
The comprehension scale and the satisfaction scale

Next, the total of the questions on the comprehension of distance learning was used as the comprehension scale (α=.879). There was no correlation between the comprehension scale and the BeC index (N.S.). In addition, the total of the questions about satisfaction with distance learning was used as the satisfaction scale (α=.905). There was no correlation between the satisfaction scale and the BeC index (N.S.). Between the comprehension scale and the satisfaction scale, a high correlation a found(r=.876). The correlation coefficients in items with high correlation are shown in Table 3 and Table 4.

Table 3

Correlation coefficient of the comprehension scale

	Text materials (books, PDFs, PowerPoint without sound)	On-demand teaching materials (PowerPoint with sound)	On-demand teaching materials (video)	Interactive class (ZOOM, MEET, etc.)	LMS (Webclass, Googleclass, etc.)	Brainstorming tools (jamboard, etc.)	Group work (breakout room, SLACK channel, etc.)
Text materials (books, PDFs, PowerPoint without sound)	1						
On-demand teaching materials (PowerPoint with sound)	.611**	1					
On-demand teaching materials (video)	.638**	.769**	1				
Interactive class (ZOOM, MEET, etc.)	.515**	.563**	.581**	1			
LMS (Webclass, Googleclass, etc.)	.622**	.615**	.637**	.575**	1		
Brainstorming tools (jamboard, etc.)	.427**	.512**	.473**	.521**	.616**	1	
Group work (breakout room, SLACK channel, etc.)	.450**	.527**	.531**	.671**	.571**	.719**	1

** Pearson's correlation coefficient is significant (both sides) at the 1% level.

Table 4

Correlation coefficient of the satisfaction scale

	Text materials (books, PDFs, PowerPoint without sound)	On-demand teaching materials (PowerPoint with sound)	On-demand teaching materials (video)	Interactive class (ZOOM, MEET, etc.)	LMS (Webclass, Googleclass, etc.)	Brainstorming tools (jamboard, etc.)	Group work (breakout room, SLACK channel, etc.)
Text materials (books, PDFs, PowerPoint without sound)	1						
On-demand teaching materials (PowerPoint with sound)	.674**	1					
On-demand teaching materials (video)	.702**	.770**	1				
Interactive class (ZOOM, MEET, etc.)	.516**	.530**	.623**	1			
LMS (Webclass, Googleclass, etc.)	.665**	.634**	.648**	.544**	1		
Brainstorming tools (jamboard, etc.)	.380**	.480**	.459**	.367**	.514**	1	
Group work (breakout room, SLACK channel, etc.)	.464**	.484**	.495**	.655**	.582**	.685**	1

** Pearson's correlation coefficient is significant (both sides) at the 1% level.

Conclusion

This paper attempted to propose a specific scale for "Behavioral Coronaphobia" and analyzed the relationship between the scale and the attitudes of university students during the pandemic toward distance learning. The results showed that the higher the BeC index value, the more likely students wanted to continue distance learning and the more likely they tended to concentrate on their studies. To go out for a trial class, they have to put on make-up, dress up, and pay attention to the eyes of their peers. The students feel that they can concentrate more on their studies with distance learning since they can concentrate on their classes at home in relaxing clothes without worrying about the eyes of others. Female students tend to wear more make-up and pay more attention to their appearance, which may have led to the higher BeC index value for them than male students. However, there were some students, both male and female, who said that they preferred distance learning.

According to a survey by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) on the status of support for students affected by COVID-19 (surveyed from January 18 to February 10, 2021), the total number of university students who dropped out in 2019 was 1.22%, while in 2020 it was 0.97%, a slight decrease. For first-year college students only, the number of dropouts decreased from 1.02% in 2019 to 0.76% in 2020, with dropouts on loans slightly decreasing. Every university has a certain number of students who have enrolled but are unable to attend classes due to shut-in syndrome. If they cannot attend classes, they will not receive credits and will eventually have to withdraw from the university. However, these students can now attend classes from home through distance learning, which may have stopped them from dropping out.

In fact, the higher the BeC index value, the more likely one thinks that giving credits for distance learning is reasonable and the less likely one wants to take classes in a classroom. For people with high a BeC index value, who have difficulty going out, and who do not like to go out, distance learning seemed to be a lifesaver. Therefore, the higher the BeC index, the more likely one thinks

that distance learning should be continued as long as the COVID-19 pandemic continues, with distance learning expected to be established as a form of teaching in the future. In addition, those who scored higher on the BeC index tend to be less apathetic, suggesting that there is some compatibility with the teaching method. For those who are motivated only by meeting other people, a certain number of classes in a classroom may be necessary.

Acknowledgement

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The On-line Teaching during 'COVID-19' Pandemic

Prof. Rekha Mahajan

Introduction

The evolution of man depends largely on the continuity of our education system which has continuously evolved over centuries. Revolutions in science, information, and communication technology have added new dimensions in imparting education. Today it has transcended into a potent system of imparting knowledge. At present, the modern education system has blended new technologies for effective teaching and learning. Despite the effective use of these new innovations like laptops, mobiles, internet etc., the teacher continues be the main key player in imparting knowledge and education to the young and growing.

The internet has made online learning possible. Many researchers and educators are interested in online learning to enhance and improve student learning outcomes while combating the reduction in resources, which is very common in higher education (Farinella *et al*., 2000; Kim & Bonk, 2006; Pape, 2010). This new mode of learning has been embraced by the academic community which has been labeled 'e-learning'. Lee *et al.* (2009) defines e-learning as web-based learning which utilizes web-based communication, collaboration, multimedia, knowledge transfer, and training to support learners' active learning without the time and space barriers.

In addition to natural development, certain situation sometimes forces the system to evolve so as to meet the present day needs. For instance, the global health pandemic brought by COVID-19 is one such situation that changed the learning modality overnight. As the whole world stood-still and complete lock-downs in place, learning has to continue. Presently, the physical "brick and mortar" classroom is starting to lose its monopoly as the place of learning. There have also been increases in demand for online learning from students from all walks of life. The present

circumstances led to new utilization of laptops, mobiles and internet as the platform for the delivery of the education services. These gadgets brought a ray of hope for the education system. Truly, the COVID 19 brought major change to the current education system. At this stage, it is essential for the academic community to be prepared and accustomed as this may be the 'new' normal in the future of education.

In view of the impact of COVID-19 in the India's education system, online courses have expanded rapidly and have the potential to extend further the educational opportunities. The online courses are difficult, especially for the students who are least prepared (Bettinger & Loeb, 2017). Accordingly, the students' learning and persistence outcomes are worse when they take online courses than regular face to face classes.

It is important that researchers and educators examine the effectiveness of online learning in educating students compared to traditional face-to-face learning. Guided by what Confucius once said "*Tell me and I will forget. Show me and I will remember. Involve me and I will understand*", this study assessed the actual implementation of the online classes in one of the private college in India. The objective of the study was to understand the utility of online classes in comparison to regular class room classes. It also identified he problem faced by the students during the online classes.

Literature Review

The positive effects as well as negative effects of online teaching have been discussed in most literature. Several authors noted the benefits and uses of online learning as well as its effectiveness in educating students. It has been identified that the online learning modality is useful for professional development. Its cost-effectiveness is used to combat the rising cost of postsecondary education, credit equivalency at the postsecondary level, and the possibility of providing a world class education with a broadband connection (Bartley & Golek, 2004; De la Varre *et al*., 2011; Gratton-Lavoie & Stanley, 2009; Lorenzetti, 2013). For instance,

Nesler and Lettus (1995) reported higher ratings on clinical competence among nurses graduating from an online program than nurses who were traditionally prepared. This also gives hope that online learning will be able to provide a world class education to anyone, anywhere, and anytime as long as they have access to the internet. As Nguyen (2015) felt that it would be too easy to jump on the online learning or dismiss.

However, there were number of reports indicating no difference between online and traditional approach. Fallah and Ubell (2000) compared midterm exam scores between online and traditional students at Stevens Institute of Technology and found little or no difference in student outcomes. Similarly, Freeman and Capper (1999) also found no differences in learning outcomes between business students participating in role simulations either face-to-face or asynchronously over distance. Furthermore, Arbaugh (2000) compared the course grades of classroom-based and Internet-based MBA students and found no significant differences between them.

Methodology

This study utilized the quantitative research method. Through the use of a questionnaire, the feedback of the students was generated to assess their use of the online classes.

In order to understand the utility of online classes in comparison to regular class room classes, the feedback of the students was taken each semester. The survey questionnaire was in the form of closed questions. There were four simple but critical questions asked.

Q1: Are the objectives of the online sessions clearly understood?

Q2: Is there an effectiveness of participation and interaction in the online sessions?

Q3: Are topics covered in the online classes were relevant to the course curriculum?

Q4: Are contents were organized and easy to follow?

Each question has three options namely Good, Average or Poor. In addition, an open unstructured response of students was also collected for the specific problems faced during the online classes.

At the height of the COVID-19 pandemic last 2020, the regular classes were suspended during the second-half of March 2020. Steps were taken to start online classes for the Semester II and Semester IV for a period of five weeks. There were 78 students in Semester II and 98 students in Semester IV. There were two (2) to thee (3) one hour classes per week for these students. During these periods, feedback was solicited from all the students on their use of online classes. The feedback was received at Saturdays of each week. The periods of gathering students' feedback were the weeks of 23-27 March 2020, 29 March- 3 April, 7-9 April 2020, 13-17 April 2020 and 20-24 April 2020.

The data were analysed using frequency count, percentage and weighted mean.

Results and Discussion

Table 1
Summary of Students Feedback by Question

Question	%
1	64.3
2	45.9
3	77.3
4	61.2

Table 1 shows the overall feedback received from the students. There was 100% students' attendance in online classes for five weeks. The feedback was received during Saturday at the end of week. The results show that the highest percentage was for Question 3 on the topics covered relevant to the course curriculum with 77.3%. It was followed by Question 1 on the students'

understanding of the online session objectives with 64.3% and Question 4 on the organized contents with 61.2%. The lowest response of students was for Question 2 on effectiveness of the participation and interaction in the online class with 45.9%.

Table 2
Summary of 'Good' Students' Feedback

	Semester II	Semester IV	Average %
Week 1	52.6	42.9	47.8
Week 2	21.8	17.3	19.6
Week 3	77.0	29.0	53.0
Week 4	70.5	47.0	58.8
Week 5	51.0	34.0	42.5
Overall %	**54.6**	**34.0**	**44.2**

Table 2 shows the summary of the students' feedback with 'Good' ratings. The percent response was higher for the students of Semester II than Semester IV while the overall percentage response was 44.2%. After first week, there was a dip in the response of the students during second week which may be attributed to lack of interaction between teacher and student as well as due to poor network. As the online teaching was new experience for the students, it was difficult for the students to concentrate. After the second week, steps were initiated to re-orient the students on the nature and purpose of online teaching up. This led to a dramatic increase in the responses of the students during 3rd and 4th week. Moreover, the response of students in Semester II was much higher in comparison to the students in Semester IV.

Table 3

Comparison of Students' Feedback by Semester

Q	Good		Average		Poor	
	S II	S IV	S II	S IV	S II	S IV
1	72.7	55.8	26.7	38.9	0.5	5.2
2	50.2	41.6	47.5	46.0	2.3	12.4
3	83.9	70.7	16.1	25.9	0.0	3.4
4	71.6	50.8	26.3	41.2	2.1	8.0
Mean	69.6	54.7	29.2	38.0	1.2	7.2
Overall %	**62.2**		**33.6**		**4.2**	

Table 3 shows the comparison of the percentage of responses as 'Good', 'Average' and 'Poor'. It was evident from the results that the maximum number of students at 62.2% considered the online teaching as 'Good'. Furthermore, there were number of students in Semester IV who considered online teaching as 'Poor' in comparison to their normal class room teaching. There were more students in Semester II who considered online classes 'Good' compared to more students in Semester IV who considered online classes as only 'Average' and 'Poor'. Furthermore, the "Good" response of the students was highest for 'Question 3' followed by 'Question 1' and 'Question 4'. On the other hand, the 'Average' or 'Poor' response of students was highest for 'Question 2' followed by 'Question 1'.

Table 4 shows the summary of the students' feedback by week. On analysing the data week-wise and question-wise, the response of students to online in comparison to class room teaching were rated into 'Good', 'Average' and 'Poor'. It was observed that the objectives of the online sessions (Question 1) were better understood by the students in Semester II than Semester IV. It was also observed that on making efforts to make them understand better the objectives of the online classes, the score has improved.

Table 4
Summary of the Students' Feedback by Week

	Question	1		2		3		4	
Week	Grade	S II	S IV	S II	S IV	S II	S IV	S II	S IV
1	Good	70.7	47.6	48.8	35.7	82.9	61.9	73.2	38.1
	Average	29.3	40.5	46.3	42.9	17.1	31.0	24.4	45.2
	Poor	0.0	11.9	4.9	21.4	0.0	7.1	2.4	16.7
2	Good	64.7	88.2	35.3	64.7	76.5	94.1	64.7	58.9
	Average	35.3	11.8	53.0	23.5	23.5	5.9	35.3	35.3
	Poor	0.0	0.0	11.8	11.8	0.0	0.0	0.0	5.9
3	Good	70.0	42.9	46.7	25.0	78.3	60.7	66.7	60.7
	Average	30.0	42.9	51.7	57.1	21.7	28.6	30.0	32.1
	Poor	0.0	14.3	1.7	17.9	0.0	10.7	3.3	7.1
4	Good	72.7	58.7	52.7	45.7	92.7	73.9	78.2	47.8
	Average	25.5	41.3	45.5	47.8	7.3	26.1	20.0	47.8
	Poor	1.8	0.0	1.8	6.5	0.0	0.0	1.8	4.3
5	Good	82.5	63.6	57.5	48.5	82.5	78.8	70.0	66.7
	Average	17.5	36.4	42.5	45.5	17.5	21.2	30.0	30.3
	Poor	0.0	0.0	0.0	6.1	0.0	0.0	0.0	3.0

The participation and interaction of the student and teachers (Question 2) are most important in any class room. The results indicated that participation and interaction was limited to students of both the semesters. Most of the students had 'Good' or 'Average' participation and interaction. Initially, there were more students with low participation and interaction which was improved in the later weeks. It was clear that the students were not fully satisfied with the online interaction and prefer regular class room studies.

