Walden University

College of Education and Human Sciences

This is to certify that the doctoral study by

Gentian Ann Miller

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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Walden University
2023

Abstract

Understanding Faculty Perspectives on Using a Learning Management System at a Caribbean University in Guyana

by

Gentian Ann Miller

MA, University of Guyana, 2004

B. Ed. University of Guyana, 1996

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Walden University

November 2023

Abstract

In this basic qualitative study, faculty hesitation toward using Moodle learning management system (LMS) for instructional delivery was investigated. The research question focused on how faculty perspectives on their hesitation toward using the institution's LMS in the Faculty of Social Sciences at a Caribbean university in Guyana reflect the tenets of Rogers' diffusion of innovation theory (DIT). Rogers' DIT formed the conceptual framework for this study. Eleven lecturers in the faculty of Social Sciences who actively use the institution's learning management system (LMS) for instructional delivery were purposefully selected for semistructured interviews. Data were analyzed using Saldana's coding manual for coding and thematic analysis. Six themes emerged to answer the research question: (a) Moodle features used, (b) benefits of using Moodle, (c) Moodle use comfort levels, (d) social influencers, (e) professional development, and (f) enabling conditions. These results provide knowledge informing stakeholders of what can lead to improved faculty use of educational technology. Faculty use of LMSs is integral to improving access to higher education globally. These research findings may contribute to understanding why faculty hesitated to use Moodle LMS for instructional delivery. Reduced faculty hesitation in using LMSs at higher education institutions can lead to the realization of Sustainable Development Goal Four, the delivering of quality education effectively. Student access to personalized, continuous learning using LMSs will foster positive social change.

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Dedication

I dedicate this dissertation to my daughters, Marika and Donell Miller, and my grandchildren, Asiya Johnny, Jihanna Smith, and Kareem Johnny, for being my support system during the duration of my studies.

Acknowledgments

I acknowledge the supervision of Dr. Deanne Otto, who with wisdom and patience, worked with me to successfully complete this dissertation. I also acknowledge the work of my second supervisor, Dr. David Perry, who guided me along this journey. I acknowledge the unwavering support of the faculty at a Caribbean University in Guyana. I acknowledge the help of my friend, Ivy Glasgow, who provided optimism and care.

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Chapter 1: Introduction to the Study

At higher education institutions (HEIs) globally faculty members have been using learning management systems (LMSs) to deliver hybrid or fully online learning over the last two decades (El Said, 2021; Kim et al., 2021; Veluvali & Surisetti, 2022). Several researchers, Bervell and Arkorful (2020), Bryson and Andres (2020), Nicholas-Omoregbe et al. (2017), and Veluvali and Surisetti (2022), have found that LMSs such as Blackboard Learn, Desire2Learn, Moodle, Brightspace, and Canvas are beneficial for delivering instruction at colleges and universities. Despite their findings, other researchers such as Ademola et al. (2022), Adov and Mäeots (2021), Fearnley and Amora (2020), Pandita and Kumar (2022), Sims and Baker (2021), and Washington (2019) reported that faculty members hesitate to use the complex features of LMSs.

Abu-Snoubar (2021), Fearnley and Amora (2020), Simelane-Mnisi and Mokgala-Fleischmann (2022), and Pandita and Kumar (2022) found that faculty hesitation often results in low LMS adoption. Faculty hesitation toward using LMSs invariably hinders students' use of innovative learning technologies. LMS use at higher education institutions has the potential to provide both faculty and students with improved 21st-century learning options, consequently affording flexible access and participation anytime, anywhere. Such LMS use has the potential to remove barriers restricting students' access to higher education irrespective of place and time. Such access to higher education will, in turn, create positive social change and foster the attainment of the United Nations Sustainable Development Goal #4: To ensure inclusive and equitable

quality education and promote lifelong learning opportunities for all (United Nations Sustainable Development Goals, 2023).

Background

Although research findings show that LMSs, available at most colleges and universities, are valuable for organizing instructional delivery (Asamoah, 2020; Buabeng-Andoh & Baah, 2020; Sue & Chen, 2022), other researchers found that faculty members resisted using LMSs. For example, Abu-Snoubar, (2021), Simelane-Mnisi and Mokgala-Fleischmann (2022), and Washington, (2019) found that faculty members resisted adopting LMSs. Among other researchers, Fearnley and Amora (2020), Guppy et al. (2022), and Jackson (2022) described the problem as faculty hesitation, the slow and reluctant use of LMSs. Such faculty hesitation in using LMSs in higher education institutions was the gap in practice this research addressed.

Even at universities where faculty had adopted LMSs, individuals avoided using the more complex LMS features. For example, Martin et al. (2020) investigated faculty LMS use and found faculty motivation and competence hampered LMS use. Rhode et al. (2017) examined faculty transitioning from using one LMS to another and found that although more faculty members had increasingly adopted LMSs in the United States, individuals avoided using the complex LMS features. Moreover, Liu et al. (2020) in their metanalysis, found that faculty adoption of educational technologies "frequently fell short of organizational expectations" (p. 1). At the University of Birmingham and the University College of London, Bryson and Andres (2020) found that the "learning curve" (p. 610) was steep for faculty using LMSs during COVID-19.

Low LMS acceptance also persisted at colleges and universities in less developed countries. For example, Yakubu et al. (2020) noted that LMSs adoption rates were low at many African colleges and universities. Studies from the Philippines, Guyana, and Nigeria also revealed low faculty LMS use (Fearnley & Amora, 2020; Oyedotun, 2020; Yakubu et al., 2020). Further, Simelane-Mnisi and Mokgala-Fleischmann (2022) found that 56% of a sample of chemistry teachers at a South African university only uploaded supplementary material using the LMS (p. 34). Reporting on LMS use at Latin American and Caribbean universities, Rios-Campos et al. (2021) noted that weak infrastructure hampered educational technology use. Meta-analyses of LMS adoption studies provided valuable information on significant trends in higher education LMS use. Bervell and Umar (2017), Liu et al. (2020), and Yee and Abdullah (2021) observed that most LMS adoption studies used student samples and quantitative designs. In their recommendations, these researchers commented on the need for more qualitative research with faculty samples. The need for more qualitative studies on faculty adoption of LMSs is the gap in the literature this research fills.

This qualitative study of faculty perspectives on using Moodle LMS provides new knowledge of the challenges faculty experienced as they hesitated to use LMSs. This knowledge can inform education managers, funding agencies, and stakeholders - such as UNESCO and the World Bank - regarding the allocation of investments and resources supporting LMS use in higher education. In addition, a better understanding of faculty hesitation to use LMSs provides data that may result in improved spending and capacity building focusing on faculty needs, such as LMS training and course designing.

Problem Statement

The problem for this study was faculty hesitation towards using the various features of the Moodle LMS for instructional delivery at a Caribbean university in Guyana. Although the Caribbean Universities Project for Integrated Distance Education (CUPIDE) for LMS capacity building ended 15 years ago, no participating faculty had successfully used Moodle LMS to design or deliver instruction for distance nor blended learning at a Caribbean university in Guyana (George, 2012). Livingstone (2015) investigated faculty perceptions on using educational technology at a Caribbean university in Guyana found that traditional chalk and talk teaching was the norm and the Moodle LMS remained largely unused. Communication from the software engineer in 2019 indicated that only 6% of this university's courses were on the Moodle LMS which functioned mainly as a repository (S. Mallampatti, software engineer, personal communication, November 2019).

Moreover, during the 2020 COVID pandemic, the Moodle LMS remained sparsely populated (Memo from dean of the faculty, personal communication, November 3, 2021). During and after the COVID- 19 pandemic, faculty continued to experience challenges transitioning to using Moodle LMS (Diaz, 2022; Oyedotun, 2020). At other universities and colleges - in Ghana (Adarkwah, 2021), the Caribbean (Barclay et al., 2018), Egypt (El Said, 2021), Brazil (Falcão et al., 2020), Korea (Kim et al., 2021), India (Roy & Brown, 2022), United States (Washington, 2019) and Nigeria (Yakubu et al., 2020) - researchers, acknowledged the problem of faculty hesitation toward using LMSs for delivering instruction. If faculty hesitation toward LMSs use continues and

researchers do not explore faculty perceptions regarding this problem, investments in educational technology will not result in higher levels of LMSs use. Ultimately, students will not benefit from innovative educational technologies and quality education for all.

Purpose of the Study

The purpose of this qualitative research was to explore faculty perceptions of using Moodle LMS in the Faculty of Social Sciences at a Caribbean university in Guyana to determine reasons for faculty hesitation. The phenomenon investigated was faculty hesitation toward using the institution's LMS. Management had mandated faculty use of Moodle LMS for fully online or hybrid teaching. The diffusion of innovations theory (DIT) (Rogers, 2003) provided the conceptual framework for this study. This study will help fill the gaps in the literature by providing more qualitative data about the reasons why faculty hesitated to use the LMS.

Research Question

RQ: How do faculty perspectives on hesitation to use the university's Moodle LMS in the Faculty of Social Sciences at a Caribbean university in Guyana reflect the tenets of Rogers' DIT?

Conceptual Framework

Researchers such as Al-Qaysi et al. (2021), Lund et al. (2020), Richardson et al. (2020), Sahin (2006), Ullah et al. (2021), and Vagnani et al. (2019) have used Rogers' DIT widely for investigating technology adoption in higher education. The DIT addresses the diffusion of new technologies, ideas, and tools in organizations and communities. Rogers (2003) provided an apt definition of technology noting that "technology usually

has two components: (a) a hardware aspect, consisting of the tool that embodies the technology as a material or physical object and (b) a software aspect, consisting of the information base for the tool" (p. 13). Faculty using LMSs at colleges and universities face challenges using both hardware and software; therefore, the DIT's scope is suitable for investigating faculty hesitation to use LMSs.

Rogers (2003), Sahin (2006), Sutton and DeSantis (2017), and Ullah et al. (2021) used the DIT to investigate several aspects of technology adoption such as the processes, adopter categories, adoption stages, and how the social system influences technology adoption. The characteristics of the DIT address individuals' adoption and continued use of educational technology. In addition, the DIT focuses on social system factors that influence technology use. The DIT framework is, therefore, suitable for this study, and its tenets form a valuable framework for investigating faculty perspectives on using Moodle LMS.

This research did not follow the quantitative research paradigm because, primarily, the intention of this study was to understand users' perspectives by collecting qualitative data. Most technology adoption researchers use technology acceptance models (TAMs) such as the original TAM by Davis (1989) and the unified technology acceptance and use theory (UTAUT) by Venkatesh et al. (2003) for the frameworks of their studies. However, the DIT was better for the conceptual framework of this qualitative study because the DIT facilitates a more in-depth understanding of faculty perspectives on using educational technology. TAMs were developed to investigate information systems adoption (Davis, 1989; Venkatesh et al., 2003) and do not

significantly address adopter categories, adoption stages, how the social system functions and how cultural and psychological factors affect educators' use of complicated learning technologies.

In addition, TAMs as quantitative models are limited to predicting users' intention to use technology; they do not measure actual technology use (Al- Mamary, 2022; Bervell & Umar, 2017; Elangovan et al., 2021;). For this qualitative study, open-ended questions and thematic analysis provided reliable data regarding individuals' actual LMS use. Few qualitative studies on educational technology exist but those by Sinclair and Aho (2017), Bakheet and Gravell (2020) Thurab-Nkhosi (2018), Washington (2017) and Noval and Johnson (2018) served as precedents. Therefore, I used the DIT for this qualitative study. Rogers (2003) investigated technology adoption in education using the DIT and there is scope for investigating human behavior in response to change. In addition, the DIT framework provides content for aligning the research question, the interview schedule items, and the analysis of codes and themes for this study. All the components of this research align with the tenets of Rogers' DIT.

In Chapter 2, I extensively address the tenets of the DIT and its applicability. I validated the instrument by piloting the questionnaire with faculty experts. I used the DIT framework to structure the interview questions and align the other qualitative research components. I recorded the answers and critical points, then used them to improve the research instrument.

Nature of the Study

I selected a basic qualitative exploratory approach for this research investigating faculty perceptions on using Moodle LMS because qualitative studies allow participants to describe their perceptions. This qualitative design follows the naturalistic inquiry paradigm which, facilitated an in-depth understanding of faculty perceptions. Patton (2015), Ravitch and Carl (2016), and Rubin and Rubin (2012) advised that interviewees' conversations provide rich information for data analysis, and conversational language generates meaning and understanding. In addition, Ravitch and Carl (2016) advised that "basic research contributes to fundamental knowledge and theory" (p. 278). I explored faculty perceptions of their use of Moodle LMS and using interview questions I investigated faculty use of LMSs at a Caribbean university in Guyana.

I collected data using a purposive sample of eleven volunteers from the of Social Sciences using semistructured interview questions aligned with the research question, the problem statement, the conceptual framework, and research instrument patterned after those by Noval and Johnson (2018) and Thurab-Nkhosi (2018). Purposive criterion sampling provided rich, thick descriptions (Patton, 2015; Ravitch & Carl, 2016) and allowed me to reach a saturation point, providing adequate data to understand why faculty hesitated to adopt the LMS at a specific university. This purposive sample as recommended by Cash et al. (2022); Islam and Aldaihani (2022); Majid et al., (2017) ensured research rigor and validity.

I am not a member of the Faculty of Social Sciences from which I recruited participants based on individuals' willingness. I shared the interview transcripts with

participants for validation as advised by Ravitch and Carl (2016) to ensure the accuracy and validity of the data. I piloted the questionnaire for this study using two experts in the research field. Kallio et al. (2016) and Majid et al. (2017) advised that piloting addresses issues of validity and reliability, researcher, and instrumentation bias. I used the Zoom video conferencing platform to conduct the interviews. In addition, I recorded interview data using Zoom. Finally, I analyzed the data using codes, categories, and themes as advised by Saldaña (2021) and Strauss (1990). I used axial inductive coding by relating codes to each other to determine dominant codes (see Ravitch & Carl, 2016).

Definitions of Terms

I define specific terms to illustrate how words associated with LMS adoption for higher education are used in this study. The entries are in alphabetical order.

Axial coding involves reassembling split data from the initial coding process to determine which codes are dominant (Saldaña, 2021, p. 308).

Coding refers to a short phrase representing an attribute obtained from interview transcripts, participant observation notes, and other forms of qualitative data (Saldaña, 2021, p. 5).

Experiences are the various events and situations individuals participate in as they actively use or try to use a new idea or technology (Creswell & Creswell, 2018).

Higher Education Institutions (HEIs) refer to all tertiary-level educational institutions such as universities, colleges, and distance education organizations.

Hybrid learning: This term describes combining synchronous and asynchronous instructional delivery.

Innovation is an idea, practice, or object perceived as new by an individual or other adoption unit. An innovation may be a new idea, pedagogy, tool, technology, product, method, or medicine (Rogers, 2003).