Sometimes, students and teachers fear that it was not possible to cover and complete all topics (Question 3). As per the students'

perception, there was fairly high percentage in both the semesters. It implies that the topics relevant to the course curriculum were completely covered although the percentages were higher for Semester II students than Semester IV students.

Though the teachers were also new to the online classes, the contents also need to be organized and easy to follow (Question 4). Most of the students felt that the contents were fully organized and it was much easier to follow which make the online teaching equally useful as class room teaching.

Conclusion

It was evident from the study that the online classes were not able to compensate for participation of students and interaction with the teacher to clear their doubts. The face-to-face interaction of students and teacher is essential that give better understanding of the subject. On the other hand, it was possible to improve the objectives of the clear understanding of online session and to cover the topics as per course curriculum. The teachers were efficient on organizing the contents which were easy to follow. It may be noted that online teaching was not able to compensate the practical hands-on teacher training wherein the teacher is in one-to-one interaction with its pupil.

It was suggested that the teachers may go through training programmes for online teaching. In view of the COVID-19 emergency, the concept of online teaching may also be included as part of the course curriculum and teaching programmes in school and colleges in the future. Continued improvement of online curricula and instruction can strengthen the quality of these courses and hence the educational opportunities for the most in-need populations.

For schools and colleges, it would be too easy to implement online learning or cancel the classes. At this circumstances, online learning is at least as effective as the traditional format, but the evidence is, by no means, conclusive. At present, we feel that the

online learning story is still being written. How it progresses will likely depend on many factors.

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Online Learning Expectations among Engineering Students

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Introduction

Due to the current situation in the world, every institution was challenged to implement a flexible scheme for their academic program offerings and services to ensure that the students will realize the same quality of education (Coman et al., 2020; Tarayo et al., 2021). There were policies developed on flexible learning modalities, adoption of synchronous and asynchronous online learning, blended learning, and other learning modes to replace the conduct of face-to-face sessions following the strict health protocols. As an alternative, most institutions in the Philippines adapted internet-based learning to reach their student-clienteles who are willing to continue their course journey despite the challenges brought by the coronavirus pandemic.

In one state university in Laguna, a flexible learning scheme of using one-time synchronous and twice asynchronous online learning for every course subject was institutionalized during the imposed community quarantine. However, it challenged the university at first on how teachers and students will accommodate the idea and the underlying processes that need to be established to meet success on its implementation. Some believed that there were problems that might be encountered on its implementation, like the knowledge and skills of the teachers in handling online learning, the material preparation that needs to be uploaded for the students, low or no internet connectivity of both students and teachers and other expectations arising from the clientele (Martin, 2019; Mahyoob, 2020; Cicha, 2021). If these were not addressed at first, a poor learning experience might be expected as a result.

Several challenges may need to be faced in implementing flexible learning in an online scheme, but there are also advantages than

can be realized later on. Students will be more focused on learning the lessons as they have comfortable work conditions (Bhamani et al., 2020), more educational resources can be accessed by the students in just one click using their internet connectivity that would broaden the concept they are learning (Lebenicnik et al., 2015) and students can learn at their own pace following the lesson guides prepared by the teachers (Kochar et al., 2018). Being in a flexible learning mode, students managed the time allocation in learning each topic given the privilege to accomplish only what they can for a specific period for as long as they can achieve everything before the deadline (Miertschin, 2015). With all the benefits that the students can realize once subjected to online learning or through the flexible learning scheme of the institution, the institution needs to analyze several factors before the implementation of flexible learning carefully. Expectations of the students as to how the institution can serve them should be examined to be the basis of several internal policies to be implemented.

The study aimed to determine the expectation level of the engineering students on pre-determined factors in the implementation of flexible learning in terms of proficiency with technology, course instructor, course content, social interaction, course organization, and time management and convenience.

Literature review

a. *Implementation of Flexible Learning*

Flexible learning is a learning scheme for students with a unique set of philosophies and systems. It provides a learning arrangement that depends on the learner's choice, capability, comfortability to learning space, and the bulk of tasks to the students (Joan, 2013). The basic questions on how, when, and where the student will learn the concept depends on the flexible arrangement. When it comes to the capability of the learners, the level of difficulty of the materials to be given is also to be considered, which should fit the level of the learners (Huang et al., 2020). Learning styles of the students should be clustered and

should be addressed by every teacher. The learning space has a significant contribution to the flexibility of learning. The infrastructure and devices available for the learners should be identified to enable the institution to effectively plan what online or offline learning mode or platform can be used (Kariippanon et al., 2018).

Several information and communication technologies were developed to satisfy the conditions of flexible learning modality for the institution. The widely used learning platform in the university is the Google classroom. It allows teachers to become facilitators of learning through asynchronous online learning activities (Azhar & Iqbal, 2018). It enables as well to realize a learner-centered standard that students were given flexible modes to respond to educational practices of their teachers (Shaharanee, 2016). Some other benefits of using it are user-friendly features to the students and accessibility using any device (McGinnis, 2020). When it comes to unrestricted use of virtual platforms used for synchronous online learning, the institution utilizes Google meet. It has basic features that allow the active participation of students during the teacher's presentation of the lesson (Basilaia & Kvavadze, 2020).

b.   *Expectations of Students toward Flexible Learning*

Determining the expectations of the students towards the implementation of flexible learning is a good indicator for the institution to improve their satisfaction with the services being offered. Through this, the institution would be able to prepare its capacity to serve its clientele. When there is a high level of expectations among the students, institutions need to work on necessary actions to lead them to successful outcomes. The pre-determined factors on proficiency with technology, course instructor, course content, social interaction, course organization, and time management and convenience should be carefully examined as to the expectations of the students for the flexible learning implementation to be more effective (Harris et al., 2011).

It is expected among the students in the higher institution that they are more proficient in the use of technology as compared to lower levels. Most of their classwork requires basic computer application of word processing, making presentations and reports, basic computing applications, and web-based mailing, which requires their capacity to work proficiently (Batez, 2021). When flexible learning is implemented, there are many academic factors that the students expect to be worth satisfying. The instructor who will teach the course and manage the learning platforms is expected to be knowledgeable. They have a good level of classroom management, which is to be applied in a virtual setup. Expectations are also considered when it comes to the course content (Coman et al., 2021). Learning materials should be prepared with good quality adhering to the standards set by the higher institution. Standards on quality of content, learning approaches, reflective parameters, and active learning components are some of the key indicators that students expect to be included in the learning content of the materials to be given (Khan et al., 2021).

Despite some limitations of flexible learning, the students still expect that there would be social interactions in the learning process. Students would still be given opportunities to interact with their classmates and their teachers (Kokoç, 2019). The organization of the learning process is also one of the critical indicators that need to be satisfied. Students should feel the total quality of teaching and learning service rendered to them through logically organized content and easy-to-understand instructions in the learning activities (Ferri et al., 2020). Lastly, effective time management and convenience should be present in the flexible learning preparation. Proper scheduling of learning tasks and performances are considerably planned (Ahmad et al., 2020).

In order to determine the successful implementation of the flexible learning, the institution need to efficiently monitor and analyze actions in the enrollment to online synchronous and asynchronous, options to take modular distance learning, use of appropriate evaluation, students grades and success tracking, and addressing arising conflicts once it exists (Andrade & Alden-

Rivers, 2019). It is not only the institution that should impart their efforts to attain success in the implementation of flexible learning, the persistence and positive outlook to the policy and programs of the student-clientele must also be present (Naidu, 2017).

Methodology

The descriptive research design was used to effectively describe the pre-determined factors in the implementation of flexible learning. The pre-determined factors are based on the expectations of the engineering students when it comes to proficiency with technology, the capability of the course instructor, delivery of the course content, setting social interaction, ensuring course organization, and realizing time management and convenience.

The study participants *were* 30 computer engineering and 55 electronic and communication engineering students of the academic year 2020-2021. They were conveniently sampled from the different group of classes in the College of Engineering. Convenient sampling was used to effectively assess the expectations of the students enrolled. The College is relatively small with limited number of students considering only five (5) regular faculty members handling the program and provision of building or learning spaces for engineering students.

The study utilized an adapted instrument based on the developed student's expectation of online learning survey of Harris et al. (2011) noting 0.897 Cronbach's alpha signifying a good level of internal consistency. The parameters used in the study covers the pre-determined factors in terms of proficiency with technology, course instructor, course content, social interaction, course organization, and time management and convenience. The scales used were the four (4) levels of expectations, Very High, High, Low and Poor. The even numbered scales help eliminate safe responses in the middle scales.

From the instrument adapted, the study created a Google form to conduct the survey due to the strict health protocols implemented

during the data-gathering period. The link was disseminated to the engineering students through the help of the College secretary as approved by the College Dean. The data gathered in the study were treated with strict confidentiality and were only used as baseline for the expectations of the students toward flexible learning to be implemented.

Several statistical treatments were used to satisfy the objectives of the study. To describe the expectations of the respondents, mean and standard deviations were used. When it comes to determining significant difference between the expectations of the two respondents, an independent t-test was used. Lastly, Pearson product-moment correlation was used following the parametric requirement of normally distributed data to find out whether there is a significant relationship between and among the study variables.

Findings and Discussion

Table 1
Expectation Level on Pre-Determined Factors in the Implementation of Flexible Learning

Indicators	CE			ECE		
	Mean	SD	VI	Mean	SD	VI
Proficiency with Technology						
1. Use of Computers and Gadgets	2.70	0.65	H	2.67	0.61	H
2. Word processing software program like Microsoft Word	2.80	0.76	H	2.75	0.70	H
3. Use of emails	2.73	0.64	H	2.82	0.58	H
4. Attaching files to email messages	2.80	0.66	H	2.85	0.68	H
5. Use of Internet and search engines.	2.67	0.66	H	2.60	0.63	H
6. Internet searches for personal reasons	2.70	0.60	H	2.67	0.64	H
7. Internet searches for school work	2.70	0.60	H	2.75	0.67	H
8. Google classroom utilization	2.70	0.53	H	2.78	0.66	H
9. Computer software troubleshooting	1.97	0.76	L	2.02	0.65	L
10. Basic technical problems (hardware) troubleshooting	2.10	0.88	L	2.07	0.74	L
Overall mean	**2.59**	**0.49**	**H**	**2.60**	**0.44**	**H**

Indicators	CE			ECE		
	Mean	SD	VI	Mean	SD	VI
Course Instructor						
I expect the course instructor…						
1. clearly communicate the course objectives.	3.40	0.72	H	3.31	0.60	H
2. clearly communicates what they expect from students.	3.17	0.75	H	3.11	0.53	H
3. posts requirements of the course within an agreed upon time.	3.07	0.69	H	3.36	0.59	H
4. delivered assignment feedback in a constructive manner.	3.07	0.83	H	3.20	0.59	H
5. consistently attends discussion sessions.	3.00	0.69	H	3.13	0.55	H
6. is supportive in the promotion of online learning sessions.	3.30	0.70	H	3.29	0.57	H
7. to have an appropriate online tone.	3.17	0.87	H	3.22	0.57	H
8. to be responsive to students' online concerns.	3.20	0.76	H	3.24	0.58	H
9. to provide contact information to students.	3.10	0.66	H	3.00	0.51	H
Overall mean	**3.16**	**0.59**	**H**	**3.21**	**0.45**	**H**
Course Content						
I expect this online course to…						
1. be productive and attentive like face-to-face set-up.	2.90	0.84	H	2.78	0.60	H
2. establish active learning.	3.07	0.64	H	3.02	0.65	H
3. set activities considering large class discussions.	2.77	0.77	H	2.76	0.72	H
4. provide activities for small group discussions.	2.70	0.70	H	2.69	0.66	H
5. allows learner for self-reflection of what they learned.	2.87	0.68	H	3.00	0.61	H
6. relate theory to real life application of concepts taught.	2.93	0.69	H	3.04	0.69	H
7. provide meaningful postings and discussions.	2.87	0.78	H	2.93	0.57	H
Overall mean	**2.87**	**0.62**	**H**	**2.89**	**0.44**	**H**
Social Interaction						
I expect…						
1. the course session allows students to meet new people.	2.63	0.93	H	2.69	0.77	H
2. a respectful academic community with my classmates.	3.37	0.56	H	3.38	0.62	H
3. a frequent online learning sessions like face-to-face scheme.	2.67	0.84	H	2.65	0.95	H
4. to have as many opportunities to get to know my classmates.	2.57	0.86	H	2.60	0.85	H
5. to be optimistic in dealing and learning online.	2.97	0.76	H	3.16	0.66	H
Overall mean	**2.84**	**0.65**	**H**	**2.90**	**0.57**	**H**

Indicators	CE			ECE		
	Mean	SD	VI	Mean	SD	VI
Course Organization						
1. Oncourse CL was user friendly.	2.63	0.67	H	2.69	0.60	H
2. The forum names and topic titles are unambiguous.	2.70	0.65	H	2.55	0.74	H
3. The course materials were easy to locate.	2.83	0.65	H	2.84	0.57	H
4. The course instructions were clear and unambiguous.	2.80	0.61	H	2.75	0.64	H
Overall mean	**2.74**	**0.54**	**H**	**2.70**	**0.49**	**H**
Time Management and Convenience						
1. I feel concerned that I may not manage my time well.	3.27	0.83	H	3.13	0.64	H
2. I am an independent learner.	2.03	0.81	L	2.09	0.75	L
3. This online course provides has flexible scheme on requirements.	2.47	0.86	L	2.45	0.79	L
4. I am confident that my family members and friends are supportive.	2.77	0.82	H	2.84	0.86	H
5. My home environment is conducive in learning.	2.27	0.83	L	2.36	0.80	L
Overall mean	**2.56**	**0.51**	**H**	**2.57**	**0.41**	**H**

Legend: 3.50-4.00 Very High (VH), 2.50-3.49 High (H), 1.50-2.49 Low (L), 1.00-1.49 Poor (P)

As can be seen from the values depicted in the table 1, both groups of engineering students have high level of expectations on proficiency with technology for them to be able to cope up with the implementation of flexible learning. As indicated, the respondents feel high capability in most of the indicators, with the indicator "*attaching files to email messages*" getting the highest mean value, and "*use of word processing software like Microsoft Word*" (for the Computer Engineering students). For indicators on software and hardware troubleshooting, low mean values were obtained indicating respondents' confidence that areas such as troubleshooting, which requires practice and proper training, is not highly expected of them in the flexible learning.