Learning Management Systems (LMSs) are web-based applications that deliver courses. They can track students' progress and store and manage content. In addition, they facilitate access to course material and resources perpetually on the platform. Users can access any internet-ready device anywhere and anytime (Yakubu et al., 2020).

LMS adoption is the comprehensive process where individuals or groups engage in a series of actions using the LMS for teaching and learning. *LMS adoption* is like LMS diffusion (Rogers, 2003). In addition, the adoption of LMSs occurs over time (Rhode et al., 2017).

LMS diffusion addresses how knowledge and use of an idea, practice, or technology are communicated and adopted within a social structure. Diffusion prompts social change (Rogers, 2003).

LMS use describes the actual putting into service the learning management system. LMS use and LMS adoption are quite different. Adoption may suggest a once and completed act, whereas use speaks of a process. On an adoption continuum, faculty may adopt features such as announcements, providing course outlines, and reading material, while complex tools such as discussion boards and fully designed modules are avoided (Rhode et al.,2017; Washington, 2019).

Moodle is an acronym that evolved into a word meaning modular object-oriented dynamic learning environment. Moodle is a learning platform providing educators,

administrators, and learners with tools to facilitate course delivery (Al-Hunaiyyan et al., 2020).

Perspectives are individuals' views concerning their use of LMSs.

Technology Acceptance Models (TAMs) measure or predict individuals' use of technologies such as LMSs, computers, mobile phones, and other products. Hybrid teaching and education consist of blends (Yakubu et al., 2020).

Assumptions

During this research I assumed that the reasons why faculty experience challenges with using Moodle LMS can be understood and explained. The assumptions critical to the study's meaningfulness are that, according to the literature, LMSs are beneficial for delivering hybrid or fully online instruction in higher education (Asamoah, 2020; Buabeng-Andoh & Baah, 2020). I assumed management asked faculty members at a Caribbean university in Guyana to adopt the Moodle LMS for instructional delivery. I collected data assuming faculty members would express their perceptions honestly. I assumed that faculty were over 18 years and had benefitted from some training provided by management. Finally, I assumed that the institution's LMS was available for use continuously. For this study, I assumed that faculty had internet connectivity, a stable supply of electricity, and technology devices such as laptops, iPods, tablets, and mobile phones. These assumptions contextualize the study.

Scope and Delimitations

The problem for this study was faculty hesitation towards using the various features of the institution's Moodle LMS for instructional delivery at a Caribbean

university in Guyana. This study's scope included faculty at various stages of using Moodle LMS and I did not discriminate against the level of use. I used a purposive sample of 11 faculty who teach in the Faculty of Social Sciences at a Caribbean university in Guyana. This is a small sample, in keeping with the nature of qualitative research. The participants were actively teaching face-to-face methods for the last 10 years.

This study did not include faculty who teach at the Institute of Distance and Continuing Education, a unit at the Caribbean University in Guyana. There is a draft policy mandating faculty use of the LMS. Transferability is strengthened with detailed, thick descriptions and maximum variation of participants to generalize the results to similar contexts (Creswell & Poth, 2018). In addition, I shared details on how the study was conducted, the context, participants' descriptions, data collection methods, and limitations.

I did not use quantitative TAM frameworks because such methods often produce confirmatory results. Bervell and Umar (2017), who reviewed a decade of LMS studies, noted that most studies used one or another of the TAM models, and the results largely confirmed individuals' intention to use LMSs. However, Bervell and Umar and Liu et al. (2020) advised that there is a need for more research that does not ignore narrative details.

I followed a different pattern in this basic qualitative research. Prediction studies do not account for actual usage; the relationships between intention and behavior are "insufficiently validated by empirical research" (Rondan-Cataluña et al., 2015, p. 799). I

did not use Liker Scale items for this qualitative research. Open-ended questions allowed participants to express themselves freely. Assigning numerical values for Likert Scale answers may have resulted in acquiescence bias (see Doniclar, 2021; Primi et al., 2019). Therefore, open-ended questions of the current qualitative study provided scope for participants to discuss any variable or factor that impacts faculty use of Moodle LMS.

Limitations

Adopting the role of the researcher comes with potential researcher biases that may filter into the data collection and analysis processes. Therefore, as Burkholder et al. (2016) advised, piloting the instrument with two other faculty members helped control for biased wording and ambiguity. Majid et al. (2017) recommended a step-by-step process for piloting interview questions to address researcher bias. First, it is necessary to align the interview questions within the scope of the research topic. Second, Majid et al. advised that having experts review the interview questions will provide objectivity and soundness of items (Majid et al., 2017). Such piloting of the interview questions helps ensure rigorous development, objectivity, and trustworthiness (Kallio et al., 2016, Majid et al., 2017). I applied the suggested modifications to the interview schedule.

The pilot offered a focused structure for the interviews providing participants with guidance on what to discuss and the possible follow-up questions. Furthermore, interviewer dialogic engagement (Ravitch & Carl, 2016) challenged and supported my thinking. The pilot responses make the study results more plausible (Kallio et al., 2016). In addition, reflective memos were used to regularly assess my identity, positionality, and subjectivities (see Ravitch & Carl, 2016).

The study participants were from one faculty within a single university, and I used pseudonyms to protect their identities. I plan to invite twelve participants utilizing the institution's Moodle LMS at a Caribbean university in Guyana. Since this is a qualitative study, the purposive sample size was small, but the data collected was extensive (see Creswell & Poth, 2018). As Majid et al. (2017) advised, "the participants should share as similar criteria as possible to the group of participants for the major study" (p. 1076). I will return the data results to the participants, who will check and validate them for accuracy, resonance, authenticity, and intentionality (Lincoln & Guba, 1985; Ravitch & Carl, 2016). Participant validation enhances the credibility of the documented data (Ravitch & Carl, 2016); member checking is "the most crucial technique for establishing credibility" (Lincoln & Guba, 1985, p. 314). Reflective notes helped guard against the halo effect (see Ravitch & Carl, 2016). Collecting extensive demographic information of participants was not necessary for this study. Inferences specific to age, gender, and qualifications are not essential for basic qualitative research on faculty perspectives on using Moodle LMSs at a Caribbean university in Guyana. In the research report, participants remained anonymous. This partially random selection helped guard against researcher bias and assumptions.

Significance

The findings of this study suggest new methods that could improve faculty use of Moodle LMS. The results can also improve practice and benefit instructors, learners, and stakeholders associated with higher education institutions. In addition, the results of this sample may be helpful for similar university campuses where faculty need help with

identical issues related to the use of LMSs. This study may contribute to positive social change by filling a gap in practice concerning faculty reactions to adopting the Moodle LMS at Caribbean universities. The results may provide a more supportive professional development program to help faculty adopt the LMS. The results could also provide information that will inform stakeholders and funding agencies seeking to provide training for faculty use of LMSs.

This research could also make a positive social change by providing new knowledge regarding the challenges faculty using LMSs experience. The findings could benefit governing bodies for higher education institutions, ministers of education, principals, and other administrators. Stakeholders could obtain a more comprehensive understanding of the challenges faculty experience when using an LMS to deliver instruction, communicate with students, and manage a course. The findings could also inform the decision-making process at a Caribbean university in Guyana regarding policy development, online curriculum design, and investments in technologies that could enhance the teaching-learning process at Caribbean universities. Finally, this research may also provide a foundation for future research on faculty use of LMSs in developing countries.

Summary

This chapter provided background information through an overview of the faculty adoption of LMSs by identifying the problem in practice: faculty hesitation toward using various features of LMSs. In chapter 1 I identified the current research gap: few qualitative studies investigate faculty hesitation toward using various parts of LMSs at

colleges and universities. After describing the problem of faculty hesitation, I explained this study's problem statement, purpose statement, and research questions. Next, I introduced the conceptual framework based on the DIT (Rogers, 1995, 2003). Next, I described the nature of this qualitative interview study and the key definitions, assumptions, scope and delimitations, and limitations. Finally, I addressed gaps in faculty LMS adoption research literature. This study could contribute to theory, practice, and social change. In Chapter 2, I discuss the DIT in greater detail and examine some key concepts in the literature. Chapter 2 contains the existing literature on LMS use in higher education.

Chapter 2: Literature Review

The problem for this study was faculty hesitation towards using various features of the institution's Moodle LMS for instructional delivery at a Caribbean university in Guyana. In this qualitative research I explored faculty perceptions of using Moodle LMS in the Faculty of Social Sciences at a Caribbean university in Guyana. Much quantitative research investigates the problem of low faculty adoption of LMSs such as Blackboard, Canvas, Saki, and Moodle (Ahmad, 2020; Al-Hunaiyyan et al., 2020; Koh & Kan, 2021; Rhode et al., 2017; Zwain, 2019). Research also indicates that though the COVID-19 pandemic required virtual teaching, faculty adopted more Zoom video conferencing software than LMSs (de los Santos & Rosser, 2021; El Said, 2021; García & Weiss, 2020; Hodges et al., 2020; Kalloo et al., 2020; Mohammadi et al., 2021).

In this chapter I reviewed essential peer-reviewed journal articles relating to LMS adoption in higher education to determine what is currently known and unknown in this area of research. In the first section I present the steps I took to locate the literature. A review of the literature related to the conceptual framework for this study follows. Here, I identify and describe the study's central problem, define critical concepts within the conceptual framework, and synthesize primary and seminal writings related to Rogers' DIT.

Next, I review the literature on LMSs use in higher education over the last 2 decades. I discuss how researchers articulate and investigate faculty adoption of LMSs in previous studies, connecting previous research to this study. I then review the literature on how COVID-19 impacted LMS use. A review of literature related to the digital divide

follows. This literature review concludes by synthesizing the literature on professional development for LMS use.

Literature Search Strategy

The literature reviewed consisted of sources, such as books, articles, conference proceedings, reports, dissertations, and journals from EBSCO and ProQuest Library databases and internet source materials. In addition, I used the ERIC database. Finally, I used the following additive key terms to locate journals, articles, and dissertations: *faculty perspectives, learning management systems, LMS use in higher education globally, educational technology use at Caribbean universities, adoption of LMSs in developing countries, the digital divide, diffusion of innovations, obstacles to faculty adopting LMSs, challenges to adopting LMSs, pedagogical approaches for LMS adoption,* and *staff training.*

The search process was progressive and iterative. Searching reputable journals, I found the need to refine search terms because, for example, "technology adoption" was an extensive area. Educational technology adoption was more specific, but another layer of refining modified the search terms to become "Higher education technology adoption." This search yielded fruitful results but led to further refining that was more specific, narrowing the search to find studies on "higher education faculty LMS adoption." Locating and searching specific journals, such as the *Journal of Research on Technology in Education,* provided a wide range of helpful articles. A perusal of the references at the end of the most current studies gave guidance for other searches. The Google Scholar search engine was most beneficial in creating searches and obtaining daily updates on

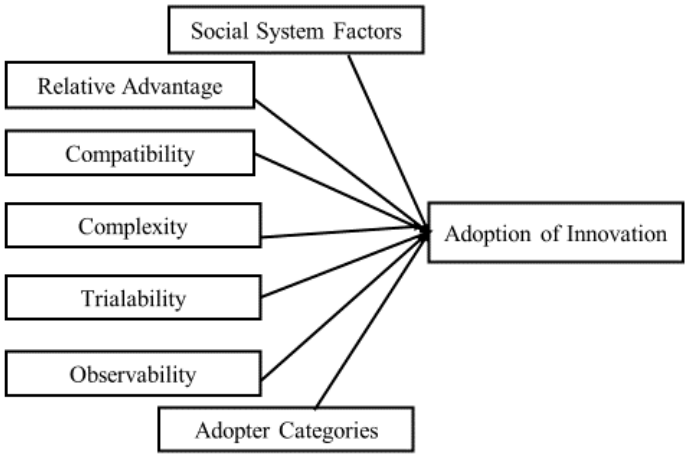
available articles in my email. Using Zotero proved reliable and helpful in storing and retrieving valuable articles.

Conceptual Framework

Over time, the DIT has been used extensively in education research (Afridi & Chaudhry, 2019; Currie et al., 2021; Foucart & Li, 2021; Ullah et al., 2021). In addition, researchers have used the DIT to investigate learning technologies adoption (Rogers, 2003). The DIT (Rogers, 2003) discusses the common characteristics of technological innovations, the adoption process, adopter categories, and social system factors influencing technology use. The diagram (Figure 1) illustrates the several components of Rogers' DIT.

Figure 1

Diffusion of innovation (Rogers, 2003)



Note: Adapted from Rogers' *Diffusion of Innovations* (2003) by Free Press and reprinted with permission.

Characteristics of Innovations

Relative advantage, the most prominent of the five characteristics, is a comparative advantage, a perceived benefit an adopter may gain from using new tools, methods, or ideas. As defined by Rogers (2003) "Relative advantage is the degree to which an innovation is perceived as being better than the idea it supersedes" (p. 229). Raza et al., (2021), Ullah et al. (2021), and Yee and Abdullah (2021) have found that relative advantage is the strongest predictor of an individual's intention to use educational technology.

Compatibility, the second attribute, defines the perceived comfort levels individuals may experience when using LMSs. Compatibility is the fit between "existing values, past experiences, and needs" (Rogers, 1962, 2003, p. 240). Compatibility is the second most frequent predictor of technology adoption (Huang et al., 2020; Khan et al., 2022). According to Rogers (2003), sociocultural values, beliefs, and knowledge systems may affect compatibility.

Complexity is the third attribute, and it defines the challenges users experience when using innovations. Rogers (2003) stated "Any new idea may be classified on the complexity-simplicity continuum" (p. 257) while high levels of complexity lead to frustration and bafflement. Trialability, the fourth characteristic, deals with how potential adopters experiment with technological innovations. Trialability involves learning by doing. Personal trials allow individuals to tinker with the technology or idea and acquire a unique experience with how the innovation works (Rogers, 2003). The last

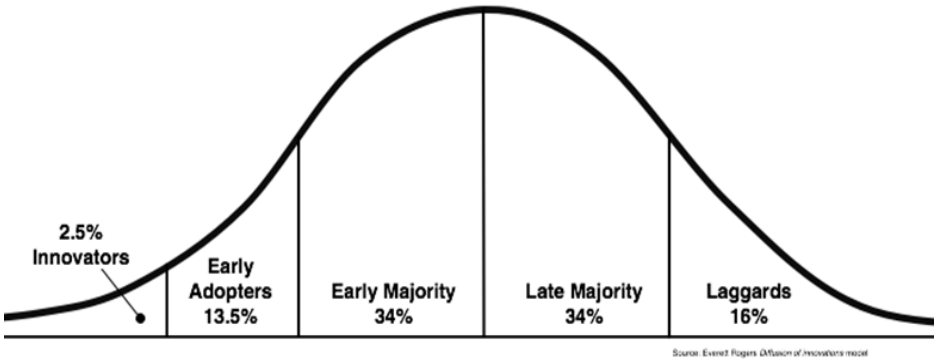
characteristic, observability, refers to individuals using visual evidence to assess how effectively the technology works. Less observability may lead to "a relatively slower rate of adoption" (Rogers, 2003, p. 259).

Adopter Categories

Rogers (2003) identified six adopter categories associated with technology adoption stages. Adopter categories describe the behaviors of potential adopters at estimated stages of adoption. The DIT illustrates that over time, the "cumulative number of adopters" (Rogers, 2003, p. 272) produces a standard bell curve indicating the possible early adopters, early majority, late majority, and laggards. Individuals may adopt technology at different points on a normal distribution curve. In addition, an S-shaped curve defines the adoption stages. Figure 2 shows adopter categories and the corresponding adoption curve.

Figure 2

Adopter Categories and Curve



Note: Reprinted from "*Behavior Change Models: Diffusion of Innovation Theory,"* by W. W. LaMorte, 2022, https://sphweb.bumc.bu.edu/otlt/mph-modules/sb/behavioralchangetheories/behavioralchangetheories4.html. 2003 by Free Press and reprinted with permission.

Social System Factors

According to Rogers' (2003) DIT, diffusion occurs within social systems where interrelated social units engage in joint problem-solving to accomplish a common goal. The members of social systems may be individuals, groups of persons, or organizations. Subsystems may also occur within existing social systems (Rogers, 2003). While examining how social systems influence technology adoption, Rogers found that factors within the structure "can facilitate or impede the diffusion of innovation" (p. 26). Determiners, such as system norms, environmental factors, and organizational structure, may influence the diffusion and adoption of educational technology (Rogers, 2003). Cultural norms can also encourage or hinder the adoption of educational technology (Rogers (2003).

Expanding on how social system factors work, Rogers (2003) advised that when diffusion occurs, new ideas are invented, diffused, adopted, or rejected, and consequences follow. "Alteration occurs in the social system . . . resulting in social change" (Rogers, 2003, p. 6). Faculty use or nonuse of Moodle will have potential implications for social change. Innovative LMSs introduce new methods of teaching and learning at higher educational institutions and resistance to new technologies is normal (see Rogers, 2003). Unforeseen circumstances also influence innovative technology use. Raza et al. (2021), found that during the unpredictable COVID 19 pandemic, social isolation and Corona fear influenced students' intention to adopt LMSs.

Most quantitative frameworks predict individuals' intention to use technology, but this qualitative study filled a gap by investigating the actual use of educational technology. This study consolidated the findings of Afridi & Chaudhry (2019); Currie et al., (2021); Foucart and Li, (2021); Rasa et al., (2021); Rogers, (2003); and Ullah et al., (2021). The DIT framework was appropriate for this qualitative exploratory.

DIT in Qualitative Research

Most research on technology and LMS adoption in higher education is quantitative, and the samples consist of students (Liu et al., 2020); less qualitative research, with faculty as participants, is available. In addition, only a few researchers use the DIT framework. Other researchers combine the DIT with TAMs. The literature shows that this trend is prevalent in developed and developing countries (see Abu-Snoubar, 2021; Al-Mamary, 2022; Buabeng-Andoh, 2022; Fearnley & Amora, 2020; Liu et al., 2020; Maphosa et al., 2022; Yakubu et al., 2020). However, less is known about faculty members' perceptions of online teaching (Al-Mamary, 2022; Bervell & Umar, 2017; Khan et al., 2022; Mansbach & Austin, 2018). I have synthesized articles from researchers who used the DIT framework in qualitative studies.

Elangovan et al. (2021) investigated transitional challenges faculty, students, and staff experienced at universities in India while adopting videoconferencing or LMSs for teaching and learning. Elangovan et al. used Rogers' (2003) DIT to form the theoretical framework for their qualitative study. The sample consisted of 341 participants. The researchers collected data using open-ended questions and imported responses into

MAXQDA software. Elangovan et al. extracted codes and themes related to the five stages of the DIT, knowledge, persuasion, decision, implementation, and confirmation.

The sample for this qualitative study was very large, and the data collected was extensive. Some of the twenty-five significant themes were family conflicts, workload, network issues, time pressure, compatibility, and motivation (Elangovan et al., 2021). In addition, the results revealed that some of the challenges for participants were time constraints, lack of infrastructure, lack of compatibility, and anxiety caused by the pandemic. This study aptly illustrated how open-ended questions could obtain valuable data. Specifically, the presentation and analysis of themes provided an excellent example for this study of faculty perspectives on using Moodle LMS at a Caribbean university. However, I restricted my sample size to 11 participants, providing more "depth than breadth" (Patton, 2002, p. 227).

Sinclair and Aho (2017) also used the DIT framework in a qualitative study. However, the participants were Moodle administrators from universities in England and Finland. Sinclair and Aho investigated the reasons for the low faculty adoption of Moodle LMS and collected data using in-depth interviews. The researchers coded the transcripts and conducted a thematic analysis. The results showed that fear of technology, apprehension concerning the adverse effects of adoption, and unwillingness to use pedagogy hindered faculty adoption of the LMS. This research shows how Moodle administrators (a different type of sample) provide good perspectives on the problem of faculty LMS nonadoption. Another essential finding was that most teaching staff used Moodle LMS only to provide resources for all their modules. Conversely, other studies

report faculty avoidance of complex features of LMSs (Oyedotun, 2021; Rhode et al., 2017; Washington, 2019). This research will investigate faculty perspectives to understand the challenges faculty at a Caribbean university experience.

Regarding Sinclair and Aho's (2017) methodology, the qualitative method and DIT framework provided scope for aligning the research components and collecting and analyzing data. Addressing the limitations of quantitative designs, Sinclair and Aho noted that most quantitative studies have provided limited insights into the actual LMS use because such studies examine relationships among variables that predict user acceptance of educational technology. This helped me determine that the best method for investigating faculty hesitation toward using various features of the institution's LMS at a Caribbean university in Guyana was a qualitative design.

Bakheet and Gravell (2020), with a qualitative study, examined factors influencing faculty adoption of the flipped classroom in the United Kingdom. The purposive sample consisted of 14 Computer Science faculty; 10 had used the flipped classroom, and two had used a partially flipped method. The researchers used the UTAUT framework instead of the DIT. Seventy-five percent of the sample agreed that performance expectancy, effort expectancy, social influence, and facilitating conditions influenced their technology adoption. The open-ended questions elicited free responses from participants. Some participants validated "receiving encouragement through a culture of support [while] others described the benefits of funding/grants, training/workshops, and teaching methodologies" (Bakheet & Gravell, 2020, p. 740). These qualitative results give a deeper understanding of faculty experiences. Bakheet and

Gravell's research is also a good model for this research because it shows how tabular data presentation makes the data clearly understood. Such tables ensure careful, systematic documentation of qualitative data.

Thurab-Nkhosi (2018) conducted one of the few qualitative studies on faculty adoption of Moodle LMS at Caribbean universities. The sample comprised deans and administrative staff from the University of the West Indies, Trinidad. Thurab-Nkhosi aligned her interview questions with Porter's (2014) blended learning framework, where there are three stages of blended-learning adoption: awareness/exploration, adoption/early implementation, and implementation/growth. These adoption steps are comparable with stages identified in Rogers' DIT (2003). The findings - based on the analysis of codes, themes, and subthemes - revealed that faculty had supplemented face-to-face lectures with online resources, and there were more courses on the LMS with content and activities.

However, Thurab-Nkhosi (2018) found that the administrators demonstrated a distinct vagueness regarding the blended-learning initiative at the St. Augustine Campus. Some faculty agreed that blended-learning pedagogies could widen access; however, there was a need for incentives to implement blended/online learning successfully. The organizational culture needed to embrace change, and there was a need for technical support for staff and students. There was also a need for a shared philosophy and a mandate. These qualitative findings are comprehensive and instructive; they indicate the nature of the data researchers can obtain by using qualitative methods to understand the perspectives on faculty use of the Moodle LMS at a Caribbean university in Guyana.

Thurab-Nkhosi (2018) was the first one who revealed that the organizational structure at some higher education institutions may hinder faculty use of LMSs. Using Rogers' (2003) DIT framework in the current research offers scope for collecting data on the possible influence of the social system and organizational structure on faculty hesitation toward Moodle LMS at a Caribbean university in Guyana.

In the United States of America, Washington (2019) used a qualitative narrative inquiry and interviewed 20 faculty members to determine faculty use of the Blackboard LMS for blended learning. The results revealed low adoption levels. Only instructors with extensive knowledge of the Blackboard LMS used features and tools specifically for pedagogical purposes. Washington also found that some faculty members only used the announcement tool and avoided complex instruments. This research methodology was useful for investigating faculty perspectives regarding LMS use, mainly because it focused on blended learning adoption, the practical option at most HEIs (see Bokolo et al., 2020; Kim et al., 2021; Maphalala & Adigun, 2021).

Since there are few qualitative studies, the literature examined studies outside the five-year limit. Dintoe (2018) used the DIT framework with qualitative research to understand the challenges nine faculty at the University of Botswana experienced while adopting technology. The results showed that the lecture mode was predominantly teacher centered. Examining the compatibility characteristic, the researchers found that adoption was more straightforward if the compatibility was high. The researchers focused on individual adopters as change agents in the bottom-up approach in the organization's social system.

After analyzing codes and significant themes aligned with the research questions, Dintoe (2018) found that PowerPoint presentations and teacher-centered approaches were the norm. In addition, this research confirmed that the adoption process was effective when the five attributes of the DIT were high. For example, faculty experienced compatibility when using PowerPoint presentations because they were familiar with creating them. On the other hand, limited training time and the top-down management approach pressured faculty to meet goals. Dintoe also found that since students did not use the technology, the faculty abandoned using the LMS.

Therefore, these are interesting results from qualitative researchers who used the DIT framework. Dintoe's research findings have implications for researchers' structuring of interview schedule questions. For example, one of the interview questions for my elicited information regarding the influence of the organizational system, at a Caribbean University in Guyana, on faculty LMS use. Such questions should provide rich data for analysis.

Qualitative studies in nursing education also provided models. For example, Noval and Johnson (2018) investigated the underutilization of LMS Canvas by 10 faculty members adopting blended learning at the Loma Linda University School of Allied Health Professions in California. Noval and Johnson used the basic TAM (Davis, 1989) as their research framework. Noval and Johnson collected and analyzed data using codes, categories, and themes and their study revealed that most allied health participants used the LMS to varying degrees; there were high and low users. In addition, the high users

had adopted an andragogy framework they used for designing using Canvas; other users did not.

In addition, Noval and Johnson (2018) used the TAM constructs to develop the interview questions aligning them with the research questions. This research addressed the gap in practice where faculty members often do not take advantage of using LMS tools to facilitate face-to-face classes at a university in California. Noval and Johnson's research also justified the need for more qualitative than quantitative research on LMS adoption. The present research on faculty us of LMSs at a Caribbean university in Guyana emulated the good practices outlined in Noval and Johnson's research.

Another example from the literature reviewed is a comparative case study by Boland (2020). Boland examined research from Texas A&M University (USA) and Monash University in Australia to determine the factors that impacted Blackboard LMS adoption for students and faculty. Boland aligned his comparative framework with Rogers' (2003) adoption processes, and the coding produced the following categories: motivation to adopt, the decision to adopt, adopter categories, and implications of adoption. The results revealed that relative advantage and compatibility influenced adoption at Texas A&M. The LMS facilitated better instructional delivery and student collaboration.

There was a need for more training and development to improve pedagogical conditions. Faculty were inclined to adopt cultural change if the university and colleagues supported it. The key to motivation was leadership, by example. Contrary to the findings of Dintoe (2018), Boland (2020) found that "Top-down authority innovation directives

were the major influential factor in the decision for faculty to adopt" (p. 7). In addition, Boland (2020) found that compatibility was essential in LMS adoption. Using the DIT framework guided the alignment of the current study. By eliciting data on social system influences, this research on faculty hesitation at a Caribbean university in Guyana provided valuable data for understanding the effect of top-down or bottom-up authority.

The preceding small body of qualitative research on faculty LMS adoption confirmed the gap and the need for more qualitative research to understand faculty perspectives regarding LMS use. The common factor in these studies is that the researchers from India, England, Finland, Africa, the USA, and the Caribbean used the DIT, or related conceptual frameworks, demonstrating the framework's versatility. Attention to a few studies on LMS adoption in higher education in the Caribbean region provided more insights. I included articles from 2018 and 2019 because of the paucity of research.

Caribbean Research on Technology Adoption

Traditional face-to-face teaching methods remain the norm at Caribbean colleges and universities (Barclay et al., 2018; Diaz, 2022; George, 2012; Leacock & Warrican, 2020; Livingstone, 2019; Oyedotun, 2020). Most HEIs in the Caribbean also provide in-person learning, with varying levels of blended learning (Thurab-Nkhosi et al., 2021). There is a history of LMS training at Caribbean universities (George, 2012). LMS use is mandatory at a Caribbean university in Guyana (Oyedotun, 2020).

The Caribbean Universities Project for Integrated Distance Education (CUPIDE) provided training for 146 faculty, forty administrators, and twenty students across five

Caribbean universities. The goal was that faculty should use Moodle LMS for distance or blended learning. Conducting a project evaluation for the UNESCO-funded CUPIDE, George (2012) found that unreliable internet, limited time for faculty to use the LMS, and weak infrastructure hampered faculty adoption of the Moodle LMS. The report also noted that other participants were unlikely to adopt the LMS except for the early adopters because they needed more educational technology skills (George, 2012).

Since this report was the first significant evaluation of LMS adoption at Caribbean universities, it was a good source document for the present research. The objective of CUPIDE included developing human resources and enabling five Caribbean universities. The issues that affected the full realization of this goal were that: the project was not time-bound; there was little commitment from those involved; only the paid instructional designers displayed "buy-in"; it was "project-driven instead of needs-driven"; participants were suspicious of the new technology replacing them (George, 2012, p. 28). These were valuable indicators. The present research findings on faculty perspectives of their LMS use provides an updated understanding of faculty hesitation towards using Moodle LMS.

A vital study by Livingstone (2015) investigated faculty perceptions about faculty readiness to adopt technology at a Caribbean university in Guyana. The researcher used a mixed methods approach, and the sample comprised 136 faculty. Both open and close-ended questions served as instruments for data collection. Seventy-five percent of the sample agreed that it was feasible for the university to adopt eLearning (Livingstone, 2015, p. 98). However, 96.4% of the participants viewed the existing teaching-learning

situation as “archaic” (p. 98). The dominant themes for this study were “traditional [teaching] approach, dissatisfaction with the quality of education, lack of teaching-learning resources and tools, and the lack of innovation” (Livingstone, 2015, p. 92).