The current situation changed the landscape of learning to an online modality, which the results clearly emphasized the findings of Vargo, et al. (2021), Mpofu (2016) and Manu and Mensah (2015) that students are becoming proficient in the use of computers and even other gadgets such as cellphones, laptops and tablets to cope up with the demands of online education. In addition, the use of internet is another familiar and even an

expertise of the students nowadays. As Liesa-Orús, et al. (2020) and Raja and Nagasubramani (2018) affirmed that survival in school has become very much dependent on technology hence almost all students were expected to become computer applications whiz in a blink of an eye. Even though applications are very familiar to them, troubleshooting is still not their expertise.

The results also showed that both groups of engineering students have high level of expectations from their course instructors. Computer Engineering students highly expect their instructor to be clear in communicating the goals of the course while Electronics and Communications Engineering students highly expect their instructors to post the course requirements within an agreed time. It is clear from the responses of the two groups that they want to prepare any course requirements in advance, which also affirm the findings of Aguilera-Hermida (2020), and (Blackmon & Major, 2012). The self-assessment of the students indicates self-discipline and responsibility that no student wishes to be caught off-guarded or unprepared on anything that is expected from them. This also shows the descriptions of Naji, et al. (2020) and Widodo, et al. (2020) that students in the online mode have keen sense of responsibility.

Since they have finished a school year without too much intervention from their instructors, they have low expectations that the teacher will be consistently with them in discussion forums or even provide contact information to students. This mentality of the students shows the observations of Gopal (2021) and Gillett-Swan (2017) that university students are getting fully aware of their responsibility and are independent in the performance of tasks with or without teachers' guidance. Interestingly, students form their own group chats, even teachers not included, where they freely discuss topics and exchange and share ideas regarding lessons (Broadbent & Lodge, 2021).

The results further showed that both the groups of engineering students have high level of expectations on the course content. The students expect that the course content will provide them with

opportunities for active learning and opportunities to relate theory to real life. Though the specializations differ in their perception of the course content, it is clear that the students expect their course to make them learn actively and relate what they have learned to real life. According to Rapanta (2020) and Coman (2020), learning is not within the confines of the topics but the ability to apply to real life situations and make them better individuals. Simply put it, learning is not just memorizing lines, theories and formulas, but rather it comes with an understanding on how these may be applied to real life situations.

Students do not highly expect that they will be provided with opportunities for small group discussion since they are now fully aware of the fact that due to the current situations outside of their homes, it is not possible for them to face one another and make discussions. There is also the issue of connectivity, which hinders them from creating group discussions for quite a long period of time as to the findings of Apuke and Iyendo (2018) and Jibrin et al. (2017). Similarly, both groups of engineering students have high level of expectations in terms of social interactions even during the implementation of flexible learning. They highly expect that their classmates will be respectful even in an online learning situation. Rules of conduct would still govern the students' behavior. Guidelines set by the instructors on the conduct of classes would still be followed to the letter. Yet they have accepted the fact and does not expect much that they will get many opportunities to get to know their classmates online as they would face to face. They have accepted the reality that conduct of classes and opportunity to meet face to face is hindered by many reasons similar to the findings of Sarmiento (2021) and Raitzer et al. (2020). IATF protocols, safety measures implemented by institutions and even internet connectivity become reasons to limit such interactions.

In addition, both groups of engineering students have high level of expectations on course organizations for them to be able to cope up with the implementation of flexible learning. As indicated, they feel that for them to successfully cope with flexible learning, course materials indicated in the outlines/syllabi would be easy to

locate as provided by their instructors. Since their access to materials is very much limited, them being confined to the comfort of their own homes, deem it necessary that the materials indicated in the materials provided by their instructors would be very much accessible for them as to the findings of Armstrong-Mensah (2020) and Chen (2018). They do not expect much that the materials be user-friendly and the names or topics be unambiguous, yet what they want is for them to have something to consult or look into when they are in the process of learning by themselves.

Furthermore, both groups of engineering students have high level of expectations when it comes to time management and convenience for them to be able to cope up with the implementation of flexible learning. As indicated, both groups have shown high concerns that they may not be able to manage their time well considering the activities they are to be given in every subject. The fact that they are at home, it is a common knowledge that their parents also expect them to at least contribute in some of the household chores, thereby dividing their focus and attention to their studies and home life as described by Baticulon (2021) and Chandra (2020) in their studies. There is also that fact that not every student has the privilege of obtaining unlimited internet connection for online learning thereby limiting their access to classes and discussions which was the same scenario in the studies of Dhawan (2020) and Francisco (2020). Yet, the respondents have quite low expectation that they will become real independent learners since it would still require synchronous sessions to be facilitated by their professors, and in the current situation, it seems not possible yet.

Overall, it can be seen that engineering students have high expectations for them to be able to cope with the implementation of flexible learning, yet all indicators lead to the fact that these expectations will leave them to become learners who were able to overcome the hindrances brought about by the new normal (Callo & Yazon, 2020).

Table 2

Test of Significant Relationship between and among the Expectation Level on Pre-determined Factors in the Implementation of Flexible Learning

Expectation to Online Learning	1	2	3	4	5	6
Proficiency with Technology	1					
Course Instructor	.158	1				
Course Content	.163	.503**	1			
Social Interaction	.233*	.503**	.688**	1		
Course Organization	.185	.358**	.401**	.324**	1	
Time Management and Convenience	.288**	.311**	.456**	.367**	.462**	1

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

It is reflected in table 2 that there is a positive significant relationship between and among the expectation level on pre-determined factors in the implementation of flexible learning. The expectations of the students with regard to their proficiency with technology considering that they will be subjected for a flexible learning mode of synchronous and asynchronous online significantly relates positively to their expectations on social interaction to be established and how they will be able to management time and convenience. On the other hand, no significant relationship is depicted with their expectations level on technological proficiency and their expectations with their course instructor, content and organization. It only implies that even though they highly expect high level of technological proficiencies in using word processing, and other computer applications to be used in an online set-up, it may not influence the way they view academic practices in learning the lesson. Students are used with these computer applications even without the implementation of flexible learning. Ever since they were in a face-to-face learning modality, ICT skill should be developed among students in order for them to prepare and submit their best learning outputs as affirmed by the studies of Heerwegh (2016) and Verhoeven (2012).

The results further show that there is a moderate positive significant relationship between and among the pre-determined factors on expectations with the course instructor, course content, social interaction, course organization, and time management and convenience. All these factors contribute to one another in order for a university student to be more prepared in attending flexible learning set-up in the institution. When one factor increases its expectation level, there is a moderate evidence that the others will follow. There might be challenges being faced by several institutions in the implementation of flexible learning modalities considering the current situation brought by COVID-19, it is beneficial that the institution should study or plan effectively all aspects concerning students' success of being part of the learning modes (Ishmael, 2020). The instructors that are well-trained and well-informed of the educational policies, there would be a smooth implementation of the flexible learning. With these, the students may be able to realize the organization of every course and the established learning spaces for them (Joaquin, 2020; Benade, 2019; Müller, 2018).

Conclusion

The engineering students have a high level of expectations on proficiency with technology, the capability of the course instructor, delivery of the course content, setting social interaction, ensuring course organization, and realizing time management and convenience. Furthermore, there is no significant difference between the expectations of the computer engineering students and electronics and communication engineering students. When both of them are to be subjected to an online learning delivery, they expect to have a high level of proficiency in word processing and attaching files to emails but had low expectations on computer software troubleshooting. They expect their course instructors to communicate the learning goals and post the course requirements as agreed upon. When it comes to the course content, they expect that it would provide them with active learning conditions and can be applied appropriately to real-life implications. Though there may be limitations of face-to-face interaction with their classmates, engineering students expect for

an online collaboration where they can respect one another. Engineering students expect that their instructors' course materials are logically organized and can be easily located through the reference list to be provided. Lastly, they expect that they would be able to effectively manage their learning time, ensuring that there are enough and appropriate activities to be given by all instructors within the specified time agreed upon. It is depicted that there is a significant positive relationship between and among the pre-determined factors in the implementation of flexible learning. Each factor is essential and should be considered by the college administrators to efficiently and effectively implement the flexible learning mode. When one of the factors is addressed and considered its relevance, most likely it would bring a positive outcome to the total learning experience of the engineering students.

University officials and college heads may use the result in ensuring an organized policy toward smooth implementation of flexible learning and examining pre-determined expectations that can be satisfied. The instructors have to be considerate in giving flexible arrangements for the students in a gradual shift of making them independent learners, which revealed to have low expectations. If needed, virtual consultation is recommended to students who will need assistance to cope with challenges brought by educational reform in order for them to comply with different course requirements. On the other side of the spectrum, students may continue to develop proficiency in using the technology to achieve more in flexible learning conditions. Since there is a significant positive relationship between and among the pre-determined factors in the implementation of flexible learning, it is suggested that curriculum planners and developers may consider that proficiency with technology and the expectations to the course instructor, content, social interaction, course organization and time management and convenience work together. With these, greater accomplishments can be realized among engineering students. For future researchers, since the study only focused on perspectives on flexible learning among limited number of engineering students, the parameters can also be adopted to other

courses with greater number of potential respondents that will serve as a guide for university-wide policy implications.

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Learning Mathematics in the New Normal through Teacher-Created Videos

Jahfet N. Nabayra

Introduction

In the past years, majority of the learning process of the students was through classroom setting or face to face interaction. Teachers used to deliver their lessons through face to face lectures, interactive activities, live discussions, hands - on practicum, and the like. However, the pandemic posed an excellent opportunity to change the way we teach mathematics in schools. Because of the pandemic, education had to migrate to the online environment. The Commission on Higher Education (CHED) advised institutions of higher education in the Philippines to implement distance education methods of learning for its classes, such as the use of educational technology, to maximize the academic term despite the suspensions (Hallare, 2020). Online learning is education that takes place over the internet. Online learning is just one type of distance learning for any learning that takes place across distance and not in a traditional classroom (Ariyanti & Santoso, 2021).

Furthermore, based on the study of Tyaningsih et al. (2020), after the surveys and online interviews through Google forms and Google meetings on what the students thought about online learning, some of the advantages of online learning were practical (easy to use), flexible (can be done anywhere and anytime), and can be done casually (while lying down, eating, drinking, etc.). Though e-Learning has been slowly being a part of the medium of instruction in the Philippine education, challenges have been evident on the use of it especially in Mathematics courses (Cortez, 2020). The study of Ariyanti and Santoso (2021) in Indonesia on online mathematics learning prior and after the pandemic found out that the average student's positive response towards mathematics before online learning is greater than after online learning. Obstacles faced by students when participating in online

learning include the issue on the teacher who directly gives questions without any material explaining how to solve problems making the students unaware on how to understand the material. In the Philippines, the study of Guansi et al. (2020) among college students found out that students still prefer the learning process where the teacher explains the lessons followed by an assessment. This indicates that students can make their learning process through learning resources. However with the explanation of the teacher via online, it is still important for them that teachers discuss their lesson for them to understand deeply the subject matter.

Considering these gaps in pedagogy and learning resources in higher education in the Philippines and other countries on how to make learning in the new normal effective, inclusive, flexible, and efficient, many studies suggested the use of instructional videos in mathematics education and other fields. Ariyanti and Santoso (2021) found out that the students prefer online mathematics learning where teachers should make videos or explain material through videos so that students can better understand completion steps and formulas that can be used. Tanujaya et al. (2021) also concurred the use of video in an effort to increase interaction between teachers and students in learning. Teachers need to make more innovative approaches to achieve the learning objectives of mathematics instruction. Wang (2021) on his study in an online undergraduate math course revealed that students improve much more in test performance when using fewer technologies and tools like videos and forums. An appropriate number of pre-lecture and lecture videos are in need to assist students with academic improvement.

As a response to the demand of the new normal learning to tailor instructional materials suited for online learning, the researcher has been using teacher-created videos uploaded in YouTube to make mathematics learning flexible, inclusive, and efficient despite the pandemic. Hence, this study was initiated to describe the experiences of the students in learning mathematics in the new normal through the use teacher-created videos.