Most of the research on LMS adoption from the Caribbean, less developed countries, and developed countries focused on students’ adoption, and there were more quantitative studies than qualitative studies. Since research on faculty hesitation towards using LMSs at Caribbean universities was limited, the literature reviewed fell outside the five-year prescribed period. This body of research provided background information for this present study of faculty perspectives on adopting LMSs. Table 1 summarizes the limited body of research available on educational technology adoption at Caribbean universities.

Table 1

Higher education technology research from the Caribbean

	Researchers & Country	Sample	Methodology	Findings
1.	Barclay et al. (2018), Jamaica	Barclay et al. (2018), Jamaica	Quantitative; expanded UTAUT, Inferential statistical analysis	Confirmed performance expectancy (PE), effort expectancy (EE), social influence (SC), and facilitating conditions (FC).
2.	George (2012), Caribbean	Faculty at Caribbean Universities	UNESCO evaluation report Quantitative, descriptive statistics and evaluations	The success of the program could have been improved by better internet infrastructure and time constraints on faculty.
3.	Samos et al. (2019), Belize	Students, Belize	Quantitative, Descriptive statistics,	There was a low rate of adopting the Moodle LMS.
4.	Livingstone (2015), Guyana	Faculty, Guyana	Mixed methods, Quantitative, survey, Likert scales, Descriptive statistics,	Faculty are ready to adopt educational technology but must start using Moodle LMS. However, 75.2% of the sample agreed that technology adoption was feasible.
5.	Thomas et al. (2013), Guyana	Students Mobile learning	Quantitative, Modified UTAUT, survey, Likert scales, inferential statistics	PE, EE, and FC were the most influential. FC influences attitude
6.	Singh et al. (2016), Guyana	Faculty and students' adoption of mobile technology	Quantitative, Modified UTAUT, survey, Likert scales, inferential statistics.	Both students and faculty have positive attitudes towards adoption for teaching and learning.
7.	Thomas et al. (2020), Guyana	Students' adoption of mobile learning	Quantitative, modified UTAUT; used Likert scales and inferential statistics.	EE did not have a significant effect. However, facilitating conditions and PE significantly affected students' adoption of Mobile learning.
8.	Ahmad (2020), Jamaica	Students Perception Mobile learning	Quantitative Descriptive statistics The survey, Likert scale,	Students' perception was generally positive, 83%, regarding using mobile technology for collaboration, Communicating and seeking teacher assistance.

9.	Thurab-Nkhosi (2018) University of the West Indies, Trinidad, and Tobago	Deans and administrators	Qualitative Interviews	There is a need for change management strategies. Administrators needed to provide clear direction on leadership and management. Need for training.
10	Williams-Buffonge (2021) Antigua Barbuda College	Barriers to faculty adoption of technology	Qualitative, Interviews, coding, and thematic analysis	There is a need for professional training, institutional support, assistance with faculty pedagogy, content knowledge, and technology adoption.

The DIT in Quantitative Studies

It was critical to report on the trends of quantitative studies where researchers used the DIT framework because such research findings provided perspective and contrast for this qualitative study. For example, al-Rahmi et al. (2021) and Huang et al. (2020) combined the characteristics of Rogers' DIT with a TAM to investigate students' adoption of open-source learning platforms. The findings of both studies confirmed that the characteristics of the DIT and the variables from the TAM were significant predictors of students' intention to adopt LMSs.

Investigating faculty adoption, Nik Azman et al. (2021) used the DIT framework to investigate thirty-six teachers' LMS adoption at Malaysian HEIs. The results showed that all characteristics of the DIT influenced faculty intention to adopt LMSs. Using a larger sample and a different TAM, Yudiatmaja et al. (2022) investigated 342 Indonesian faculty's choices to use educational technology. The researchers found that except for effort expectancy, the other variables - performance expectancy, facilitating conditions, and social influence – significantly predicted faculty intention to adopt the technology.

Benbaba and Lindner (2021) investigated TESOL teachers' perceptions of adopting LMSs in Alabama and Mississippi. The researchers aligned 24 Likert scale survey items with the characteristics of the DIT. The findings showed that most of the sample agreed or strongly agreed that all attributes of the DIT had a significant influence on LMS adoption. Seventy percent of the respondents agreed that the LMS was better than face-to-face teaching and was compatible with their needs. Seventy-three percent of the sample agreed that the LMS was user-friendly and not complex. Sixty percent agreed that there was a high level of visibility, and trying out the LMSs facilitated the adoption (Benbaba & Lindner, 2021). These positively skewed findings reflected some amount of participant confirmation bias (see Doniclar, 2021)

Doniclar (2021) advised that researchers should be careful about converting bipolar 5/7 points survey answer formats to ordinal data and conducting statistical analysis. For example, Benbaba and Linder's (2021) close-ended question: "I can define the term LMS" (p. 23), did not accurately measure LMS use. Neither did these questions allow participants to express themselves meaningfully. Further to this, the assigning numerical value for worded answers tends to result in acquiescence bias (Primi et al., 2019). To avoid such biases, the present qualitative study provided participants with open-ended questions allowing for free and meaningful expression of faculty perspectives regarding their use of the LMSs at a Caribbean university in Guyana.

A different limitation of quantitative studies is the adding new variables to existing models. Pinho et al. (2021) used the DIT framework to study 631 Portuguese students' adoption of the Moodle LMS. The results showed that the DIT characteristics

and "personal innovativeness in Information Technology" (p. 421) positively influenced students' use of Moodle LMS. Pinho et al. added one more variable for a factor that is already accounted for in relative advantage. Similarly, Alkhateeb and Abdalla (2021) added new variables to investigate 372 Palestinian students' satisfaction with using the Moodle platform. Alkhateeb and Abdalla expanded the TAM framework to include "service quality" and "computer self-efficacy" (p. 138). The results showed that all the hypothesized predictors of the TAM influenced students' adoption of Moodle. Nevertheless, the practice of mixing concepts and variables in models resulted in "ad hoc models" (see Rondan-Cataluña et al., 2015, p. 793).

Another example was a study by Buabeng-Andoh (2022), who used a convenience sample of 276 students in Ghana during the COVID-19 pandemic to determine the level of Moodle LMS adoption. Nine constructs accounted for 53.8% of the sample's utilization of the LMS, but 47.2 % was left unexplained. Buabeng-Andoh suggested that other researchers can add more determinants to address discrepancies. However, adding more variables may not result in a better explanation. For example, Bervell and Umar (2017), in their meta-analysis of LMS adoption, discouraged adding more variables after finding that researchers had used more than thirty different variables in quantitative studies. In addition, Liu et al. (2020), in their literature review, noted that their review was "challenged by the range of definitions of similar variables" (p. 10).

Synthesizing the results of more than 162 studies, Venkatesh et al. (2003) noted that expanded models became too wide-ranging and advised against more "replications" and "minor tweakings" of models (p. 279). Nevertheless, the literature shows that

researchers continued adding new variables (see Bervell & Umar, 2017; Dwivedi et al., 2020; Huang et al., 2020; Kim et al., 2021). For example, Baber (2021) added six new variables: "instructor attitude, instructor interaction, instructor competency, collaboration, student motivation, and mindset," (p. 1) to the original TAM.

Sometimes, adding variables resulted in a possible replication of variables For example, Raza et al. (2021) expanded the UTAUT to investigate the influence of social isolation and the moderating role of Corona fear on Pakistan university students' adoption of an LMS. Expanding the model suggested that measuring *social influence*, an existing variable in quantitative models, did not capture subtle variations. Therefore, this qualitative study with open-ended questions allowed participants to discuss any variable or factor that impacted faculty hesitation to use Moodle LMS at a Caribbean university in Guyana.

Another criticism of using quantitative TAMs models was that researchers should consider that LMSs are complex educational technologies. Koul and Eydgahi (2017), advised that research designs should discriminate between less and more-complex technologies. Bagozzi (2007) questioned how reasonable it was to have one quantitative model explain the adoption of "various technologies, adoption situations and difference in decision making and decision-makers" (p. 244). For example, after surveying the adoption of educational innovations in various schools, Rogers (2003) found that "56% of the adopters implemented only selected aspects of the innovation" (p. 182). Rogers (2003) therefore criticized the use of single TAM for investigating both simple and complex educational technologies use. Given such limitations Vogelsang et al. (2013)

argued that quantitative models are not "suited for explaining complex decision processes nor forecasting actual behavior" (p. 2).

Similarly, Sinclair and Aho (2017) argued that theoretical models which treat usage as binary - will use or will not use - "cannot effectively capture the more complex reality" (160). In addition, Yudiatmaja et al. (2022) cautioned that researchers could measure relationships among different dependent and independent variables "without understanding meaning and reason behind the variables"; such meaning is "solely addressed by a qualitative approach" (p. 84). Qualitative research provided more scope for understanding the factors affecting LMS adoption, filling the need for a more comprehensive understanding of the problem.

The literature reviewed also reflected certain methodological gaps. Quantitative studies tended to produce confirmatory results. After reviewing 131 articles on academics' adoption of learning technologies, Liu et al. (2020) found that for most quantitative studies, "adoption [was] invariably positive" (p. 10). Criticizing this trend, Liu et al. advised that since faculty adoption of educational technology was a very "complex process impacted by learning technologies, academics, and other contexts" (Liu et al., 2020, p. 12), findings should not be simply confirming or non-confirming, but should reflect technology adoption's varied and complex nature. The present qualitative study with open-ended questions allowed participants to give broader and more diverse responses relating to faculty hesitation to use Moodle LMS.

Finally, based on this literature review, quantitative research did not address actual LMS use. The literature on LMS adoption revealed two existing gaps. First, there

was the need to know more about faculty use of LMSs, and there was the need for more qualitative research. I therefore used qualitative methods to investigate faculty perspectives on using Moodle LMS at a Caribbean university in Guyana. A closer review of the literature on critical concepts follows.

Literature Review Related to Key Concepts and Variables

LMS Use in Higher Education

LMSs are web-based platforms that deliver electronic learning (eLearning) using computers and web-based tools. LMSs are beneficial because they improve teaching and learning at higher educational institutions in developed countries (Rhode et al., 2017; Richardson et al., 2020; Washington, 2019) and developing countries (Adeola et al., 2022; Barclay et al., 2018). Educators use LMSs to design and deliver courses and programs for eLearning and Mobile learning (;). LMSs are also accessible on mobile learning devices such as smartphones and tablets. This availability allows students to access and engage in learning as they travel (Huang et al., 2020; Samsudeen & Mohamed, 2019). In addition, instructors may use LMSs for virtual-only or hybrid teaching (Muniasamy & Alasiry, 2020).

eLearning evolved from the offerings of correspondence courses in the middle of the 19th century and distance education in the 1950s (Kumar et al., 2017). The introduction of computers and the internet in the 1990s transformed distance learning as LMS web-based platforms for delivering asynchronous learning emerged. Over the last two decades, LMSs have been used worldwide in universities and colleges to deliver eLearning, and the demand has proliferated (Bryson & Andres, 2020; Huang et al., 2020).

In 2020, videoconferencing tools were added to the LMS range of features to persuade faculty to use the LMSs at HEIs (Chahal & Rani, 2022; Gamede et al., 2021; Mpungose, 2020; Samos et al., 2019; Yakubu et al., 2020).

Blackboard LMS became available in 1997, Moodle in 2002, and Canvas (Instructure) in 2008 (Kumar et al., 2017). Blackboard and Desire2Learn are commercial LMSs, while Moodle and Sakai are open-source LMSs (Turnbull et al., 2021). Open-source and commercial LMSs are comparable and can improve access to education globally (Yakubu et al., 2020). Elangovan et al. (2021) found that LMSs can also augment traditional teaching for blended or hybrid learning. Pelletier et al. (2022) found that more equitable access to LMSs could facilitate institutions' hybrid or fully online opportunities. LMSs are valuable tools for organizing instructional delivery and achieving engagement, administration, assessment, content delivery, and collaboration (Asamoah, 2020).

LMSs also facilitate Massive Open Online Courses (MOOCs), which are asynchronous and web based. Turnbull et al (2021) found that LMSs promoted various degrees of student-to-student and student-instructor interaction. In addition, Al-Hunaiyyan et al. (2020) found that some LMS courses were attractive because they were free, and students could personalize their learning experiences. Turnbull et al. (2021) and Tseng et al. (2019) found that universities and colleges had increased their MOOC offerings as LMSs became a critical part of instructional delivery.

Though the previous researchers found that LMSs were vital because they served the needs of educational institutions, learners, and instructors, offering alternative

learning pathways for higher education, Hunaiyyan et al. (2020) added a caveat noting that the new online learning model has yet to be entirely successful especially in effective online pedagogy. In addition, Kumar et al., (2017) found that student attrition rates were high, and MOOCs "did not bring about significant change to higher education" (Kumar et al., 2017, p. 5)

Rhode et al. (2017) who examined LMS use at HEIs in the USA, reported that 99% of the higher education institutions in the United States had an LMS to deliver eLearning. Correspondingly, 85% of faculty and 83% of students had access to LMSs (Rhode et al., 2017, p. 68). In addition, Rhode et al. found that Faculty members increased their use of Blackboard course tools for credit-bearing courses over a period of fifteen years at a Midwest University in the USA. Faculty LMS use grew from 65.5% in 2008 to 87.9 % in 2015 (Rhode et al., 2017, p. 74). Correspondingly, students' use of the LMS was high.

Data from the LMS system logs and database also showed that adoption had grown to nearly universal use over the fifteen years. Faculty recorded more than average use of the LMS tools such as announcements, folders, grades, and assignments (Rhode et al., 2017). Notwithstanding this widespread adoption of LMSs in the USA, Rhode eta al (2017) noted that some teachers found some tools challenging. Instructors' use of plagiarism detection, discussion boards, and tests was less than 30% (Rhode et al., 2017). Washington (2019) also found that only faculty with extensive knowledge of Blackboard used the tools and features specifically for pedagogical purposes.

The popular LMS in developing countries was Modular Object-Oriented Dynamic Learning Environment (Moodle). Adeola et al., (2022), Fearnley & Amora, (2020) and George (2012) found that faculty access and adoption of Moodle LMS were challenging. Over the last decade, higher education institutions in less developed countries used Moodle LMS for blended and distance learning. Nevertheless, several researchers observed that LMS adoption in Latin America, the Caribbean, Sub-Saharan Africa, and Asia was generally low (see Barclay et al., 2018; Bervell & Umar, 2017; Diaz, 2022; Fearnley & Amora, 2020; George, 2012; Livingstone, 2019; Nicholas-Omoregbe et al., 2017; Oyedotun, 2020; Samsudeen & Mohamed, 2019; Simelane-Mnisi & Mokgala-Fleischmann, 2022; Thurab-Nkhosi, 2018; Williams-Buffonge, 2021). LMS adoption rates in the developed world were relatively better (see Abu-Snoubar, 2021; Cutri & Mena, 2020; Rhode et al., 2017; Simelane-Mnisi & Mokgala-Fleischmann, 2022).

Modular Object-Oriented Dynamic Learning Environment

Moodle LMS is a free learning platform that provides educators, administrators, and learners with tools to facilitate course delivery (Al-Hunaiyyan et al., 2020; Alkhateeb & Abdalla, 2021). Among other researchers, Al-Nuaimi et al (2022), Nicholas-Omoregbe et al. (2017), and Maphosa et al. (2022) agree that the various features of LMSs - announcements, forums, discussion boards, assignment submission portals, quizzes, module blocks, and chat portals, are valuable for organizing instructional delivery and engagement. In addition, Moodle LMS enables content management, assessment, testing, report generating, communication, and collaboration using discussion boards, forums, and chat features (Al-Nuaimi et al., (2022).

Moodle is an open-source and robust LMS having "several functions such as automation of administrative activities, rapid assembly and delivery of learning content, a scalable web-based platform, portability, and standard support and knowledgeable reuse" (Nicholas-Omoregbe et al., 2017, p. 108). Despite the benefits of using LMSs, adoption rates were low. Zwain (2019) found that though the University of Kufa in Iraq adopted the Moodle LMS in 2010, faculty and students' adoption remained low. In Shri Lanka, Samsudeen and Mohamed (2019) investigated student adoption of LMSs at fifteen universities. The results revealed that adoption was slow, and students needed additional skills training. This trend was consistent in most developing countries.

The findings of a meta-analysis by Bervell and Umar (2017) revealed that higher educational institutions in Kenya, Tanzania, Uganda, Ghana, Nigeria, and South Africa, introduced LMSs (Bervell & Umar, 2017) to "widen access, reduce cost, and improve the quality of education" (p. 7269). However, Yakubu et al. (2020) found that even though researchers agreed that LMSs had the potential to improve instruction, "only a handful of African tertiary institutions have fully deployed LMSs" (p. 1**).** Falcão et al. (2020) examined LMS adoption at a Brazilian public university and found high drop-out rates for in-person and online courses; students perceived the Moodle LMS as problematic and avoided participating in forum activities.

Generally, the literature from developing countries revealed that LMS adoption was low, and adopters experienced similar problems, such as the lack of technology skills, time constraints, poor internet infrastructure, and poor collaboration (see Barclay et al., 2018; Falcão et al., 2020; George, 2012; Leacock & Warrican, 2020; Livingstone,

2019; Oyedotun, 2020; Samsudeen & Mohamed, 2019; Yakubu et al., 2020; Zwain, 2019). Although researchers have documented the above reasons for LMS non-adoption, conclusions were based on inferences from mainly quantitative studies. The present qualitative study presents specific evidence regarding faculty hesitation to use Moodle LMS at a Caribbean university in Guyana.

Adeola et al. (2022) and Fearnley & Amora (2020) agreed that LMS use in higher education offers a gateway to innovative, technology-enhanced teaching and learning However, Alshammari (2021) and Turnbull et al. (2021) found that problems such as the fear of using technology, unwillingness to use pedagogy, lack of technology skills, poor infrastructure, ineffective online pedagogy, lack of motivation and incentives, and weak infrastructure hampered LMS adoption. These factors are not exhaustive; Raza et al. (2021) and Yee & Abdullah (2021) found that environmental and social system factors also influenced LMS adoption.

COVID-19 and Social System Factors

According to Adov & Mäeots (2021) and Raza et al. (2021), global health issues, social influences, cultural norms, and organizational dynamics affect educational technology adoption. The severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2) and its associated disease, COVID-19, emerged in Wuhan, China, in December 2019 and quickly spread to countries worldwide (Sahu, 2020). Rapid responses resulted in travel restrictions and the global closure of all face-to-face educational institutions (see Agormedah et al., 2020; Al-Nuaimi et al., 2022; Bryson & Andres, 2020). Most colleges

and universities transitioned to online learning using LMSs and videoconferencing tools such as Zoom (Bryson & Andres, 2020; de los Santos & Rosser, 2021; Oyedotun, 2020).

Describing the situation in the United States, Bryson and Andres (2020) observed that "The COVID-19 pandemic undermined existing practices and changed the rules in unpredictable ways; buffering included the rapid substitution of classroom-based teaching to online teaching" (p. 608). The pandemic experiences in the United States were like those at other universities globally and in the Caribbean (see Irfan et al., 2020; Leacock & Warrican, 2020; Oyedotun, 2020; Saavedra & Di Gropello, 2021; Van Nuland et al., 2020; Williams-Buffonge, 2021; Wallace et al., 2021).

Ezarik (2021) reported on a survey by *Inside Higher Education* and *College Pulse.* With a sample of 2000 students from 108 American colleges, Ezarik (2021) investigated the nature of online learning during the pandemic and found that 47% of the students rated their education during the pandemic as fair or poor (Ezarik, 2021, para. 3). In addition, students were dissatisfied because professors were "not teaching and using technology adequately" (Ezarik, 2021, para. 5). At one New York City university, faculty had difficulty using basic technology for teaching (Ezarik, 2021). In addition, students found that the virtual courses required more time for doing assignments, and the length of the online lectures made it difficult for students to remain engaged and concentrate (Ezarik, 2021).

Moreover, Ezarik (2021) noted other students were frustrated because break-out rooms did not work well. Peers did not turn on their cameras and discussions rarely related to the course material. Students quickly became bored; "Eight in ten students

found it difficult to concentrate during remote lectures" (Ezarik, 2021, para. 15). It was evident that students and teachers grappled with emergency remote teaching as videoconferencing became the norm (de los Santos & Rosser, 2021; Ezarik, 2021). Diaz (2022) among other researchers observed that social distancing resulted in impersonal teaching and learning loss (Diaz, 2022; Foster, 2020; Oyedotun, 2020).

The sudden transition to virtual teaching exposed instructional delivery weaknesses (see Agormedah et al., 2020). Though most research findings were based on student samples (Liu et al., 2020), some researchers such as Oyedotun, (2020) and Adarkwa (2021) found that faculty also experienced problems pivoting to the online mode during the pandemic. In addition, Maphala and Adigun (2021) noted that students' educational technology use depended on faculty use. Therefore, technology adoption is a two-way interrelated process for students and faculty. These research findings provide evidence for comparing learning technologies adoption in developed countries during the pandemic.

Agormedah et al. (2020) examined students' LMS adoption in Ghana, during the pandemic, and found additional challenges affecting a sample of 467. Though students knew about the university's LMS, they lacked orientation, training, and constant access to the internet. Furthermore, students could not afford internet access. The Ghanaian government provided monthly data for students at universities to alleviate this problem, but provisions were inadequate (Adarkwah, 2021; Hedding et al., 2020). Similar student issues affected technology adoption in the Caribbean and Guyana (Diaz, 2022; Livingstone, 2019; Oyedotun, 2020).

Investigating faculty technology adoption during the pandemic, with a qualitative study of twenty-six Indonesian faculty who taught Mathematics, Irfan et al. (2020) found that 82% of teachers used Zoom, Google Classroom, and Edmodo. Only 12% used the University's LMS (Irfan et al., 2020, p.150). The findings also revealed that the absence of Mathematical symbols, equations, and programming languages on the LMS contributed to faculty avoidance. Moreover, study findings revealed that Indonesian faculty avoided utilizing the university's primary LMS because Video Conferencing and assessment features were unavailable. Faculty members lacked technical skills and did not know how to edit video lectures. They only shared their PowerPoint presentations using Zoom.

In Ontario, Van Nuland et al. (2020) found that the transition was less challenging for many universities already using LMSs to track documents, prepare reports, and deliver courses. However, university faculty and students in some urban areas needed more broadband and cellular service. Remote areas were most affected; there were "dead zones - pockets with no access to broadband internet service" (Van Nuland et al., 2020. p. 445). Internet connectivity affected educational technology use in both developed and developing countries (de los Santos & Rosser, 2021; Tadesse & Muluye, 2020). Similar problems existed at a Caribbean university in Guyana.

Investigating how COVID-19 affected HEIs in Latin America, Hershberg et al. (2020) conducted a survey with officials at 50 universities. The results showed that 75% of the HEIs had transitioned to some form of online instruction (p. 2). Forty-three percent of the sample said Zoom was the most popular platform (p. 2). However, less than half of

the universities took steps to address the problem of internet connectivity. Examining the situation in Brazil and Puerto Rico, Falcão et al. (2020) and Rosario-Rodríguez et al. (2020) used student satisfaction surveys. In both studies, learners reported that the teachers lacked knowledge of working with online courses. In addition, there was a lack of responses from the faculty. Financial and technology resources were unavailable, classes were not well organized, faculty had poor technology skills, the online courses were more complex, and there was no social interaction. Students also experienced internet access problems.

A Caribbean university in Guyana experienced similar issues. Oyedotun (2020) found that having pivoted to online instruction using Zoom videoconferencing and Moodle LMS, "the challenges and inequalities [became] new realities" (p. 1). Oyedotun identified five significant challenges: poor infrastructure and slow internet, unreliable electricity, the lack of devices, lack of training for faculty and students, and reduced teacher/student engagement. There is limited literature on faculty experiences and perspectives at a Caribbean university in Guyana, except for Oyedotun's desktop survey. Such surveys provide fast, credible insights for understanding how social factors affected technology use at a Caribbean university in Guyana. In the absence of empirical research, Oyedotun's study is singular, and a significant gap in the literature existed. More qualitative research on faculty use of LMSs in the Caribbean is needed, and this present qualitative study on faculty perspectives regarding their use of Moodle LMS at a Caribbean university in Guyana fills this gap.

In the Caribbean, the impact of COVID-19 on educational technology was most severe and student satisfaction surveys - quantitative studies - provided some evidence of problems associated with educational technology adoption. For example, Smith and Haughton (2021) examined how COVID-19 impacted emergency remote teaching (ERT) in the Faculty of Social Science at the University of the West Indies (UWI). From a sample of 115 students, 81% reported high dissatisfaction with student engagement, connectivity, and communication (Smith & Haughton, 2021, p. 26). Students were also dissatisfied with the feedback received from faculty, the use of online chat, and unreliable internet connection.

Pierre et al. (2021) also conducted a satisfaction survey with medical students at UWI Mona campus and found that although medical students were enthusiastic, they experienced challenges accessing Wi-fi and staying connected. One third of the sample was "satisfied with the content, communication, lecturer preparation, instructional material, and online learning activities (p. 46, 47). In addition, Pierre et al. reported that faculty members experienced problems using Blackboard Collaborate because they were unfamiliar with using videos and multimedia platforms. Since instructors were unfamiliar with online chats and breakout rooms, they used PowerPoint slides that became monotonous (see Pierre et al, 2021). The experiences at a Caribbean university in Guyana were similar; some students who lived in remote areas experienced unreliable internet access (Oyedotun, 2020).

These results from the Caribbean provided much-needed data on the trends that occurred at Caribbean universities during the last five years. Moreover, research from the

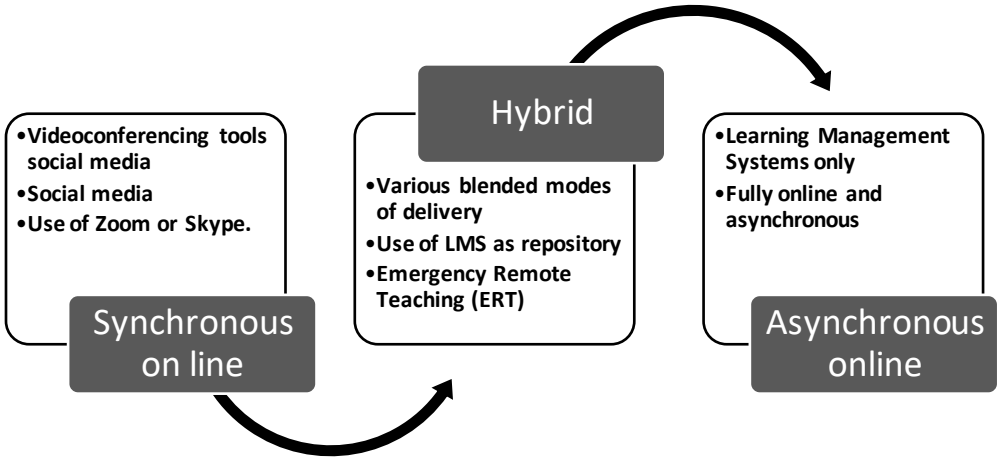
Caribbean provided scope for comparing how the pandemic affected faculty technology adoption. Notably, most of these findings relate to students and faculty adopting Videoconferencing tools instead of LMSs. Nevertheless, the results illuminated the problem in practice that the current research addressed - faculty hesitation to adopt innovative LMSs.

Some students could not participate in learning because they needed laptops or devices. The emergency transition caused faculty to use Zoom videoconferencing and other platforms for the online delivery of instruction (Oyedotun, 2020). The Zoom tool was an add-on to the Moodle LMS, and instructors made recorded lectures available by placing links in the LMS (Oyedotun, 2020). There was reduced student-teacher engagement as students did not participate in class discussions. Some students became "impolite to lecturers because of the stress" (Oyedotun, 2020, p. 3).

This aspect of the reviewed literature revealed that faculty were reluctant to use LMSs. The issue of student-teacher engagement was of crucial importance for students' use of educational technology. The literature revealed that students struggled with adjusting to ERT. Based on the literature reviewed, the following chart (see Figure 3) describes the different types of online learning that thrived during the COVID-19 pandemic.

Figure 3

Chart showing types of online teaching during COVID-19



Three distinct types of online education occurred during the COVID-19 pandemic. First, synchronous online learning was the most frequently used adaptation, where instructors used video conferencing tools and social media (Oyedotun, 2020; Pierre et al, 2021). Second, faculty members practiced hybrid teaching where various types of blended learning were the norm, and faculty "replicated face-to-face teaching in the digital environment" (Morreale et al., 2021, p. 117). Thirdly, the less practiced teaching mode was fully asynchronous delivery using LMSs (Hodges et al., 2020). The LMS became a repository for sharing materials with students (Bryson & Andres, 2020). Although the difference between ERT and online teaching tended to be obscure, Hodges et al. (2020) made the distinction that: "Well-planned online experiences are

meaningfully different from courses offered online in response to a crisis or disaster" (Hodges et al., 2020, p. 1).