Theoretical Framework

This study was anchored on E-learning theory of Mayer, et al. (2015) which consists of cognitive science principles that describe how electronic educational technology can be used and designed to promote effective learning. These include the following empirically established principles: Multimedia principle (also called the Multimedia Effect), Modality principle, Coherence principle, Contiguity principle, Segmenting principle, Signaling principle, Learner control principle, Personalization principle, Pre-training principle, Redundancy principle, and Expertise effect. Furthermore, teachers could apply this e-learning theory in their classrooms to create effective technology-enabled instructional materials.

Methodology

This study employed a descriptive research design. According to Kumar (2011), a study in which the main focus is on description, rather than examining relationships or associations, is classified as a descriptive study. A descriptive study attempts systematically to describe a situation, problem, phenomenon, service or program, or provides information about, say, the living conditions of a community, or describes attitudes towards an issue. Since the purpose of the study involves describing the experiences of the students in learning mathematics in the new normal through teacher-created videos, a descriptive study is well-fitted.

Moreover, the participants of the study were twenty randomly selected first year non-mathematics major college students from a State University in Western Visayas. These students are taking Mathematics in the Modern World (MMW), a general education subject in the Higher Education curriculum, during the conduct of the study. Students' pseudonyms were used in the discussion of the qualitative data to ensure anonymity and confidentiality of identities. The open-ended questionnaire used in the study through google form was validated by experts. A total of eight (8) teacher-created videos ranging from 30-40 minutes per topic/video were uploaded in YouTube as an instructional material in teaching

mathematics. The unified parts of the videos were the following: title, learning objectives, overview, discussion with integrated self-assessment, and references. In addition, thematic analysis was used to analyze the data gathered in the study.

Findings and Discussion

When these non-mathematics major students were asked about their experiences on the use of videos in learning mathematics online, their responses present the idea that the videos were easy to understand, flexible, with implied social presence of the teacher, and suited to new normal learning. The students were allowed to answer in their mother tongue or native language so that they can express their thoughts better. English translations were provided in the discussion for those answers of the students based on their native languages.

Easy to Understand. The answers of the students boil down to the idea that the videos utilized in class are easy to understand learning material. Since the videos were personally made by the teacher, a detailed, guided, and informative discussion was presented in the videos to meet the objectives of a particular lesson. The clarity of the discussion was also considered by the students as a significant part why the videos were easy to understand.

Student A stated that, *"Videos gave us a better view and understanding about our lesson on math, it became our guide in easy learning the topic and finding some sort of ideas in solving the activity. And it made me/us more knowledgeable about the concept of this subject. Video became our guide and way to correct our output/ activity."*

It was also validated by Student B and Student C who cited *that "My experience about watching videos helped me to easily understand the lesson. It's really a big help for me to analyze the problem because when the teacher is explaining through video, it gives me a clear explanation and knowledge on how the problem will be solved."*

Student C: *"As I've watched the videos, my experience about it was memorable because the videos gave me a sense of excitement in answering the activities you've given. It helps me easily understand the ways on how to solve the problem."*

Furthermore, the students found the videos in the material simple, comprehensive, effective, and easy to understand as agreed by Student D and Student E.

Student D further added, *"Easy and interesting sir, kasi ano sir… mahambae ko nga easy kasi kung tutuusin abi sir hay mas madali akong makaeubot kato sa video kaysa sa ginadiscuss it teacher sir…"* (It was easy and interesting because actually, I can comprehend easily the video compared to the actual discussion of the teacher…).

Student E said that, *"Video is very beneficial and effective educational material for me because it is comprehensible, understandable, and composed of various examples. It is good for those students who cannot easily understand and catch up a certain topic fully like me because it gives me a chance to study it again. The efforts of putting some pictures, voice over, and the smooth transitions of effects are also helpful in learning the discussion very well."*

These teacher created videos indeed embody the multimedia and modality principles of Mayer et al. (2015). Using any two out of the combination of audio, visuals, and text promote deeper learning than using just one or all three. Learning is more effective when visuals are accompanied by audio narration versus onscreen text.

Flexible. Moreover, the flexibility of the videos played a big part in its effectiveness as a learning material because students can play and pause the videos depending on their available and most convenient time. It was further validated by what Student G, Student H, Student I, and Student J have said.

Student G: *"I am grateful that there's a video explainer in each modules. It helps me to understand the lessons well. With the advantage that we can re-watch the explainer to fully get the totality of mathematical ideas."*

Student H: *"…Moreover, the videos aren't just a way to help us learn but also to boost our independence in learning. In my own stand, I have learned so much thing by just simply watching the videos provided. Other than it is reliable, it also allowed each of us to learn from your discussion in our most comfortable time. The video also lessen my problem with regards of my internet connection because after I downloaded it, I can watch it until I deeply understand without spending a lot of data connection."*

Student I: *"…With the help of these videos, hindi po mahirap ang umintindi sa mga lessons, masaya nga po kasi pwede naming ma pause yung may mga questions at answeran upang ma check kung nauunawaan namin yung diniscuss." (With the help of the videos, understanding the lessons seems to be easier because we can pause and answer the questions posted in some part of the videos, then play it again to check our understanding of the topic discussed).*

Student J: *"Learning with videos help me understand more the lesson. It is very flexible even compared to face to face class because whenever my brain is not ready for the information, I am free to rewind and play it again."*

This result agrees with what Kahrmann (2016) have found out that other factors that students' thought enabled the videos to be effective included the videos being available on their phones so they could watch them anywhere and anytime. They liked them being available if they were absent from class, so they would not get behind in their work. It also affirms the Learner control principle of Mayer, et al. (2015) which states that for most learners, being able to control the rate at which they learn helps them learn more effectively.

Social Presence of the Teacher. Many of the participants also shared the same idea that the videos used during their online mathematics class highlighted the social presence of the teacher. Some even argued that their experience is comparable to the usual face to face classroom set-up because they are still listening to the voice of the teacher while discussing the lesson. The combination of visual and audio elements of the video through the teacher's discussion played a vital role in making this experience

meaningful for the students. This is depicted in the answers of Student L, Student M, and Student N.

Student L: *"Medyo malayo ang agwat ng face-to-face class sa online at modular learning. Itong videos po na ito ay magandang way for the students to learn and understand the lessons well. It's just like a normal set-up of class kung saan mayroong teacher na nag di-discuss."* *(There is a huge gap between face-to-face instruction and online learning. These videos are good strategies for the students to learn and understand the lessons well. It is similar to the normal face-to-face instruction wherein a teacher discusses the topic.)*

Student M: *"Some courses and subjects, like Math and Science, truly need face-to-face interactions and hands-on performances that an online or modular means cannot carry out. However, when the videos were introduced to me, somehow I felt the typical classroom vibe. I can clearly hear the voices of my instructors and vividly grasp the whole idea of the topic being discussed. The mathematical stuff is bearable to understand and feasible for us to manage our time learning."*

Student N: *"Honestly speaking, videos have been great platforms that were provided in this class. Through these, it was easy for me to understand clearly the topic. My experience in watching videos felt like I'm on a face to face to class, because there's a discussion clearly stated in the video same as in modules. Hence I can tell that this was a big help in learning and catching up a lesson. That's why I am grateful enough that there are videos provided in this class."*

It is, indeed, important that the teacher's presence must manifest in an instructional video tutorial as corroborated by the study of Kahrmann (2016) that the teacher's voice has been found to be an effective design feature of the tutorials for both the students and the parents. All positive comments centered on how the tutorials sounded like the teacher was talking directly to the student in conversational style. Hence, teacher-created videos make learning personalized as reflected in the personalization principle of Mayer et al. (2015).

Suited to New Normal Learning. Ultimately, the students also agreed that the videos used in online mathematics learning are suited in the new normal way of learning because of the clear and detailed explanations, flexibility, accessibility, and built-in reflective assessment for independent learning. They also expressed the idea that this might be a good solution to the problem on how to maximize learning despite of the current pressing situation.

Student H narrated that *"During this pandemic, we aren't be able to attend school and be guided personally, but the educational videos you've created has become an effective solution for us who are struggling with the new normal education. Moreover, the videos aren't just a way to help us learn but also to boost our independence in learning. In my own stand, I have learn so much thing by just simply watching the videos provided. Other than it is reliable, it also allowed each of us to learn from your discussion in our most comfortable time."*

Student O also shared the same point, *"learning through watching videos helps me to further understand the lesson. It gives me a clear explanation how to solve problems. It expand the knowledge that the teacher is trying to discuss. For me it is necessary to have videos with this new way learning."*

Student P also cited that *"Base on my experience in learning with the videos, it helped me to understand the lesson and it was easy to learn or gain knowledge. Even if there's a crisis that we are facing today which affected our studies, there's a solution like what we are doing today, online learning and by watching videos."*

This confirms the study of Ariyanti & Santoso (2021) in Indonesia on online mathematics learning which found out a suggestion from students for online mathematics learning, that, teachers should make videos or explain material through videos so that students can better understand completion steps and formulas that can be used. Even before the pandemic, the students, based on their learning experiences with the video-based e-modules, found it to be unique and interesting, has immediate feedback with rich

examples, flexible and efficient, effective and easy to understand in learning the concepts of mathematics (Nabayra, 2020).

Conclusion

Videos are truly beneficial in learning mathematics in the new normal considering the flexible modalities like online and remote learning. To add, teacher-created videos exemplify effective, efficient, flexible, personalized, and appropriate learning resources in making mathematics instruction meaningful, easy to understand, and engaging despite the challenges brought by the pandemic.

Thus, institutions of higher learning like the universities and colleges have to prioritize trainings, workshops, and other professional engagements involving the teachers on the development of technology-enabled learning resources that would answer the demands of time. This would help the teachers to become more creative and adept in instructional materials development that could bolster their morale on becoming excellent instructional designers in the 21st century and the next normal.

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Part 3

The Efficacy of Online Learning Experience – Educators' Perspectives

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Looking Through the Lens of Rural Science Teachers in the New Normal Setting

Juliet C. San Luis

Introduction

Teaching science in the new normal learning has severely challenged the teachers in maintaining a quality learning experience during the pandemic (Porter, 2020). Science teachers are expected to expose learners not just to laws and theories that build the pillars of science education; students should also be engaged with observations, experiments, and other hands-on activities. However, the sudden shift of learning modality opened to new experiences for science educators to facilitate learning in a new normal setting, especially in rural schools. Since students' locations are far apart within these rural communities, teachers strive to reach their students during the new normal learning.

This study aims to have a deep understanding of the lived experiences of rural science teachers during the new normal learning setting of education. The study wants to recognize the struggles, challenges, and coping strategies of rural science teachers in response to the circumstances in their locality. This research paper intends to determine insights from the experiences of rural science teachers from which themes will emerge as the findings of the study. The outcomes of this study could be used to address issues and concerns of science teachers in the rural context and can enhance teaching and learning processes in new normal learning.

Literature Review

The Face of Rural Schools under the New Normal Education

The pandemic caused a significant impact on the basic education system, around 87% of the student population across the globe was affected by the school closures (UNESCO, 2020). Since the

primary concern is the health and safety of the citizens, especially youths, schools were forced to close. According to a news article of Malipot (2020) the Department of Education Secretary Leonor Briones stated that even though the country is facing the impacts of the Covid-19 virus, education must continue. This put forward to the DepEd to adopt the Basic Education Learning Continuity Plan under the DepEd Order No. 12 series of 2020. The DepEd provided learning modalities applicable during the pandemic; distance learning is one of the top choices of the schools. Distance learning is the learning modality wherein teachers and learners are of different locations during the instruction. Under this modality are modular-based learning, online-based learning, ad television or radio-based instructions (DepEd, 2020).

Another article by Malipot (2020), secretary of the Alliance of Concerned Teachers General Raymond Basilio said that one concern of new normal learning is the schools in rural communities. Students in rural communities have little to no access to the internet and electronic learning modalities. Thus, this would lead to greater possibilities that rural schools will be academically left behind in this opening of classes, because of the limitations on learning resources, internet access, and facilities. To answer that shortfall, as cited in an article by Jadhav and Patankar (2013) on the Roles of Teachers in Curriculum Development for Teacher Education, the primary role of the teacher in school is to serve as the bridge between the curriculum and the students. Thus, despite the closure of schools, they are responsible for providing quality education to all learners. However, there are changes in the curriculum because of the emergence of the Covid-19 that gave challenges to rural teachers, especially on those teachers instructing subjects whose nature includes content knowledge and practical skills such as science. Teachers are expected to expose learners not just to laws and theories that build the pillars of science education; students should also be engaged with observations, testing, experiments, and other hands-on activities. Through the help of these dedicated rural teachers, even though profoundly challenged due to the sudden shift of the education system, and the threat of the coronavirus,

science educators still translate the understanding of knowledge on science to meaningful classroom experiences.

Theoretical Framework

According to Grant and Osanloo (2014), in a qualitative research design, the researcher may begin the study with a less structured theoretical framework to avoid preconceptions to intervene in the findings of the study. Thus, the researcher should avoid theoretical framework, presumptions, and knowledge prior to the study to limit the biases on the data analysis (Khankeh, 2014). Theoretical frameworks may emerge based on the analyzed data. Subsequent with the deep reflection and analysis on the essence of teachers' experiences, the study made it possible for the researcher to represent the lived experience of rural science teachers in a schema as shown in the figure.