The COVID pandemic exacerbated problems associated with adopting LMSs at higher education institutions. Since traditional colleges and universities were not online universities, structural issues may have affected transitioning to fully online delivery using LMSs (see Bishop-Monroe et al., 2021; Cutri & Mena, 2020; Smith & Haughton, 2021). However, D'Agostino (2022) observed that offering blended or hybrid instructional delivery encouraged LMS use, narrowing the gap between in-person and online learning. This review provided a background for investigating the challenges faculty experienced while hesitating to use the Moodle LMS at a Caribbean university in Guyana.

The Digital Divide

Another social factor affecting faculty use of LMSs was the digital divide. Technology and the internet are social, economic, and educational enablers. Adarkwah (2021), Morales Dussan et al. (2021), and Tomczyk et al. (2019) found that students with dependable access to devices and reliable internet had a better advantage learning with educational technologies than students with unreliable access. Such findings outlined the nature of the digital divide. Vulnerable groups, living in rural areas in developed countries such as the United States and Canada, were also affected by the digital divide (de los Santos & Rosser, 2021; Van Nuland et al., 2020). Other vulnerable groups experiencing problems accessing educational technology were women, girls, and persons with disabilities (Morales Dussan et al., 2021).

In the USA, García and Weiss (2020) reported that disadvantaged students at HEIs were less engaged in online learning during the pandemic; some had never engaged in online classes before. According to García and Weiss, the pandemic "exacerbated well-documented opportunity gaps that put low-income students at a disadvantage relative to their better-off peers" (p. 2). Researchers, Katz et al. (2021), Mpungose (2020), Sims & Baker (2021), Stewart (2021), and Wallace et al. (2021) agreed that access to devices and stable internet was a precondition for students benefiting from online learning. De los Santos and Rosser (2021) noted that "broadband availability for many rural regions was a significant barrier, along with affordability for monthly broadband costs, especially for students in rural areas of the United States" (p. 23).

According to a report from "The Economic Commission for Latin America and the Caribbean (ECLAC) "even before the pandemic hit, the social situation in the region was deteriorating, owing to rising rates of poverty and extreme poverty, the persistence of inequalities, and growing social discontent" (CEPAL-UNESCO, 2022, p. 1). These social situations contributed to the widening digital divide, not limited to access to devices and the internet. There was also the disparity among "skill sets needed to leverage the potential of Information and Communications Technologies (ICTs), which was uneven among students and faculty (p. 7).

Reporting on remote learning during the pandemic, Vegas (2020) noted that access to the internet, technologies, and devices allowed high-income countries such as Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States to provide 90% percent of broadcast and TV learning, with at least 60% using online

platforms. In contrast, less than 25% of low-income countries, such as Sub-Saharan Africa, Latin America, Southeast Asia, India, and the Caribbean, provided students with limited TV and radio broadcast learning (para, 3). The pandemic exacerbated the digital divide.

Adarkwah (2021), Agormedah et al. (2020), Hedding et al. (2020) and Thomas et al. (2020) found that smartphones facilitated mobile learning. Nevertheless, the cost of data was often prohibitive for students (Adarkwah, 2021; Agormedah et al., 2021). Administrators at a Caribbean university in Guyana instructed faculty to move teaching to the online mode "using Moodle and other platforms without adequate . . . internet access, stable power supply, or licenses for online communications platforms" (Oyedotun, 2020, p. 2). Therefore, despite LMSs being available, low availability of devices, unstable internet and weak infrastructure impeded faculty and students' Moodle use at a Caribbean university in Guyana.

Professional Development for LMS Adoption

In the literature on LMS use, some researchers found that facilitating conditions such as professional development (PD) interventions could address the lack of training and pedagogy for LMS use (Garone et al., 2020; Novla & Johnson, 2019; Richardson, 2020). Where faculty needed skills, and on-the-job training, successful PD programs would facilitate faculty acquisition of specialized efficacy for using educational technology. Darling-Hammond et al. (2017) defined professional development as "structured professional learning that resulted in better teacher practices and

improvements in student learning outcomes" (p. 2). Darling-Hammond et al. identified seven characteristics of effective professional development noting that PDs should:

1) be content-focused

2) incorporate active learning utilizing adult learning theory

3) support collaboration

4) use models and modeling for effective practice

5) provide coaching and expert support

6) offer opportunities for feedback and reflection

7) be of sustained duration (Darling-Hammond et al., 2017, p.4).

Darling-Hammond et al. further noted that instead of non-specific training PD should provide pedagogy needs. PD programs should be sustained and periodic, with multiple sessions incorporating hands-on learning based on adult learning theory. In their literature review, Darling-Hammond et al. advised that professional development facilitators should provide scaffolding for teachers.

Darling-Hammond et al. (2017) addressed professional development in general; however, all seven characteristics are essential for creating an enabling environment for faculty LMS professional development. Richardson et al. (2020) however noted that PD programs can be costly and complex to manage for achieving goals. One example was the CUPIDE project that provided training for distance and face-face-face teaching at Caribbean universities. According to George (2012), the project should have ended in December 2006; however, with six months remaining for the project's completion, universities had not spent 77.1% of the project's donor contributions (p. 45).

George (2012) reported that although the PD program was content-focused and supported collaboration, there were several weaknesses and lessons learned. According to George, the program needed to provide modeling for effective practice, enough coaching, and expert support. The PD intervention also needed more opportunities for feedback and reflection. The PD needed to be of sustained duration. More specifically, the most severe problem was the lack of bandwidth and infrastructure for designing courses. There needed to be more commitment from universities to use the designed courses. The training was simply "an exercise" (p. 28). There needed to be an incentive for faculty to participate.

George (2012) also noted that the presence of strategic plans and the five universities could have helped the execution and success of the program. Participants from all five universities needed to familiarize themselves with online teaching and technologies. While skilled consultants conducted the Moodle LMS training workshops, faculty needed more participation and time to practice handling the content. Recommendations were that the training should address participants' needs and there should have been a limit on the amount of circulated material since there were time constraints. In addition, participants needed to be committed to the exercise instead of being "dubious about the value of participating" (p. 68).

There has been little change at a Caribbean university in Guyana. The COVID-19 pandemic determined that faculty do emergency remote teaching. Administrators circulated many email invitations to online training workshops. Faculty attended some single-session workshops, but time constraints hampered full participation (Oyedotun,

2020). The current qualitative study, with free-response questions, will investigate faculty perspectives on how professional development may facilitate faculty use of Moodle LMS.

Garone et al. (2019) investigated 244 Belgian university faculty LMS professional development needs using Rogers' DIT's adopter categories (2003). Cluster analysis findings showed that 44.55% were innovators and early adopters, 40.93% were the early majority, and 14.5% were the late majority (p. 2473).

Moreover, this study found that the early majority needed increased social influence, while the late majority needed additional facilitating conditions. The needs analysis findings suggested that there should be three separate groups for professional development instead of a one-size-fits-all approach. However, Garone et al. (2019) have identified one of the limitations of their prediction study. The results are based on self-reported behavioral intention to use LMSs, which is very different from measuring actual use. This is a limitation of quantitative designs and chosen methodologies. Qualitative research may produce more dependable findings. A valid observation was that "A one-size-fits-all" approach to professional development does not work well because it does not consider individual or group needs (p. 2477).

The first characteristic of PD programs as identified by Darling-Hammond et al. (2017), remains relevant: content should meet faculty needs. It is vital to conduct cluster analysis and needs assessments before implementing PD programs; the PD content should match the needs of faculty. After beginning the CUPIDE training program at Caribbean universities, the facilitators discovered insufficient internet bandwidth to

facilitate technology use during training sessions (George, 2012). Careful needs assessments would have catered to this problem. Compounding this problem, most participants for this generalized training needed more technical skills and needed to prepare for the activity. George (2012) reported that the training was nothing more than an exercise since most universities had yet to design courses. The qualitative study in progress will investigate the professional development needs of faculty members at a Caribbean university in Guyana.

Researchers found that PD programs are beneficial if they provide faculty with the pedagogical skills for teaching with LMSs. Dintoe (2018), investigated faculty LMS adoption at a university in Botswana and found that most faculty used teacher-centered approaches instead of student-centered instruction. The situation was similar in most developing countries. Examining the teaching approaches at a university in Toronto, Van Nuland et al. (2020) noted that though the learning curve was steep, teachers needed to "dramatically change their way of teaching" (p. 446). They needed to create learning material and understand how to use the technology simultaneously. Instructors' roles changed as they became instructors and LMS course designers. Manuals and webinars provided emergency training because universities expected immediate online teaching, but manuals and webinars did not fill the gap.

Van Nuland et al. (2020) also argued that faculty must acquire skills to facilitate teaching and learning with technology. For example, faculty needed to be "creating and sharing of videos, engaging students with asynchronous and synchronous discussions, establishing a sense of community, generating ideas for increasing student engagement,

and using hands-on activities online" (p. 446). Manuals and webinars provided by universities may work for emergency training. However, Darling-Hammond et al. (2017), emphasized that manuals and webinars cannot provide the structured support and scaffolding that LMSs adopters require. Commenting on this same issue, Rucker and Frass (2017) noted that: "Some of the biggest issues with any new technology implementation are providing adequate training and support to assist users with learning these new technologies" (p. 259).

New technologies often require new pedagogies; traditional pedagogy "will be an obstacle to effective technology utilization among lecturers" (Sulaiman et al., 2022). Noval and Johnson (2018) found that high-level adopters were the ones who had adopted an andragogy framework that allowed them to design courses. The actual use of technology was essential for adoption. Modeling and experiential learning could facilitate trialability, an important characteristic of technology adoption that Rogers (2003) recognized. Observability was also part of the process because faculty needed to see others using the LMS as this could t, provide motivation and promote efficacy. Faculty use of Moodle LMS at a Caribbean university in Guyana could improve if professional development programs facilitate LMS adoption. The foregoing researchers provided data and strategies informing managers of universities and colleges on how to provide optimum professional development for enhancing faculty technology skills.

Examining the case of three Nigerian universities, Adamu and Benachour (2020) combined the DIT with a TAM model to investigate students, faculty, education managers, and software designers' views on professional development. Benachour used

focus groups and individual interviews. The results revealed there was a need for change management strategies and support systems to enhance pedagogy.

Finally, the literature on LMS adoption revealed that the organizational structures at some universities impacted faculty adoption. Cutri and Mena (2020), with a meta-analysis, investigated faculty readiness for transitioning to online teaching. Cutri and Mena found that many traditional tenure-track faculty members were new to online teaching and needed more formal education to teach online successfully. However, some instructors did not see the importance of professional development. In addition, structural and cultural expectations led faculty to believe that online teaching was less critical than research scholarship. Instead, conducting and publishing research was more important. Such structural and cultural traditions threatened to thwart professional development interventions. (see Bishop-Monroe et al., 2021; Cutri & Mena, 2020; Smith & Haughton, 2021).

Similarly, Rotidi et al. (2020) studied the views of professors at the Ionian University in Greece and found that though most professors agreed that there was a need for pedagogical training, 33.9% of the sample saw such a need as unnecessary (p. 739). This finding at a university in Greece resonates with the Canadian study by Van Nuland et al. (2020) who also found that "academics saw themselves as first and foremost academics and often were not familiar with the technology required to conduct online courses . . . unless it was their particular area of expertise" (p. 444). Most university faculty see themselves as content specialists. However, while "a lecturer's content knowledge contributes to effective teaching, teaching effectiveness involves more than

subject matter expertise. Considering these possible hindrances, “faculty buy-in, training, and support are essential for the adoption and effective use of technologies” (Pelletier et al., 2021, p. 9).

The present study is vital for investigating what will motivate faculty to adopt Moodle LMS. This aspect of the literature review indicated that carefully designed professional development interventions are indispensable for successful faculty adoption of Moodle LMSs at a Caribbean university in Guyana. Once carefully designed and delivered, professional development interventions can address faculty training and pedagogy needs. The current research provides a better understanding of why faculty members hesitated to use Moodle LMS, and qualitative methods provided new knowledge that fills this gap.

Summary and Conclusions

The literature reveals a comprehensive overview of the DIT in technology adoption research. Most researchers gave strong attention to using TAM models to measure LMS adoption. Some researchers combined TAM models with the DIT framework, but often, the research focused primarily on students’ adoption instead of faculty adoption of LMSs. Based on this literature review, the key factors affecting LMS adoption in higher education were usability, social system factors, access to devices and the digital divide, and the need for training for LMS adoption. This research fills the gaps by providing data and analysis of faculty perspectives on their actual use of LMSs. A better understanding of the challenges experienced by faculty offers valuable data to managers and administrators seeking to have instructors make full use of the LMSs

available at colleges and universities. Chapter three will outline the rationale for choosing qualitative research to answer the research questions and includes information regarding the participants for the study, interviewing techniques, data collection, ethical implications, and the plan to protect the confidentiality of study participants. In addition, chapter three will address the research design, the researcher's role, and the research methodology.

Chapter 3: Research Methodology

The purpose of this qualitative research was to explore faculty perceptions of using Moodle LMS in the Faculty of Social Sciences at a Caribbean university in Guyana. Despite LMSs availability at most colleges and universities, faculty often resisted adopting innovative learning technologies (Abu-Snoubar, 2021; Oyedotun, 2021; Simelane-Mnisi & Mokgala-Fleischmann, 2022; Washington, 2019). Through responsive qualitative interviews, I investigated the perceptions of faculty tasked with using the institution's LMS. It was vital to obtain qualitative data to understand why faculty hesitated to adopt the LMS fully. In this chapter, I discuss the research design and rationale for the study, the researcher's role, methodology, participant selection, instrumentation, data collection, data analysis, trustworthiness, and ethical procedures. The chapter concludes with a summary of the research method and process elements.

Research Design and Rationale

This research focuses on exploring faculty perspectives on their use of Moodle LMS.

RQ: How do faculty perspectives on hesitation to use the university's Moodle LMS in the Faculty of Social Sciences at a Caribbean university in Guyana reflect the tenets of Rogers' diffusion of innovation theory?

In this qualitative study I sought to understand faculty perceptions, opinions, feelings, experiences, and knowledge (see Patton, 2002) regarding their use of Moodle LMS. Qualitative research enables the collection and documentation of multiple realities and views (Merriam & Tisdell, 2016; Patton, 2015) and facilitates reporting on different

perspectives resulting in the development of themes within the findings (Creswell & Poth, 2018). Rogers' (2003) DIT framework addresses how the behavior of potential adopters in a social system can influence technology adoption since interrelated units work together using technology to solve problems. I focused on understanding human behavior using questioning.

I investigated faculty members' perspectives regarding using Moodle LMS for teaching at a Caribbean university in Guyana. A qualitative design is appropriate for this study because quantitative analyses determining correlations among hypotheses predicting intention to use LMSs would not provide a deeper understanding of why faculty hesitate to use Moodle LMS (see Noval & Johnson, 2018). After considering the purpose of this study and the guiding research questions, I selected a qualitative research method for the approach. Qualitative research falls within the tradition of the constructivist worldview, which acknowledges that knowledge is socially constructed, and meaning is cocreated through interactions with individuals (Burkholder et al., 2016). Qualitative research attempts to understand individuals, groups, and phenomena in their natural settings in ways that reflect the meaning people make from their experiences (Ravitch & Carl, 2016). Conversely, quantitative research "tests objectives, theories, or hypotheses by exploring relationships among variables" (Creswell & Creswell, 2018, p. 4). Qualitative methods apply to the present study, which seeks to understand faculty perspectives.

This study was a basic qualitative one. Education, health, social work, and counseling researchers often do basic qualitative research. Merriam and Tisdell (2016)

defined basic qualitative research as the most common type where the researcher does the qualitative research without declaring it is a particular type, such as a case study, grounded theory, ethnography, phenomenological, or narrative. The philosophy of constructivism underlies basic qualitative research, which involves collecting words and images to understand views and perspectives (Merriam & Tisdell, 2016). According to Ravitch and Carl (2016), "basic research contributes to fundamental knowledge and theory" (p. 278).

Qualitative research is chosen for several reasons. The first reason is that qualitative research occurs in natural settings, and I was able to collect data on the perceptions of faculty in their work settings where they are required to use Moodle LMS. The data collected from faculty using Moodle LMS constitutes field research at a site where the participants experienced the problem. Secondly, qualitative research facilitates a close relationship with the interviewees as the researcher strives to be objective and encouraging. Qualitative researchers aim to make participants feel comfortable. Qualitative research allows the researcher to encourage participants to respond freely to the questions (Rubin & Rubin, 2012). Finally, I selected a qualitative design because it facilitates inductive and deductive data analysis so that the researcher can build patterns, categories, and themes from the bottom up, organizing the data into information units (see Creswell & Creswell, 2018).

Another feature of the qualitative study is that researchers can reflect on how "their role in the study, and their background, culture, and experiences hold potential for shaping interpretations such as the themes they advance and the meaning they ascribe to

data" (Creswell & Creswell, 2018, p. 162). To remain focused, I practiced reflexivity by keeping a journal, while documenting attention to detail and essential descriptions given by interviewees to reduce the possibility of researcher bias.

According to Creswell and Poth (2018), "researchers aim to interpret participants' constructions of meaning" (p. 34) because humans construct multiple realities as they live and interact with others. In qualitative research, meaning is coconstructed between the researcher and participants. "Individual values are honored and are negotiated among individuals" (Creswell & Poth, 2018, p. 35). The researcher gets close to the participants, and subjective evidence is collected and analyzed. The interpretive framework for this qualitative study was social constructivism, where individuals seek the meaning of the world in which they live. Instead of narrow ideas and few meanings, qualitative "researchers look for the complexity of views" (Creswell & Poth, 2018, p. 24).

This qualitative research began with the assumption that perspectives of faculty adopting LMSs need exploring to understand faculty hesitancy. Interviewees remained in their natural setting where many factors interact; participants shared their constructed realities. Rogers' DIT (2003), as the conceptual framework for the present study, provided a lens for interpreting meanings. I collected data from participants in their natural settings as faculty members in the Faculty of Social Sciences, where they experienced the problem of hesitating to use Moodle LMS for instructional delivery.

I used semistructured interviews to obtain faculty perspectives on using Moodle LMS. I analyzed and compared educators' perspectives to explore the research problem and address the research questions. I collected data using virtual audio interviews using

Zoom video conferencing. I created interview questions that aligned with the characteristics and the social system factors of Rogers' DIT. I pilot-tested the questions with experts from the Faculty of Social Sciences. The open-ended questions (Appendix D) were aligned with the general research questions and the essential parameters of the DIT to ensure the sufficiency of the data collection instrument (see Burkholder et al., 2016). I also developed interview questions based on models provided by Noval and Johnson (2018) and Thurab-Nkhosi (2018). An open-ended question was included at the end as good practice to allow participants to add additional comments (Ravitch & Carl, 2016). Open-ended questions enable participants to construct meanings of their situations.

For this qualitative research design, I did manual data analysis involving axial coding (Ravitch & Carl, 2016) that is generative and recursive, identifying recurring patterns or themes supported by the data from the interviews. Several software packages, such as MAXQDA, efficiently organize data into codes and themes for large samples. For example, Elongovan et al. (2021) used this software with data from a selection of 341 participants. For such large samples, using the software is advantageous for organizing data. For this qualitative study with a sample of 11, it was better to do manual coding and thematic analysis.

Role of the Researcher

The researcher is the primary instrument in qualitative studies as they conduct direct observations, interviews, and analyze data (Burkholder et al., 2016; Ravitch & Carl, 2016). My role as a researcher was to gather data from study participants. I had no

influence or power relations with the proposed participants. I assumed a personal data-gathering and interpretive role. I analyzed and engaged in report writing, ensuring that participants' perspectives were accurately captured and reported. I practiced self-awareness, examining participants' assumptions and making them available to the readers. I made transcriptions available to participants for verification and requested that participants sign a confidentiality agreement.

I requested and obtained permission to recruit participants and collect data at a higher education institution in Guyana. Although I have taught at the study site, I was not part of the social science faculty, nor I was not in a position of influence. No subordinates or individuals with whom I could have had a conflict of interest, were recruited for my study. I maintained confidentiality through open and honest communication, member checks, and personal identification of biases. I protected participants from potential harm by using pseudonyms in the report. Participants' names and information were not recorded in the research records. Participants' identities were not disclosed. The partner organization was not named in the results.

As an educator, I was interested in the study's findings, and documenting my self-reflections in a journal increased awareness of potential biases and other ethical concerns. As advised by Creswell and Creswell (2018) I practiced self-reflection to control bias. Creswell and Creswell indicated that a researcher's background can affect their interpretation of findings. When researchers share roles and identities with participants in particular settings, it is called positionality (see Creswell & Creswell, 2018) Reflexivity and member checking with participants are core characteristics of qualitative research,

and I openly shared with participants the purpose and findings of my research. To ensure accurate and unbiased data. I reviewed the Walden University's guidelines and completed an institutional review board (IRB) application before conducting the fieldwork for this study. I present a detailed data collection plan in the Methodology section, including the study's purpose, expectations, participant selection, instrumentation, procedures, and data analysis.

Methodology

Participant Selection

The purpose of this qualitative research was to explore faculty perceptions of using Moodle LMS in the Faculty of Social Sciences at a Caribbean university in Guyana. The population included full-time university faculty who used Moodle LMS to deliver blended learning. Participants were recruited using purposive sampling with a sub-population of faculty members who had been using Moodle for 1 year at a Caribbean university in Guyana. First, I recruited participants by obtaining email addresses from the administrative officer. Then, I emailed all members of the Faculty of Social Sciences requesting volunteers.

Purposive sampling was used because, according to Etikan et al. (2015), it allows each participant to provide valuable and unique information for the study. By using purposive sampling, participants "can best inform the researcher about the research problem under examination" (Creswell & Poth, 2018, p. 148). Both participants and researcher spoke the same language, English, therefore, all communication was done using English. The participant criteria were as follows:

- Participants were using Moodle LMS to deliver instruction for at least 1 year.
- Participants were teaching undergraduate students in the Faculty of Social Sciences at a Caribbean university in Guyana.

These participants were considered information-rich individuals (see Patton, 2015). Purposive sampling allowed me to obtain volunteers who fit the criteria of having used Moodle LMS for 1 year. According to Creswell and Poth (2018) such participants can present different perspectives on the problem. To protect the privacy of participants, participants' names and information were not recorded in the research records. Participants' identities were not disclosed. The partner organization was not named in the results.

By inviting participants from a pool of faculty members using Moodle, I obtained answers to the research question. Being familiar with the culture I understood local privacy, confidentiality, and advocacy norms. First, I recruited participants by using emails, inviting volunteers, and introducing the purpose of the study and explaining the criteria for participation. Once I received notice of an interested participant, I shared an informed consent form with the volunteer. I then scheduled a one-on-one virtual interview using Zoom video conferencing. Guest et al. (2006), who addressed the adequacy of sample and data saturation, noted that "If the goal is to describe a shared perception among a homogenous group," a sample of six to 12 participants could allow for data saturation (, p. 76). Eleven volunteers responded positively and became the participants of this study.

Instrumentation

The research site was the Faculty of Social Sciences at a Caribbean university in Guyana. For this study, omitting some demographic data maintained the integrity of the data collected. This study's data collection instrument was an interview protocol called "Interview questions for faculty use of LMSs" (see Appendix C). Though the interview protocol was self-designed, it borrowed focal points from the CUPIDE evaluation report (George, 2012). I aligned the interview schedule with the general research question and the essential parameters of the DIT (Rogers, 2003) to ensure the sufficiency of the data collection instrument as advised by Burkholder et al. (2016). I also developed the interview protocol based on Noval and Johnson's (2018) and Thurab-Nkhosi's (2018) models. An open-ended question was included at the end as good practice to allow participants to add additional comments (see Ravitch & Carl, 2016). I pilot-tested the interview questions and received reflective insights. Two research experts advised on effective ways of conducting interviews and I refined the instrument for content validity (see Table 2).

Table 2

Showing alignment of interview questions.

Research Question	Conceptual Framework	Interview Questions
How do faculty perspectives on hesitation to use the university's Moodle LMS in the Faculty of Social Sciences at a Caribbean university in Guyana reflect the tenets of Rogers' Diffusion of Innovation Theory.	*Rogers' DIT* *Characteristics of Innovations* Relative advantage Compatibility Complexity Trialability Observability	1. (a) In what department do you teach? (b) How long have you been using Moodle LMS (c) What features do you use? 2. What are the benefits of using Moodle LMS for delivering instruction? Is Moodle better? 3. Please tell me how comfortable you are with using the various tools of Moodle LMS. What is easy and what is challenging to use?
	Rogers' DIT Social System Factors	4. How do others influence your full use of the LMS? For example, how do social situations and environment affect your use of the LMS? 5. What professional development and training may help you fully utilize the LMS? 6. What other conditions may help or hinder you from using Moodle LMS for blended learning? 7. What other comments would you like to share?

The above alignment table established the sufficiency of the data collection instrument. I aligned the open-ended questions with Rogers' (2003) DIT' characteristics of technology use and social system factors. There was no attempt to establish one-to-one mapping of questions with the DIT's constructs since this would have narrowed the scope of the data collected.

Procedures for Recruitment, Participation, and Data Collection

I recruited participants from the Faculty of Social Sciences at a Caribbean university in Guyana. The Dean of the faculty forwarded the recruitment email, on my behalf, to all faculty members who had at least one year experience using Moodle LMS for teaching. I shared a brief of my study so that potential participants were informed. I asked participants to respond to the general email indicating their interest in participating. I used emails to provide an informed consent letter for potential participants to read and complete. Once I obtained the participants' consent, I sent a link to an online appointment schedule for them to select an interview slot. I conducted audio interviews using Zoom video conferencing. Interviews lasted for approximately 40 minutes to one hour each. I used Zoom cloud recording and transcription applications to record and transcribe all data. The Zoom Participation Guide (Appendix E) indicated the step-by-step process for conducting the interviews. Another invitation (Appendix F) provided an invitation to the Zoom interview. I informed participants about the intentions of the study. After the interviews, I emailed participants a copy of the interview transcript, asking them to verify accuracy.

Data Analysis Plan

After recording all responses to specific interview questions using Zoom videoconferencing, I will obtain transcripts from Zoom and check all data. Next, I will do a first cycle of in vivo coding for all data applicable to each interview question identifying and coding as data occur (Rubin & Rubin, 2012). First, I will work inductively, looking for and building patterns and categories. Then, I will follow the

protocol of identifying similarities and differences with the phrases of the narrative data to identify themes. Finally, I will use Microsoft Excel Spread Sheet to store all the data. Then I will examine any relationships among the themes. I will work iteratively with the codes in the database until a comprehensive set represents the participants' narratives.

As Saldaña (2021) advised, I will use a hybrid coding method to include a priori and inductive codes. Coding will be iterative and cyclical. Words and phrases will be coded and saved in Microsoft Word. Then I will do pattern coding by looking at individual questions across the range of different respondents, comparing. Next, I will note the emerging themes in the collected data and document these using Microsoft Excel. I will do reflexive journaling to record my thoughts, different from what the participants said. I will accurately represent participants' perspectives. Next, I will analyze themes to determine individual and collective data that answers the interview and research questions. Finally, I will do member checking to ensure an authentic representation of participants' ideas. Finally, I will review the data to determine if the data contains unexpected findings.

Trustworthiness

A certain degree of trust should be the assurance of qualitative research. To ensure trustworthiness in qualitative research, truth value should be evident; the findings should have applicability and consistency if the study is replicated under similar circumstances, and neutrality should be apparent. Researchers' biases, motivations, interests, and perspectives should not influence outcomes (Lincoln & Guba, 1985). Lincoln and Guba (1885) identify four criteria for achieving trustworthiness: (a)

credibility, (b) transferability, (c) dependability, and confirmability (Lincoln & Guba, 1985). Consumers of qualitative research should not be skeptical about the methods and results of the studies.

Credibility

Credibility is the researcher's ability to account for all of the complexities in a study (Ravitch & Carl, 2016). One way to ensure credibility is to ensure that the chosen interview participants know the research issues (Lincoln & Gubar, 1985; Rubin & Rubin, 2012). The participants for this study will be faculty at a higher educational institution using Moodle LMS for online teaching and can provide answers to the research questions. Rubin and Rubin (2012) cautioned that participants speak accurately about their experiences. The questions will be non-threatening. The interview protocol had enough overlapping questions to allow for consistency checks. Additionally, the participants had a copy of the interview transcription to review for accuracy before data analysis began.

Transferability

The degree of transferability is a direct function of the similarity between two contexts" (Lincoln & Guba, 1985, p.124). There should be sufficient information about contexts, and there should be congruence between one context and another. After each interview, I will record codes that occurred and monitor for data saturation (Guest et al., 2006). Transferability will be strengthened with detailed, thick descriptions and maximum variation of participants to generalize the results to similar contexts (Creswell & Poth, 2018). To ensure transferability, it is vital to share details on how the study was

conducted, the context, participants' descriptions, data collection methods, periods, and limitations. I will provide information on this study, including possible rules, to ensure transferability to other institutions. By documenting the findings, sharing insights, and providing the reasoning behind conclusions and analysis, I will increase the trustworthiness of my findings.

Dependability

"Dependability refers to the stability of the data" (Ravitch & Carl, 2016, p. 189), which means there is evidence of consistency in data collection and reporting. Qualitative research should be consistent and stable over time, demonstrating that the data collection method is reasonable and that the collected data answers the research questions (Ravitch & Carl, 2016). My study's interview questions (see Appendix D) are aligned with the research questions and are designed to obtain detailed descriptive data. In addition, I will use memos and peer checks throughout the study to note researcher bias. "A solid research design is key to dependability" (Ravitch and Carl, 2016, p. 189).