Figure 1
Thematic Scheme of the Lived Experience of Rural Science Teachers during the New Normal Setting
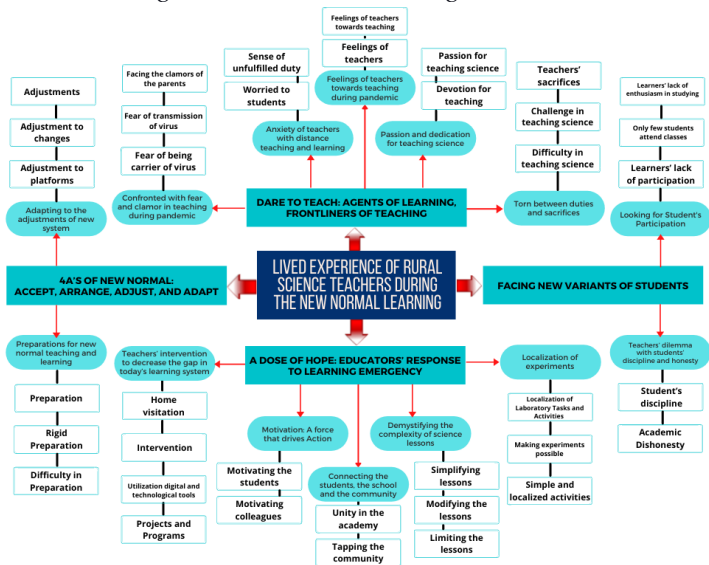
It shows the four major themes that emerged from the study. The first theme, entitled 4A's of New Normal: Accept, Arrange,

Adjust, and Adapt, represents the four-word phases of how teachers embrace the new system of teaching and learning processes. It reveals that acceptance of the situation is the first step to efficiently arrange and prepare the needed plans for the school year. As they apply the formulated strategies for the new normal learning, they eventually adjust and continuously adapt to the changes. The second theme, Dare to Teach: Agents of Learning, Frontliners of Teaching, shows that, science teachers also put their lives in the front line as this theme is composed of narratives that discuss the apprehensions and sacrifices of the teachers. These teachers were holistically challenged as their personal and work-related concerns were uncovered to be at stake, thus indicating their love and passion for teaching science behind the siege of new normal education. The third theme, coined as Facing New Variants of Students, represents teachers' insights towards the students learning away from them. The theme discloses the teachers' dilemma on the discipline, honesty towards outputs, and students' attention on their tasks. Then lastly, the fourth theme the teachers' intervention with the underlying problems posed by today's educational setup. Their story gave rise to its title, A Dose of Hope: Educators' Response to Learning Emergency, which pertains to how the science teachers created projects and interventions to give light to the deficiencies posed by the new normal.
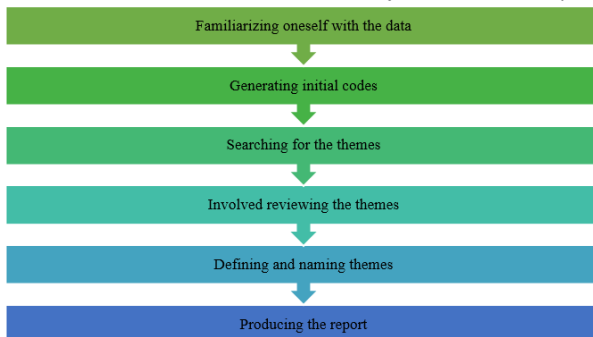
Methodology

This study used a qualitative phenomenological research approach to explain rural science teachers' lived experiences during the new normal setting of education. According to Creswell (2014), the qualitative research method is used to understand and explore the significance of rendering the complexity of a human or social situation. In addition to that, it is essential to consider that the lived experiences of the person can explain a specific phenomenon. Thus, a phenomenological research method aims to describe features of any lived experience of a group of individuals who are the primary source of information, situation, or event common to all (Creswell, 2013).

Ethical standards on trustworthiness and rigor were followed. Informed consent was provided by the researcher that provided the participants with detailed information on the study. It was sent then was signed, and the day and time of interviews were scheduled based on the participant's availability. Five (5) participants were purposively chosen through criterion sampling with the following criteria: (1) should be a junior/senior high school rural teacher 30-55 years old. (2) Should be teaching science in the school year 2020-2021. (3) Should be willing to express and share their experiences. Interviews were taken about 20 to 45 minutes to ensure that the data gathered were sufficient. Phone and online interviews were conducted via video conferencing applications. The researcher used the unstructured interview format with an opening question: "What are your experiences as a rural science teacher during the new normal setting of education?" Follow-up questions were asked to clarify thoughts, feelings, and meanings of what was expressed and gain a deeper understanding of the phenomenon. After the interview, the audio recordings were immediately saved to a laptop before transcription. Significant words, phrases, and sentences or paragraphs were extracted from the interview from the raw transcriptions.

Figure 2
Braun and Clarke (2006) Methods of Thematic Analysis

Familiarizing oneself with the data

Generating initial codes

Searching for the themes

Involved reviewing the themes

Defining and naming themes

Producing the report

Data were analyzed using Braun and Clarke (2006) thematic analysis, which identifies and analyzes patterns within the data collected widely used in a qualitative research design. This

procedure can gave the researcher the ability to describe complex information in a rich and detailed manner.

Findings and Discussion

Theme 1: 4A's of New Normal: Accept, Arrange, Adjust, and Adapt

After a precise analysis and reflection of the narratives, *4A's of New Normal: Accept, Arrange, Adjust, and Adapt* was the first theme that came out. Two sub-concepts were identified under this theme: (1) Preparations for new normal teaching and learning and (2) Adapting to the adjustments of the new system. This theme highlights how the teachers accepted the challenge of implementing the Basic Education Learning Continuity Plan. *Leoncio* shared his experience on how they prepare for the new normal learning.

"So, the survey happened before the school year has begun which during May we had what we call "Balik Eskwela" we had a meeting, we were discussing and also had conducted the so-called learning action cell where each department plan regarding that [learning continuity plan] and also as a whole, there was also what we call Learning Delivery Modalities where all the teachers had a session within each district about what preparations and what they should do beyond the pandemic."

Science teachers also discussed how they adapt to the adjustments brought by the new system. Ma'am *Josette* stated that:

"I easily adjusted it is because we were trained how to used [the new platform], how to create exam before the school year began, because we had few weeks that each day have different topics, like at first how to launch meeting, what button should be clicked, it was quite detailed, then next one was how to present word file from the PowerPoint on the zoom…so we were taught about those, that is why during the start of classes, we were quite not afraid or felt intimidated at all… but I was intimidated at first."

Ma'am *Fe* also stated:

"Yes, we must adjust, we need to adjust on the capacity of today's children and with the situation as well."

To further strengthen the themes, reflective resonance was done that presents available works of literature parallel to the generated theme. The sudden shift of the educational system was too short for all, especially for the teachers who facilitate learning. Teachers must accept the situation in order for them to build the mindset of continuing education amid the pandemic. After having that mindset, preparation is essential to equip teachers with the necessary knowledge and skills needed in new normal education (De Villa & Manalo, 2020). In addition to that, according to Tanhueco-Tumapon (2020), the global crisis posed an immediate adaptation of teachers to the new normal learning. Teachers showed flexibility and fortitude in dealing with the abrupt changes in teaching and learning processes.

Theme 2: Dare to Teach: Agents of Learning, Frontliners of Teaching

The second theme, entitled *Dare to Teach: Agents of Learning, Frontliners of Teaching*, came from five sub-concepts: (1) Confronted with fear and clamor in teaching during the pandemic, (2) Torn between duties and sacrifices, (3) Feelings of teachers towards teaching during pandemic, (4) Anxiety of teachers with distance teaching and learning, (5) Passion and dedication for teaching science. This theme talks about the challenges faced by the teachers in new normal learning. These educators dared to continue teaching behind the threats of the virus. They also shared how their passion and dedication to teaching acts upon them to face all the hurdles of an agent of learning.

Leoncio shared:
"Regarding the health risk, since our modality is through a module, how can we face the children? How can we face the parents since there is a fast transmission of the virus? Especially

here in Pagbilao, Pagbilao belonged to the top four areas with many Covid cases at that time. So, the challenge there is on how we would face [the people]?"

Clara added that:
"Their parents are usually undergrad of elementary such as grade 2, grade 1 parents… it is difficult because there is no one that could teach the children. However, another issue is that it is too strict in Kabulihan; they were strict to the rules to the extent that they prohibit the teachers from entering there because they were afraid of Covid."

Leoncio narrated his experience as he encountered this problem:
"…there were parents who were bucking there … I was angry thus I preceded the parents, "Aren't you were the one who gave that time? You were the ones who gave that time, then what are you complaining about?" I told that to the parents. Yes, "We have an agreement, you signed into this, and then what else do you want to happen? Do you want it to change again?" See, he could not [talk], this is because I was in the frontline in the distribution of modules."

Luz shared:
"In case of public [schools], there were a lot of students who have no [internet] access. Thus for those [who have no internet connection], what I suggest was they could write their observations and then draw and color, however, of course, I'm uncertain of whether they really accomplish it or not, hence at least they comply. That is why the system right now is too difficult, especially in our science subject."

As *Fe* said that:
"Of course, it is different, challenging but manageable. Yes, our love for teaching science is still there, that even through chat, through text, through call, as long as you could still share what you needed to teach to the students, guiding them, especially those who were struggling in the new normal, like that."

In terms of curriculum content, because of the impact of Covid-19 on learning processes, there is a problem on whether the lessons of the subject would be integrated or reduced. In this case, as cited from the study of Cahapay (2020), according to Romano, Papa, and Saulle (2012), the solution is to decrease the number of class hours. However, the duration of discussions should still maximize the lessons' objectives and address the expected learning goal. Another challenge that a science teacher can encounter is facilitating laboratory tasks since it requires technical assistance and supervision from the facilitator (Arrieta, Dancel, & Agbisit, 2020). This has been crucial to the teachers, especially in this subject that entails hands-on engagement among the learners to meet the objectives of the subject. As Lansangan and Gonzalez (2020) stated, public school science teachers continue to empower learners even struggling in the new normal learning using their dedication and perseverance in teaching science.

Theme 3: Facing New Variants of Students

Another theme comes to the fore from the experiences of science teachers, entitled *Facing New Variants of Students*. This theme was divided into two subtopics which are (1) Teachers' dilemma with students' discipline and honesty (2) Disconnected students. It contains teachers' descriptions of their distant students. The emergence of learning deficiencies among the students challenged the teachers as they strive to keep students engaged in learning and their value of academic integrity. During distance learning, these educators encounter problems with their students. *Luz* shared her experience:

"During the retrieval [of modules] because the modules provided by the DepEd have the key to correction, that's why you have to give additional tasks to the students. But they'll be incompletely returning [it to you] only some of those given to them will be completely answered."

Leoncio also experienced academic dishonesty among students:

"Okay, so of course one of the problems since it is a modular instruction, one of the greatest problems that we encountered is to… the learner's value of honesty. You know… After all, some students were creating their group chat to share their modules to the class with their answers."

As Dhawan (2020) indicated, given that DepEd imposes protocols regarding the students' participation, students were not forced to submit modules early on time because of the limitations brought by the learning situation. These became a huge concern among the science teachers in monitoring the students in distance modality. The Department of Education admits they already expected that issues on academic dishonesty are inevitable in the system of blended learning. As cited from the news article of Adonis (2020), the DepEd Undersecretary for curriculum and instruction, Mr. Diosdado San Antonio, asked the help of the guardians or any significant adults that they play a huge role in reinforcing the value of academic honesty within their child. In addition to that, the article pointed out that a teacher is knowledgeable enough to identify whether the outputs of the learner were indeed done by them or accomplished by someone else.

Theme 4: A Dose of Hope: Educators' Response to Learning Emergency

Through an in-depth analysis of the data collected, the theme *A Dose of Hope: Educators' Response to Learning Emergency*, unfolded from the five sub-themes under it, such as (1) Teachers' intervention to decrease the gap in today's learning system, (2) Localization of experiments, (3) Demystifying the complexity of science lessons, (4) Connecting the school, the community and the society and (5) Motivator that drives learning. This theme highlights the teachers' response to all the problems brought by the new normal setup of education. *Leoncio* shared his experience in conducting projects for distance learning:

"I even climb the mountain of… and under the heat of Atimonan, yes you're right, we go there since we have a vehicle. We visit the learners from the lists of names of the students in a barangay or a

sitio, we conduct mobile learning that we called project SMILE-Student Mobilization Intervention for Learning and Enhancement."

Fe talked about the science experiments during new normal learning:

"Yes, it's still possible, they have activities and experiments, but then it will be done at their homes. For example, before, I had a topic in grade 8 about the earthquake, so they used stones, water for them to see what waves looked like if they used big pale with water, stone or ruler, like all the possible materials that they could use are available at their home thus localization of activities are done."

Leoncio shares his role as motivator:

"Yes, in times like that, you need to motivate them. I'm actually good at dealing with the students, not to brag about it, even the lazy ones and those struggling learners there can do [activities]. They may be pushing themselves, yes also when it comes to the delivery of lessons since some children who cannot cope up, we create; actually interventions for that."

According to De Vera's (2020) study about teachers' resiliency in new normal classrooms, one of the integral parts of today's educational situation is to think of what is effective in teaching and how to facilitate it. Teachers must develop ideas that would promote meaningful learning even students are distant from the instructors. The science teachers in the study embrace the use of technology through the utilization of new applications, media, and learning platforms that pave the way to meaningful learning. The unforeseen learning emergency that shifted all systems paved the way for teachers to go out of the box in finding solutions to the challenges posed by the pandemic (Arietta et al., 2020). Since science experiments are difficult to conduct in distance learning, localized laboratory experiments were conducted, modifications of lessons that still correspond to content standards, and discovery

of online platforms proved that learning must continue through these committed science teachers.

Conclusion

The findings of the study imply that rural science teachers have to equip themselves with the knowledge and skills needed in teaching in the new normal learning. Teachers have prepare methods and strategies that will continue meaningful learning in science, even in distance learning. They attended webinars, online training on using educational technologies and science software applications that would provide them with knowledge and competencies to efficiently teach in the new normal learning. All these seminars and several meetings prepared them to face the challenges of distance teaching. Science teachers also emphasized that since the time duration of science subjects was lessened due to the limited and possible hours given to teach in distance learning, it affects the depth of the content that the teacher could cover. It is challenging for rural science teachers to grasp students' attention in the new normal setting. The findings imply that the reduced amount of face-to-face guidance also reduces the drive of students to learn science lessons. The science teachers' intervention to the problem they encountered in facilitating scientific experiments is conducting localized experiments. Using improvised materials in dealing with the experiments prescribed by the DepEd answered the limitations on laboratory tools and equipment amid the pandemic. This paves the way for teachers to become more creative and ingenious in optimizing the availability of the resources found in local communities integrated into learning. Given all these insights and implications, these findings contributed to a deeper understanding of the experiences of rural science teachers as they facilitate learning amidst the pandemic.

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The Administrative Challenge of the 'New Normal' in Education

Dr. Ruel F. Ancheta

Introduction

The operation of the private basic education institutions in the country and around the world was severely affected by the COVID-19 pandemic which began in December 2019. It became a worldwide health crisis where everyone were literally affected regardless of age, gender and social status. The world stopped and economy collapsed as all businesses shutdown operations. For instance, most countries closed the schools, colleges and universities to contain the spread of the virus. The crisis became a dilemma not only to the health sectors but also to the education sectors. When the Philippine government ordered closures of all educational institutions, the disruptions were sudden since classes were still running. At the height of the pandemic, educational institutions came out with remote learning as an alternative solution. The immediate action and strategy aims to mitigate the closure while continuously delivering quality education.

The sudden shift to online learning created a hot debate in the Philippines citing the poor living conditions of the learners. Magsambol (2020) cites an obvious gap between those who can and cannot afford the resources to avail the new education platform. The general condition of children in the public school system sends a message of inequality with the DepEd's mantra 'no child left behind.' However, learning cannot be cancelled as much as to drive the economy. This led to a tighter measures for education institutions in sustaining its operations despite the impending risk.

One of the basic problems seen by Kasrekar (2020) is the conduct of classes despite of the closure order. As the face to face classes

pose higher risk of spread, the most viable solution is through online teaching and learning. This platform challenges both the teachers and the students as it occurs something new to them. This calls for an 'adopt quickly' response to the new normal in teaching and learning amidst the pandemic (Tanhueco-Tumapon, 2020). The shift to online learning was too sudden at a very short notice but academic institutions have to strategize and accelerate new forms of teaching pedagogy. The question of how ready the schools are in terms of technical infrastructure is still left unanswered. Reopening of the schools at this stage is really expensive (Felter & Maizland, 2020). Magsambol (2020) cites that the Coordinating Council of Private Educational Associations posed threat of closure of over 400 private schools due to lack of enrollees.

Private basic education institutions in the Philippines are not funded by the government. They operate in accordance with the laws and regulations set by DepEd and follow the same curriculum as the public schools. The public school is basically free, but parents with financial capacity opt to send their children to private schools due to smaller class size and better facilities and resources. The role of the private basic education institutions in the Philippines play a vital role in educating the minds of young Filipinos in terms of quality services (Acidre, 2019). The House Bill 4813 created the Bureau of Private Schools (BPS) that regulates the conduct of educational programs of all private basic education institutions in accordance with the DepEd standards. The bureau undertakes studies and prepares prototype curricular designs and guidelines to improve the curricular offerings of the private schools. All the programs and activities of the private education institutions are still under the supervision of DepEd (Carcamo 2014).

This article examines the administrative challenges faced by the private basic education institutions in the Philippines in the 'new normal' of teaching and learning modality. It particularly assesses the different factors considered by the private schools in shifting to the online learning.

Discussion

Most countries all over the world are focused on how to start the new school year within the 'new normal' of teaching and learning without depriving the students of their right to quality education. The public and private academic institutions in the Philippines are instructed by DepEd to come up with a learning continuity plan (LCP), a package of education intervention in response to the challenges in basic education brought by Covid-19 pandemic. This strategic plan is designed to carry out the conduct of classes amidst pandemic. It is a commitment of the government in protecting the health and safety of learners, teachers, and school personnel under the health protocol of the Department of Health (DOH) and the World Health Organization (DepEd Order Nos. 12 and 13, 2020).

a. The Learning Continuity Plan

Per DepEd Order Nos. 12 and 13 s. 2020, the LCP contains two major parts: the rationale and the operationalization home-based learning through modular, online or a combination of modular and online (blended approach). The rationale is an easy part of the LCP as it only indicates the nature of the school which include government recognition or permit number, accreditation, and its classification whether small, medium or big school. It also includes the location of the school, summary of the number of students for the past two school years, number of administrators, teaching and non-teaching staff, and number of classrooms and other facilities. The number of currently enrolled students are included in the rationale. In reality, this part shows a drastic decrease on the number of current enrolment in most of the private basic education institutions as compared to the past two years data. This is because most of the students transferred to the public school. It was clearly stated by DepEd Secretary in the interview conducted by Rappler on 08 July 2020 that the transfer of students to public schools is due to the economic downturn. Parents who used to send their child in the private schools have lost their jobs during the pandemic. She also said that almost 200,000 students from private schools had transferred to public schools.

The operationalization part of the LCP is a very comprehensive plan in response to the new normal in education. This part needs strategic planning and coordination with the stakeholders in order to come up with a comprehensive contents as per DepEd guidelines. The operationalization part include 10 major contents which are school readiness, platform and support, content, assessments, teachers preparation, learners capability, parents role, communication plan, continuance, and monitoring and evaluation. All these require proper preparation, brainstorming, meeting, survey and coordination. Briones (2020), DepEd Secretary, emphasized that the basic education learning continuity plan in the time of Covid-19 is the response of the department to the challenges posed by Covid-19 in the field of education. She pointed out that education must continue whatever the challenges and difficulties faced now and in the future. Thus, the LCP is an integrated output of the Department in consultations with advisers, legislators, executive directors, teachers, parents, learners and the general public.

All private basic education institutions must have a clear statement of its readiness in the new normal. This readiness include consultation with stakeholders as to how the new normal would take place such as online enrollment, the date of school opening, teaching and learning modality, and the availability of the learning resources. A sample class program needs to be presented on this content. In this item, the DepEd wants to find out if the private basic education institutions are ready to continue their services to their stakeholders during the pandemic. Hernando-Malipot (2020) cites the DepEd directive that as long as no face-to-face classes, basic private education institutions and other non-DepEd schools are allowed to continue their respective school openings. The non-DepEd schools which started or scheduled to start their classes are allowed to proceed with the provision of using distance learning (DLE). However, parents assert that this 'home schooling' scenario is unfavorable to the students. Burges et al. (2020) agree that home schooling is not only a massive shock to parents but also to the social life and learning of the students.

b. *School's Plan for Compliance with Minimum Health Standards*

DepEd Order No. 14, s. 2020 instructs all private basic education institutions to come up with health and safety protocols in compliance with the guidelines on the risk-based public health standards for COVID-19 mitigation. This Covid-19 mitigation aims to increase mental and physical resilience, reduce transmission and contact, and reduce duration of infection (DOH AO No. 0015, 2020). For this, the UNICEF (2020) emphasizes on the water and hygiene facilities.

In compliance with the DOH guidelines on the risk-based public health standards for covid-19 mitigation, the general health and safety protocols advocate the use and practice of respiratory etiquette and other protective measures. All learners, teachers, and non-teaching personnel are required to observe this general health safety protocols through the use of protective measures. Additionally, the school needs to ensure the availability of disinfecting paraphernalia at all times. Singh-Vergeire (2020) explains that the public must be vigilant and observe the infection prevention such as the use of PPEs, proper hygiene and social distancing to avoid the spread of the virus.

Early detection through temperature check of all who enters the school premise is a primary step in times of pandemic. In case someone is detected to have high temperature, referral to the nearby local health unit is a must. This is an additional challenge to the school as they are responsible for the monitoring of students and teachers with or without disease symptoms. The responsibilities of the school administration extends to the implement of this policy to maintain safety within the school community. Bender (2020) emphasizes that the school community must promote information sharing including prevention and control measures and follow the guidelines set by the health authorities.

Curricular and co-curricular activities are part of the teaching and learning process. These help learners develop their skills and

talents. Naii (2018) points out that extracurricular activities provide students with self-confidence to become a well-rounded individual. However, for the current school year, all school activities are postponed except those that can be done through online. DepEd Order No. 13, s. 2020 reiterates that all activities of the private basic education institutions are postponed for the entire school year 2020-2021. Postponement of the school's extracurricular and co-curricular activities like field trips, school retreat, foundation day and other activities will surely be missed by the students this school year.

The school clinic plays a big role on the students' health and safety. The school has to ensure that teachers and other school personnel who manifest symptoms shall not be allowed to report to school. The school clinic also needs to coordinate with the local health authorities in tracing and quarantine of confirmed positive cases. The school clinic ensures the availability of emergency health kits that include PPEs and other needed supplies and materials. The role of the school management in the protection, detection, prevention, and monitoring of the school community plays a big role in times of pandemic (Vergeire, 2020).

In times of pandemic, physical arrangement of the school complies with the DOH guidelines. All classrooms must meet the standards prescribed by the DOH to avoid the spread of the virus. This includes proper ventilation, proper sanitation and hygiene facilities. Even though students are not coming to school, the physical arrangement of the school has to follow the standards set by the government (DepEd Order No. 13, 2020).

The support mechanisms include physical and mental resilience and administrative support of the school. The first step to achieve resilience is through proper orientation to its teachers and learners. Furthermore, the school guidance office must be functioning effectively in monitoring students' mental health. The school also makes sure that teachers working at home are provided with necessary logistics.

Conclusion

It is obvious that almost all private basic education institutions are facing lot of challenges brought by the effect of covid-19 pandemic. The government order on the stoppage of face-to-face classes until vaccine is available has impacted on the enrollment data of the basic private education institutions. The decrease on the number of enrolment is due to economic downturn as parents who can afford high fees in the private schools lost their jobs during the pandemic. In addition, the sudden shift on the teaching and learning modality added burden and pressures to the school owners.

The DepEd requires all private basic education institutions have to comply with all the government requirements if teaching and learning are pursued for the current school year. Of these requirements, the LCP and health and safety protocols add additional burden as these are for strict compliance and immediate implementation. Though DepEd gave guidelines on how to prepare all the requirements for the opening of classes, the documentation process is a tedious process completed in no time. The bigger challenge is now passed on to the private schools.

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Balanced Scorecard: A Design Thinking Assessment of Higher Education's Organizational Performance

Michael Jere' D. Abiol

Introduction

A balanced scorecard is a metric of organizational management performance that distinguishes and improves various internal organization positions and the external implications that result from them (Kaplan & Norton, 2009). Organizations use balanced scorecards to measure and offer feedback. Data collection is essential for both quantitative and qualitative results, so managers and executives gather, interpret, and apply information to make better business decisions (Tarvar, 2020). The scorecard offers managers four distinct viewpoints from which to choose indicators which supplement standard financial indices with metrics for customer satisfaction, organizational operations, and innovation and development practices. Moreover, the balanced scorecard encourages radical improvements in critical areas such as commodities, operations, customer behavior, and market development (Kaplan & Norton, 2009).

In a similar context, the design thinking is a method that places the employee experience at the forefront of the initiative. When using design thinking, the company transitions from a process maker to an experience creator, concentrating on the user and the overall experience rather than the process itself. Thinking like a designer entails researching how people behave, creating personas and profiles to better appreciate various demographics, work environments, and real problems they face (CoreAxis, 2017). Corporate training and eLearning allow examining three significant touchpoints within the organization to appreciate better what is needed. These are the procedures, people, and technologies with which workers interact at various stages of their employment with the company (Maier, 2019). For instance,

anyone who works on faculty development in higher education understands that adult learners must understand that preparation can benefit them today. For faculty with large workloads and many binding commitments, dedicating even an hour to training can be a significant task. Design thinking is ideal for revising current training, developing new training, selecting a modality, and selecting workshop materials (Wahl, n.d.). As the design thinking revolution in education broadens and deepens, more professionals adopt the design thinking process to their specific contexts (Susie Wise, 2016).

Every higher education institution aims to enhance their competitive advantage through a proper competition plan. Thus, every firm's policy formulation, and implementation are essential enablers. To carry out its plan, organizations are using the new principles in Design Thinking to formulate the balanced scorecard to improve and maintain competition (Ambastha, 2019). In this context, this study evaluates the design thinking of organizational performance in higher education through the balanced scorecard perspectives. It particularly discusses how design thinking develops the balanced scorecard in organizational performance using one online modality.

Methodology

This research involves a case study, an in-depth examination of a specific research topic as compared to a broad statistical survey or systematic comparative investigation. The case study condenses a vast field of study into a few conveniently researched examples. The case study research design is often helpful in determining if a given hypothesis or paradigm corresponds to real-world phenomena (USCLibraries, 2021). This research method is beneficial for putting scientific models to the test by putting them in real-world contexts. The case study strategy empowers in-depth, multifaceted investigations of emotional issues in their real-world settings. Specifically, the qualitative case study analysis allows researchers to perform an in-depth investigation of complex phenomena within a specific framework.

Participants in this study were ten selected employees from a higher educational institution in Iligan City in the Philippines. The purposively selected participants were the primary informants in a focus group discussion (FGD). The FGDs can be classified as interviews of individuals to collect various information, which could have as few as four participants and as many as ten (Statistic solutions, 2021). In this data gathering method, the participants were asked open-ended questions in an immersive environment where they publicly shared ideas. The open-ended questions are free-form that encourage respondents to reply in open text format, allowing them to respond based on their complete experience, feeling, and interpretation. It relies on accessible and subjective questions and answers on a given topic of conversation, with space for more probing by the researcher depending on the respondent's response (Bhat, 2020).

With the current restrictions implemented by the government, the FGD was conducted online. The participants were asked questions related to their perception and analysis of the organizational performance in terms of financial, education and growth, internal process and customer satisfaction. The participants gave their consents on the conduct of the FGD as well as the recording of the entire discussion. From the recordings, the data were summarized and sorted according to the themes. The themes were the four perspectives of the balanced scorecard. Based the keywords given during the discussion, the responses were summarized and tabulated

Findings and Discussion

Table 1:
HEIs Financial Performance

Perspective	Summarized responses of the participants
Financial	- The school management focuses on strategic approaches, such as the cost of transitioning from face-to-face to the school's preferred learning management system. - In a pandemic, the management must have all the financial and strategic resources to prepare its stakeholders.

The table 1 summarizes the participants' thoughts about the organization's finances. In general, the pandemic had a detrimental influence on the economy, which impacts the financial elements of the educational institution and its stakeholders. In particular, the participants reiterated on the school management's focus on the recruitment strategies for a more significant increase in student population. In terms of cost, the associated expense of shifting from face-to-face to the school's preferred learning management system is a major concern. The positive correlation on the two factors equates to "lower population is equal to lower income." Relative to this, the participants assert that the HEI has all necessary financial resources and policies to prepare its stakeholders for the consequences of the pandemic.

The FGD highlights that during the pandemic the company's financial status and stakeholders are a source of concern. For instance, personal finance is one area where the coronavirus pandemic has had a negative effect. The situation severely caused disruptions on the ability of the students to afford the cost of their education which the pandemic has made it much more difficult (Reinicke, 2021). While students' finances are bleak, the impact of which to the HEI enrolment and operation is much bigger. The low enrollment rates have the potential to jeopardize funding. When the coronavirus pandemic shut down school buildings, the education system was already suffering the repercussions of the Great Recession, throwing the world into economic shock (Modan, 2020). With the decreasing number of student enrolment comes the increasing cost of learning modalities. There are many unknowns, but scenario preparation should be in full swing, with schools reopening in various ways (ERS, 2021).

Table 2 summarizes participants' perspectives on the organization's education and development. During the pandemic, the institution adopted the online learning modality with asynchronous and synchronous sessions. The participants mentioned that the e-learning is an achievement of the school. The FGD highlights positive insights on e-learning particularly the utilization of various resources and the use of design thinking

techniques giving students variety of possibilities for learning eventually helping them succeed. The participants also asserted that the use of the design thinking process for successful practice studies included technology in hybrid courses. In addition, the design thinking technique facilitated participatory and empathy-driven creative educational activities, which aided implementation and transformed the experience and community perception.

Table 2
HEIs Education and Growth Performance

Perspective	Summarized responses of the participants
Education and growth	• This e-learning modality improves school success, where students are more likely to succeed as teachers use various resources, including the design thinking processes. • The design thinking approach is used to examine technology in hybrid courses. The design thinking methods facilitated participatory and empathy-driven creative educational activities that boosted the transformational experience and the resultant feeling of community.

It is well-researched that online instruction, like most teaching techniques, has advantages and disadvantages. According to Gautam Priyanka (2020), decoding and comprehending the positives and negatives would assist institutes in developing plans for more effective conduct of lectures, ensuring students have an uninterrupted learning journey. Considering the current situation, the world has come to a halt, programs have been postponed, workplaces and classrooms have been closed. The online learning enabled students to continue their schooling which is the preferred educational model for schools (Angdhiri, 2020). However, as addressed by Simenson-Gurolnick and Miller (2021), designing and introducing large-scale distance learning is a modern challenge for multiple school programs. For this, creative thinking would offer a novel approach to address the challenge which may be counterintuitive to take a human-centered approach. Nevertheless, by having stakeholder needs, teachers at the core of

distance learning design, there are multitude of opportunities for innovation in an online atmosphere.

Table 3
HEIs Internal Process Performance

Perspective	Summarized responses of the participants
Internal Process	• The organization transitioned successfully from paper to paperless transactions throughout deployment. Providing online procedures in any way, shape, or form is a must-have for every firm in the new digital age and beyond. • Since the organization's major current income source was its online platform, it was vital to integrate databases and website output monitoring in the process.

Table 3 displays the participants' assessment of the organization's internal processes. As to their observations, throughout the implementation phase and until the present, the institution seamlessly transitioned from paper to paperless transactions. Accordingly, it advances the organizational status in the new digital age and beyond by meeting the demands of the modern-day learners. The participants also describe the offering of online procedures in any way, shape, or form which is a must-have for every organization. The participants' evaluation also pointed out the vital database monitoring involved as part of the process which bring together the accurate data acquired from the organization's productivity initiatives and online components.

With the shift to online learning, all transactions were also fully online which facilitates faster and easier process. This is supported by Tan (2014) with his evaluation of online enrollment that increases productivity and reduces needless documentation. Moreover, online transaction consistently develops operation and promotional technologies, enabling users to sign up when and where it is most suitable for them from every Internet-enabled computer. However, this requires investment and resource allocations for the organization Wow Digital (2021) suggests that

an online registration system, which is becoming society's standard, demonstrates credibility and a forward-thinking strategy. In today's ever-changing world, incorporating sustainability into a business strategy is no longer an option. Considering a values-driven approach when implementing business strategies can be critical to long-term success, and sustainability initiatives can contribute to an organization's overall success in addition to driving social and environmental change (Chladek, 2017). Moreover, sustainable development will fuel company growth (Alexandra, 2019).

Table 4
HEIs Performance on Customer Satisfaction

Department	Summarized responses of the participants
Customer satisfaction	• Both learners and educators started the problematic phase on the transition of online modality, yet the essence of the process paves the way to sustainable education amidst pandemic. • Students recognize the importance of online modality, which improves institutions in the new world.

Table 4 summarizes participants' responses on the organization's customer satisfaction. According to them, both the learners and educators started the challenging transition to virtual learning, but the core of the process prepares the way for sustainable education in the face of pandemic. The participants also profoundly asserted that virtual education is the most significant change in the modern education. The whole situation has been characterized as a dramatic change in the structure which also opened up additional opportunities for individuals. The participants are positive that the teachers and students realized the value of online education in improving the institution in the modern world.

The description of the participants' learning experience is supported by Heap (2017) where the learners can select their own learning experience that better suits their interests by studying online. In the online environment, classroom sessions are set in a conventional atmosphere where students have the flexibility to

choose their schedules for independent learnings. With the flexibility, most online students appear committed to their tasks while set aside other tasks. Through multi-tasking, learners can manage their learning experience in an online class. This is the same environment for the Community College of Aurora (2019) where the new learning models have emerged offering students suitable curriculum with various options allowing individuals to graduate from the program they have begun but have not completed.

Conclusion

The coronavirus pandemic has had a negative impact on the financial aspect of the educational institutions. The results of the FGD showed the critical financial challenges faced during the COVID-19 caused by low enrollment rates which jeopardized funding. The pandemic also forced the school to provide learning modalities through proper planning in order to reopen the teaching and learning in various ways. The study also revealed that the online learning modality, like other educational methods, has benefits and drawbacks. The participants added that designing and integrating massive learning activities is an instruction period for many school programs, and creative thought provide a revolutionary solution to addressing the drawbacks of online learning. The participants also believe on the human-centered approach to the problem by putting stakeholder interests and teachers at the center of distance learning design.

With the challenge of online learning, the school management must first focus on implementing strategies to increase student enrolment and impose cost-cutting measure to cover up the losses incurred in the transitioning to the online learning. In order to successfully implement the online learning, teachers are encouraged to continuously employ design thinking methods to provide students with options for learning new material. Lastly, the school must formulate strategic plans to sustain the operational performance of the organization despite the challenges of the pandemic. To this, a new way of thinking will definitely create the

'new normal' in the field of education. As the online learning is here to stay, the schools must be able to embrace this new model of education.

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Part 4

The Future of Online Learning Experience

Future Management of Online Learning in Higher Education

Wai Wai Than

Introduction

Online learning is considered to be essential in the 21st century and its popularity increases more radically among the people all across the world. It is said in a most recent survey from Babson Survey Research Group that over 30 percent of higher education students in the States take at least a distance course through online learning (Gemma Josep, 2021). Not only in the States but also all over the world, the number of people who study online increases day by day because of the coronavirus pandemic. According to an article from Insider, Zoom, a teleconferencing application typically used by businesses, has become the hot new way for people to connect and study online while social distancing during the coronavirus pandemic (Ben Gilbert, 2020). Like Zoom, other learning management systems are becoming popular in this time of favoring online learning. Some higher education institutions are trying to develop and utilize their own learning management systems. Because of this popular nature, there is the need for selecting the efficient learning management systems for education institutions for the effective management of online learning.

Although online learning is an inevitable road to continuous education during Covid-19 crisis, there are still many difficulties in establishing online learning in every education institutions. This creates a need for reviewing the current establishments of online learning during this crisis in order to learn the facilitating factors and challenges of online learning and develop a comprehensive framework for the future management of online learning.

Among the various sectors of education such as primary education, secondary education, higher education, and vocational education, higher education sector is the field in which online

learning is highly possible to establish and also really developed to some extent. As of the conduct of this study, there are very few systematic review of studies focusing online learning in higher education during Covid-19 crisis. To fill this need in higher education field, this study aimed to review the studies to explore the learning management systems, factors influencing online learning and challenges encountered in online learning establishment in higher education during the Covid-19 Pandemic by the use of systematic review technique. The purpose of this review is to develop a framework that can assist educators and designers in the future management of online learning in higher education by systematically reviewing the previous papers focusing online learning establishments during the Covid-19 pandemic. Three research questions drive this systematic review of online learning establishments.

1. Which types of learning management systems (LMSs) are mostly used in online learning establishment in the field of higher education during Covid-19 Pandemic?
2. What are the main factors facilitating online learning effectiveness in higher education institutions during Covid-19 Pandemic?
3. What challenges are students and teachers faced with in the real online learning classes in higher education institutions?

Methodology

This study utilized the systematic review approach to analyze the previous researches, journal articles and reports on online learning establishments in higher education institutions during the Covid-19 Pandemic. A systematic review is a piece of work that asks a research question and then answers it by summarising the evidence that meets a set of pre-specified criteria. The specific procedures for conducting this systematic review are presented step by step.

Inclusion criteria for this study were formulated as in the table 1.

Table 1

Inclusion Criteria

Criterion	Inclusion criteria
Focus	LMSs, Factors and Challenges of Online Learning Establishments
Level of education	Higher education
Language	Published in English
Design	Qualitative, Quantitative, Reports
Period of research	During Covid-19 pandemic

Since the coronavirus pandemic started in December 2019, in China and spread out nearly all over the world in 2020, the search period of the relevant studies covered from 2020 to September 2021, both included. Studies were collected via available search engines: Google, Google Scholar, Research Gate, Academia and ERIC. In searching the relevant studies, the keywords "Online learning establishments in higher education during Covid-19 period", "Learning management systems used for online learning in higher education during Covid-19 period", "Factors facilitating online learning in higher education during Covid-19 period", and "Challenges encountered in online learning in higher education during Covid-19 period" were used. In addition, the references of the studies retrieved were also checked in order to get additional studies compatible with the inclusion criteria.

Figure 1 shows a flowchart describing the selection process of the studies.

Figure 1
Flowchart of Selection Process of Studies
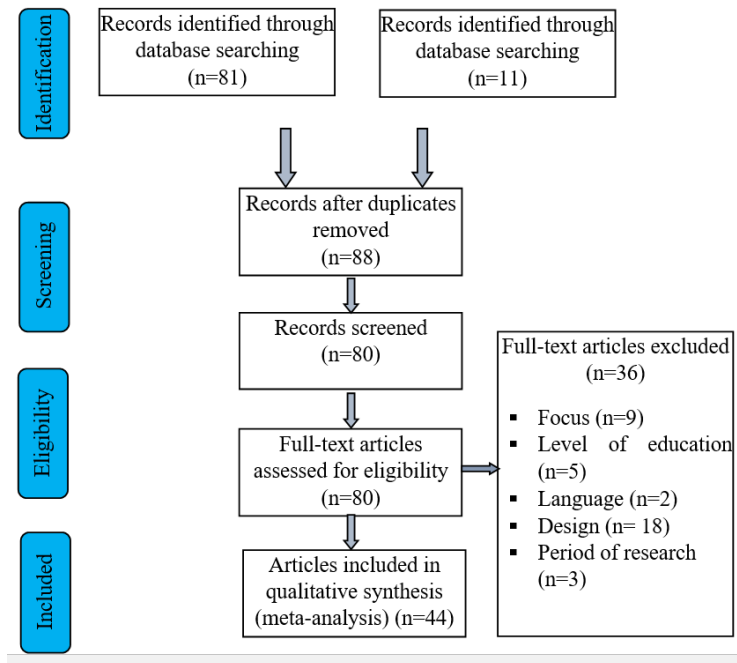
After the studies are selected based on the inclusion criteria, data are extracted and entered into the excel sheet. The authors, year, nation, target population, sample size, type of learning management systems, factors influencing online learning and challenges encountered in online learning.

To analyze the qualitative data of factors and challenges of online learning, thematic analysis is used in this study. The qualitative data are examined to identify the common themes: topics, ideas and patterns of meaning. This thematic analysis is conducted by means of the six-step process: familiarization, coding, generating themes, reviewing themes, defining and naming themes and writing up.

Findings and Discussion

Question 1: Establishment and Effectiveness of Learning Management Systems

The learning management systems applied in online learning establishment are reviewed by means of systematic review technique. Although 44 studies focusing online learning establishments in higher education during Covid-19 Pandemic are selected in this study, only 11 studies described their learning management systems used in online learning.

Table 2

Learning Management Systems (LMS) mostly used in Online Learning in the field of Higher Education

LMSs	No. of Studies	Names of Studies
Zoom	7	Ritonga, et al., 2020; Mahyoob, 2020; Mishra, et al., 2021; Jurgen & Tan, 2020; Parvin 2021; Awal, 2021; Affouneh, et al., 2021
Google Classroom	5	Agormedah, et al., 2020; Soeryanto, et al., 2020; Mahyoob, 2020; Mishra, et al., 2021; Gurung & Bhutia, 2021
WhatsApp	5	Ritonga, et al., 2020; Mahyoob, 2020; Mishra, et al., 2021; Gurung & Bhutia, 2021; Affouneh, et al., 2021
Emails	4	Mahyoob, 2020; Mishra, et al., 2021; Awal, 2021; Affouneh, et al., 2021
Moodle	3	Agormedah, et al., 2020; Murugesan & Chidambaram, 2020; Affouneh, et al., 2021
Facebook	3	Ritonga, et al., 2020; Mishra, et al., 2021; Affouneh, et al., 2021
YouTube	3	Ritonga, et al., 2020; Mishra, et al., 2021; Affouneh, et al., 2021

The platforms mostly used in online learning during Covid-9 crisis are Zoom app, Google classroom, WhatsApp, Emails, Moodle, Facebook and YouTube. Other used systems are Blackboard Interactive, Webiner, Alison, Canvas, Google meet, Instagram, Jenzabar, Microsoft, Own LMS, Panopto, Sakai, Schology, Skept, Telegrams, Telephonic conversation and Web conferencing platforms (Mishra, et al., 2021; Turgen & Tan,

2020; Mahyoob, 2020; Agormedah, et al., 2020; Murugesan & Chidambaram, 2020; Gurung & Bhutia, 2021; Ritonga, et al., 2020).

Question 2: Factors Influencing Online Learning in Higher Education

By systematically reviewing the 44 selected previous studies conducted during the crisis of Covid-19 Pandemic, there are five major factors influencing the online learning effectiveness in higher education.

Table 3

Factors Influencing Online Learning Effectiveness in Higher Education during the Covid-19 Pandemic

Factors	Descriptions	References
Technological factors	Technological knowledge, Technological communication skill, IT skill, Proficiency in using online tools, Ability to access online courses	Gautam & Gautam, 2021; Slimi, 2020; Elumalai, et al., 2020; Mohamed & Sami, 2021; Butnaru, et al., 2021; Siaw & Jiang, 2021
Personal factors	Self-management skill, Problem solving skill, Communication skill, Language proficiency, Online learning readiness, Perceptions on remote online learning	Slimi, 2020; Dong, 2020; Siaw & Jiang, 2021; Gautam & Gautam, 2021
Social factors	Social interaction with teachers, Social interaction with peers, Cultural aspects, Isolation with boredom and frustration	Febrianto, et al., 2020; Dong, 2020; Mok, et al., 2021; Elumalai, et al., 2020; Bhowmik & Bhattacharya, 2021; Tsang, et al., 2021
Instructional factors	Teacher expertise, Teacher consultation, Course content, Course design, Active learning activities, Blended learning	Gautam & Gautam, 2021; Paudel, 2021; Mok, et al., 2021; Elumalai, et al., 2020; Butnaru, et al., 2021; McDougall, et al., 2020; Tsang, et al., 2021
Support factors	Infrastructure, Economic support, Availability of recorded videos, Administrative support, Financial support	Gautam & Gautam, 2021; Febrianto, et al., 2020; Mok, et al., 2021; Elumalai, et al., 2020; Bhowmik & Bhattacharya, 2021

According to the result of this systematic review, there are five categories of factors influencing online learning effectiveness in

higher education: namely, technological factors, personal factors, social factors, instructional factors and support factors. The specific conceptual characteristics behind each factor are clearly presented in the above table.

Question 3: Challenges Encountered by Students and Teachers in establishing Online Learning in Higher Education

Based on the current establishments of online learning in higher education institutions, major challenges that are encountered by students and teachers are categorized and presented in the following table.

Table 4

Major Challenges of Online Learning in Higher Education during the Covid-19 Pandemic

Challenges	No. of Studies	Names of Studies
Technological skill	21	Agormedah, et al., 2020; Dlamini, 2020; Paudel, 2021; Slimi, 2020; Dong, 2020; Rajab, et al., 2020; Mok, et al., 2021; Mahyoob, 2020; Banji, et al., 2021; Mohamed & Sami, 2021; Marin & Bocos, 2021; Al-Akabi, 2021; Jili, et al., 2021; Williams, et al., 2021; Mollah & Parvin, 2020; Awal, 2021; Kaur & Kaur, 2021; Gurung & Bhutia, 2021; Affouneh, et al., 2021; Gautam & Gautam, 2021; Sarkar, et al., 2021
Internet and data access	24	Agormedah, et al., 2020; Paudel, 2021; Slimi, 2020; Febrianto, et al., 2020; Dong, 2020; Egielewa, et al., 2021; Mok, et al., 2021; Demuyakor, 2020; Mahyoob, 2020; Mishra, et al., 2021; Banji, et al., 2021; Mohamed & Sami, 2021; Gonzalez-Ramirez, 2020; Fatoni, et al., 2020; Bhowmik & Bhattacharya, 2021; Marin & Bocos, 2021; Al-Akabi, 2021; Williams, et al., 2021; Parvin, 2021; Mollah & Parvin, 2020; Kaur & Kaur, 2021; Gurung & Bhutia, 2021; Gautam & Gautam, 2021; Sarkar, et al., 2021
Social interaction	17	Slimi, 2020; Yang, 2021; Febrianto, et al., 2020; Dong, 2020; Rajab, et al., 2020; Mok, et al., 2021; Mahyoob, 2020; Means & Neisler, 2020; Mishra, et al., 2021; Banji, et al., 2021; Fatoni, et al., 2020; Bhowmik & Bhattacharya, 2021; Marin & Bocos, 2021; Kaur & Kaur, 2021; Affouneh, et al., 2021; Gautam & Gautam, 2021; Sarkar, et al., 2021

Challenges	No. of Studies	Names of Studies
Facilities	17	Agormedah, et al., 2020; Febrianto, et al., 2020; Egielewa, et al., 2021; Demuyakor, 2020; Means & Neisler, 2020; Mishra, et al., 2021; Banji, et al., 2021; Mohamed & Sami, 2021; Gonzalez-Ramirez, 2020; Marin & Bocos, 2021; Jili, et al., 2021; Williams, et al., 2021; Parvin, 2021; Mollah & Parvin, 2020; Gurung & Bhutia, 2021; Gautam & Gautam, 2021; Sarkar, et al., 2021
Teaching Learning Capability	15	Moawad, 2020; Dong, 2020; Rajab, et al., 2020; Mok, et al., 2021; Mahyoob, 2020; Means & Neisler, 2020; Mishra, et al., 2021; Fatoni, et al., 2020; Bhowmik & Bhattacharya, 2021; Al-Akabi, 2021; Parvin, 2021; Mollah & Parvin, 2020; Gurung & Bhutia, 2021; Gautam & Gautam, 2021; Sarkar, et al., 2021
Personal readiness	13	Paudel, 2021; Ritonga, et al., 2020; Rajab, et al., 2020; Mok, et al., 2021; Means & Neisler, 2020; Mishra, et al., 2021; Banji, et al., 2021; Bhowmik & Bhattacharya, 2021; Parvin, 2021; Mollah & Parvin, 2020; Kaur & Kaur, 2021; Affouneh, et al., 2021; Gautam & Gautam, 2021
Online culture	10	Dlamini, 2020; Paudel, 2021; Slimi, 2020; Dong, 2020; Mok, et al., 2021; Means & Neisler, 2020; Gonzalez-Ramirez, 2020; Fatoni, et al., 2020; Bhowmik & Bhattacharya, 2021; Gurung & Bhutia, 2021
Health problems	8	Rajab, et al., 2020; Mok, et al., 2021; Means & Neisler, 2020; Banji, et al., 2021; Marin & Bocos, 2021; Mollah & Parvin, 2020; Kaur & Kaur, 2021; Gautam & Gautam, 2021

Technological Skill. Lack of formal orientation and training, instructor's use of technology tools, instructor's ability of content creation, instructor's experience in online teaching, teacher and students' computer application technology, digital skill, difficulties in connecting on certain platforms, language difficulties in online classes are categorized under the challenge of technological skill. These challenges are presented in 21 studies of online learning in higher education during Covid-19 Pandemic.

Internet and Data Access. Among 44 selected studies, 24 studies reported the challenges of internet or data access for online

learning. The difficulties involved lack of constant access to internet connectivity, lack of reliable internet speed at work, network issues, poor internet infrastructure, lack of electricity, unstable network connection, uninterrupted electricity connection, intermit- tent signal issues, insufficient/ unstable internet connectivity, interruption of internet due to lack of and poor broad band internet, unavailable of internet in rural areas, rare availability of high-speed broadband or cellular internet connection outside the city areas and daily data limit.

Social Interaction. The 17 studies out of 44 studies reported the challenges related with social aspects of online learning. These challenges are mainly related with students' cooperation, social engagement and the learning benefits from face-to-face interaction with instructors and peers, missing the presence of instructors and peers, interaction with teachers, and lack of personal contact with teachers.

Facilities. The facilities-related challenges are encountered by teachers and students in establishing online learning in higher education field to a large extent. The notable challenges are unavailability of devices/equipment, lack of device and unsupported learning environment at home, lack of electronic devices (Laptop, computer, and Smart Phone), inequities in digital access, the lack of resources and exposure to remotely use information and communication technology, lack of a high-performance computer, tablet or phone, high cost of participating in online learning, and unavailability of supporting facilities.

Teaching learning capability. Among 44 selected studies, 15 studies reported the challenges of teaching learning capability in various online learning fields of higher education. Teachers' challenge on lack of control on their students' class participation, uncertainty regarding exam, the end of semester and assessments, the voice of lecturers, asynchronous teaching materials, absence of immediate feedback, lack of schedule for regular class, less attendance, lack of practical, lab and field visit, writing problem/ issue of whiteboard, difficulty in demonstration of steps as in on-class mode, and loss of authentic and hands-on experiences are the

real and intense challenges in online teaching learning aspects during Covid-19 Pandemic.

Personal Readiness. The challenges related with personal readiness of students and teachers are also presented in 13 studies focusing online learning in higher education during Covid-19 Pandemic. To create effective online learning, students and teachers' personal aspects also play an important role. These aspects include self-motivation, time-management skills, favourable attitude towards online learning, awareness of addiction in social media, self-discipline, and expectation of employment opportunities. Today online establishments frequently encounter inadequacy of these personal aspects of the persons involved as the challenges of personal readiness.

Online culture. During Covid-19 Pandemic, majority of students and teachers in higher education have been trying to aware and accept the online culture for the successful establishment of online learning. However, policy initiatives, lack of autonomy and freedom to the teachers and learners, compliance with educational policies, need of a quiet space or separate rooms in home, students' pilling up of their work, and planning to fit the course schedule with the work are considered by teachers and students as challenges in their online learning.

Health Problems. Among 44 selected studies, 8 studies reported the challenges of health problems during online learning. Students and teachers frequently encountered the problems of eye fatigue caused by staring at the screen for a long time, feeling too unwell, physically or emotionally, to participate, inability to focus on screens for long time and physical fatigue, mental fatigue and emotional problems related to the suspension of the university courses or to the evolution of the current epidemiological context. These are the major physical and mental health problems reported by students and teachers as challenges of online learning during Covid-19 Pandemic.

In summary, this study reported that the challenges of technical skill, internet and data access, social interaction, facilities, teaching learning capabilities, personal readiness, online policy awareness, and health problems are the major challenges mainly

encountered by students and teachers in establishing online learning in higher education sector during the Covid-19 Pandemic.

Conclusion

The main aim of this review is to develop a framework that can assist educators and designers in the future management of online learning in higher education by systematically reviewing the previous papers focusing online learning establishments during the Covid-19 pandemic. The three research questions are: "Which types of learning management systems (LMSs) are mostly used in online learning establishment in the field of higher education during Covid-19 Pandemic?", "What are the main factors facilitating online learning effectiveness in higher education institutions during Covid-19 Pandemic?", and "What challenges are students and teachers faced with in the real online learning classes in higher education institutions?"

According to the results of this systematic review, the platforms mostly used in online learning during Covid-9 crisis are Zoom app, Google classroom, WhatsApp, Emails, Moodle, Facebook and YouTube. Then, the five major categories of factors influencing online learning effectiveness in higher education are technological factors, personal factors, social factors, instructional factors and support factors. Finally, the challenges of technical skill, internet and data access, social interaction, facilities, teaching learning capabilities, personal readiness, online policy awareness, and health problems are the major challenges mainly encountered by students and teachers in establishing online learning in higher education sector during the Covid-19 Pandemic.

Finally, it is expected that the result of this study may provide a framework for future management of online learning, especially in the field of higher education. It provides the comprehensive factors facilitating the online learning effectiveness and the most possible challenges for students and teachers in establishing the successful online learning. By being aware and incorporating the concept of the factors and challenges in managing the online leaning systems, higher education institutions will accelerate the

benefits of online learning for students and teachers, and minimize the drawbacks of online learning in cultivating the educational objectives. For the mentioned implications, it is anticipated that this study may be a valuable one conducted during this pandemic period.

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