Confirmability

Confirmability requires that other informed researchers come to the same conclusions when examining the same qualitative data (Babbie, 2017; Lincoln & Gubar, 1985). A confirmability audit and reconciliation of the researchers' journal will ensure confirmability. Collaborating with peers to review the data and findings is one strategy that will ensure confirmability. I will also collaborate with my chair and committee members to discuss and receive feedback on the processes and methods used.

Ethical Procedures

The Walden University Institutional Review Board (IRB) approval will be required and obtained before participant recruitment or data gathering. I included the IRB approval number 03-14-23-0738754 on the consent forms. Recruiting guidelines clearly described the research topic, and I provided all participants with an informed consent letter to make them aware of their rights and participation requirements. I did not study my subordinates and reminded participants that they were free to refuse participation at any time or withdraw from the study.

I used pseudonyms instead of actual names to protect participants' identities and eliminate potential research bias, and I also created semi-structured interview questions and probes. I remained consistent during the interview and data collection process. I informed participants that I would store all data in a password-protected computer, and hard copies would be locked in a cabinet for five years at the researcher's home. After that, I will destroy the data to comply with Walden University's IRB policy. To ensure internal and external transparency, a researcher must disclose the limitations when sharing the results (Ravitch & Carl, 2016). I assured participants that any information gathered through the study would remain confidential. Ethical considerations included IRB approval of participants and data protection procedures (Appendix J).

Summary

This section described the study methodology. The topics discussed explained the research design and rationale for the study, the researcher's role, process, participant selection, instrumentation, data collection, data analysis, trustworthiness, and ethical

procedures. I conducted qualitative research with higher education Faculty who used Moodle LMS for at least one year. I used in-depth semi-structured interviews for data gathering. Data analysis involved manual analysis. Trustworthiness issues were addressed to ensure credibility, transferability, dependability, and confirmability.

Chapter 4: Results

I explored faculty perceptions of using Moodle LMS within the social sciences departments at a Caribbean university in Guyana to determine reasons for faculty hesitation of use Moodle LMS. I explored how their views aligned with the tenets of Rogers' (2003) DIT. Chapter 4 includes the study's setting, a description of the participants, and the data collection and analysis processes. Finally, I discuss the evidence of trustworthiness, including credibility, transferability, dependability, and confirmability. The following research question guided my data collection and analysis:

RQ: How do faculty perspectives on hesitation to use the university's Moodle LMS in the Faculty of Social Sciences at a Caribbean university in Guyana reflect the tenets of Rogers' DIT?

Setting

I conducted this study at a Caribbean university in Guyana, with population of over 10,000 students and 1,000 staff members. This university offers undergraduate and graduate programs. English is the language of formal discourse, but students and lecturers often speak mutually intelligible Caribbean English (see Smith, 2013), and participants did not always use Standard English sentence structures. Zoom transcribing did not recognize some phrases. However, as the varieties of English are generally understandable, I re-read and edited for sentence construction and clarity. I conducted member checking to minimize transcription error.

Data Collection

After receiving research study approval from IRB: approval number 03-14-23-0738754, I began the data collection process the same week by emailing all 64 full-time faculty members seeking volunteers to participate in my study. They all met the criteria of being full-time lecturers at the university and using Moodle LMS to deliver instruction for at least 1 year. The consent form and recruitment email contained my Walden University email and phone number (Appendix B). Participants emailed me if they were interested in participating in the study. An introductory briefing (Appendix D) provided participants with a background of the research and its purpose.

The Walden University Consent Form provided information about the interview procedures, the voluntary nature of the study, the risks and benefits to participants, the protection of participants' privacy, and contact information for Walden University. After participants replied by email saying, "I consent," I scheduled interview sessions, and volunteers responded to my Zoom link indicating they would participate in the recorded interview. I sent a reminder email 15 minutes before the interview sessions, and in three cases, rescheduling was necessary because of unforeseen circumstances. Of the 14 interested volunteers, 11 took part in the interview sessions via the Zoom platform. I achieved data saturation with the 11 interviews.

Interviews lasted from 45 minutes to 1e hour. I obtained transcripts for all interviews from Zoom, imported them into Microsoft Word, then began the preliminary coding process of transposing data to a Microsoft Excel spreadsheet. One week after the interviews, using emails, I asked P3, P5, and P8 follow-up questions to clarify their

answers regarding their use of Moodle's features. I conducted member checking with all participants using emails and made minor grammar adjustments.

Participants' Demographics

Eleven participants, lecturers from various departments in the Faculty of Social Sciences, comprised the sample. Below is a table that illustrates necessary participants' demographics. There is an alphanumeric code for each participant in column one. The second column indicates the department where participants use Moodle LMS for instructional delivery (see Table 3).

Table 3

Participants' Demographics

Participant code	Department
P1	Sociology
P2	Law
P3	Economics
P4	Sociology
P5	Government & International Affairs
P6	Sociology
P7	Sociology
P8	Government & International Affairs
P9	Law
P10	Communication Studies
P11	Government & International Affairs

Data Analysis

In this qualitative study, I gathered data on faculty perspectives on using Moodle LMS at a Caribbean university in Guyana. Addressing the task of extracting codes, I used

first-and second-cycle coding as advised by Saldana (2021). The first cycle coding involved the initial In Vivo coding of data. For second cycle coding, I refined the first cycle In Vivo codes and extracted patterns and categories. Also, following the advice of Saldana, I prepared and organized the data by extracting first cycle codes and creating analytic memos; the process involved five steps.

In Step 1, precoding the data, I read the transcripts and masked identities mentioned in the transcripts. I numbered the transcripts for identification purposes, P1 to P11, and inserted continuous line numbers for authentic referencing. With "meticulous attention to language" (see Saldaña, 2020, p. 15), I deleted repetitions. I read all transcripts deducing words and phrases related to the tenets of Rogers' DIT (2003): compatibility, complexity, relative advantage, trialability, observability, and social system factors. I then organized the data in a Microsoft Excel spreadsheet, which became my initial code book that determined data saturation. I organized the data in cells with headings of the interview questions, and characteristics of Rogers' DIT. First-cycle coding followed.

For Step 2, first-cycle coding, I read and interpreted raw data to identify codes relating to participants' use of Moodle LMS. Table 4 illustrates the various steps in the coding process (see Table 4).

Table 4

The Five-Step Coding Process

Coding	Procedures
1. Precoding:	Reading and masking identities mentioned in the transcript, numbering transcripts for identification purposes, inserting continuous line numbers for authentic referencing, deleting repetitions, and "meticulous attention to language and images" (Saldana, p. 15). Organizing data in cells with headings for the research question(s), interview questions, and theory guiding deductive coding.
2. First-cycle coding	*In Vivo* codes, descriptive codes, lumping and splitting the data, summarizing codes, comparing data sets, recognizing similarities and differences, and discovering what probes reveal.
3. Analytic Memos	This involved recording reflections, observations, inferences, insights, and pre-analysis.
4. Second-cycle coding	This involved eclectic coding, pattern coding across first cycle codes, creating categories, and pattern coding.
5. Theming the data	It involved displaying and diagramming the data focusing on emerging themes aligned with the Diffusion of Innovation theory (DIT) and answering the research question.

I extracted NVivo software codes for individual participants and individual questions. Following the advice of Saldaña (2020), the first-cycle coding involved making distinctions as I grouped and separated information, summarized codes, compared data sets, and discovered what probes revealed. I did three iterations of first-cycle coding to obtain familiarity with the data and codes.

Next, I prepared analytic memos. I recorded my reflections, observations, inferences, insights, and placed them as pre-analysis in a separate spreadsheet column. I wrote my reflections and questions. Essentially, these reflected researcher subjective opinions and biases. However, valid analytic memos helped me to be less biased

regarding participants who gave negative views on why they did not use the LMS at all. I realized that I was being affected by proinnovation bias (see Rogers, 2003).

For Step 4, second-cycle coding, I followed the advice of Saldaña (2020), who divided coding into two major cycles, first and second cycle coding, where the researcher cycles back and forth. I reconfigured the first-cycle spreadsheet combining data according to individual interview questions. I filtered the data, by retaining participants' identifications (P1 - P11) and working with eleven data cells for each interview question, consolidated codes, and conducted pattern coding. From this data, I then extracted categories and obtained emerging themes and sub-themes aligned with the DIT.

For Step 5, theming of the data, I added a left column to the existing second-cycle spreadsheet to accommodate my identification of "emerging patterns and categories" and inserted labels. The interrelated processes involved iterative recoding and code weaving using analytic memos to gain clarity. During the process, the analytic memos helped me eliminate subjective judgements. For example, I tried associating tones and moods relating to the voice data but soon realized that I was imposing my interpretation on the data. In my analytic memo's I then wrote questions reflecting my possible insights to avoid researcher bias. Finally, theming the data involved diagramming. I created figures displaying all the extracted categories aligned with six emerging themes from the DIT. Table 5 below shows an extract from the first cycle coding.

Table 5

Example of First Cycle Coding

Question & participant identifier	In vivo codes	Summarizing in vivo codes	Analytic memo
What are the benefits of using Moodle LMS to deliver instruction? **P1**	"For me, it [Moodle] acts as evidence recording that you have actually done the work. I would post the link to the Zoom recording so they can access it in Moodle. Or if I have information that I want to send out to them, I will send it through the Moodle system" There are many challenges with a face-to-face lecturer. For me to use Moodle, I have to find time to lecture to the students because there is the view that unless you are lecturing, you are not teaching".	Moodle is beneficial for recording, storing, and sharing information; keeping evidence that the lecturer did work as a retrieval system for students and as a repository for Zoom links.	Is this a justification for using Moodle? Note that all participants say that Moodle results in more work.
P2	"The benefits as I understand them are that you reach all the students and you can tell them what you want to tell them, put whatever you want to put there, any kind of information, any kind of handouts. It can work in the same way as giving handouts used to work in the days of printed paper. Another advantage might well be that the students are initiated into it, and they go there for anything pertaining to the course. So, it seems to be a good way of keeping contact and communication".	Moodle isa good way of keeping contact. It reaches all students remotely; it facilitates effective communication functional storage of information and students' benefit from the availability and accessibility of course material.	A participant identified benefits based on students' reports. Admits that Moodle is beneficial.

Results

In this section, I present the results of the data collected from 11 interviews with university faculty. I explored faculty perceptions of using Moodle LMS in the Faculty of Social Sciences at a Caribbean university in Guyana to determine reasons for faculty hesitation. I used a qualitative study with semistructured interviews. I aligned seven interview questions with the single research question and the conceptual framework, the DIT (Rogers, 2003). Table 6 shows the emerging themes aligned with respective DIT principles.

Table 6

Interview Questions & Emerging Themes

Interview questions	Emerging themes aligned with the DIT
1. (a) In which department do you teach? (b) How long have you been using Moodle? (c) What Moodle features do you use?	1. Participants' Moodle use aligned with the DIT principles: *Compatibility, Complexity, Trialability, Observability*
2. What are the benefits of using Moodle for delivering instruction? Is it better than what you used before?	2. Benefits of using Moodle reflecting the DIT's principle: *Relative Advantage*
3. How comfortable are you with using Moodle?	3. Moodle Use Comfort Levels reflecting the DIT principle: *Adopter Categories*
4. How do others influence your use of Moodle?	4. Social influencers: Colleagues, Students, Administrators/administration, Environment reflecting The DIT's –*Social System Factors*
5. What professional development and training may help you use Moodle?	5. Professional Development and Training. Reflecting the Innovation Decision Process and Social System Factors. (Rogers, 2003).
6. What other conditions may help you use Moodle more?	6. Enabling Conditions. The DIT- The Innovation Decision Process (Rogers, 2003).
7. What other comments would you like to share?	7. Data distributed among questions 1-6

I observed and selected patterns and sorted categories in the second coding cycle. I present the 195 categories in a new column of the second cycle coding and later in diagrams as I address respective themes. After obtaining categories for each survey question, reviewing them, and consolidating similar data, I identified six emerging themes and subthemes) corresponding with the interview schedule. Another table of subthemes facilitated meticulous identification and presentation of results of this study (see Table 7).

Table 7

Themes and Subthemes Extracted from Categories

Emerging Themes	Subthemes
1. Participants' Moodle use	Features used
	Adopter categories
2. Benefits of using Moodle	Advantages & disadvantages
	Online blended learning
	Relative advantage
3. Moodle comfort levels	Negative and positive views
	Increased workload
	Technology skills
	Innovators
	Resistance and change
4. Social influencers	Colleagues influencing LMS use
	Students influencing LMS use
	Administrators influencing LMS use
	Environment influencing LMS use
5. Professional development	Time constraints
	Relevant step-by-step training
	Adult learning styles
	Collective responsibility
6. Enabling conditions	Requiring expertise
	Policy matters
	Better tools and work environment

Theme 1: Moodle Features Used

The first interview question asked participants to indicate their department and length of experience using Moodle. Participants also indicated what Moodle features they used. Eight participants said they began using Moodle for teaching university students during the COVID-19 pandemic. Five participants (P1, P4, P7, P8, P9) had used an LMS previously as graduate students. One participant, P9, had gained experience while creating content for distance learning (DL) and had organized teaching content using Moodle blocks. Explaining, P9 said:

> Moodle is useful because we can teach asynchronously and synchronously. I do a full flash. Okay. I'm good. I use the Discussion Forum and the Assignment Box; I've used Quizzes. I use URLs to upload things such as files and folders. I create videos; I have a YouTube channel.

P4 said,

> I use Moodle for general teaching and setting Assignments. I also use the Forum post for my postgraduate class, and the students are into talking and writing a lot and expressing themselves. I use the breakout rooms; I use Zoom. So, there are still some things that I need to learn to do.

The data for this study revealed that ten participants used Zoom and the less complex features of Moodle to send out announcements and share materials. Ten participants avoided creating content using Moodle Blocks or Modules and did not use the Gradebook, the Forum feature, Assignments, nor Quizzes. P2 and P6 hesitated to use Moodle more than others. (See Table 8)

Table 8

Showing Faculty Moodle Use

Features of Moodle	P#1	P#2	P#3	P#4	P#5	P#6	P#7	P#8	P#9	P#10	P#11
Less complex tools											
1. Announcements	*		*	*	*		*	*	*	*	*
2. Zoom	*	*	*	*	*	*	*	*	*	*	*
3. Course Outline	*		*	*	*		*	*	*	*	*
4. Readings	*		*	*	*		*	*	*	*	*
More complex Tools											
5. Chat									*	*	
6. Quizzes				*							
7. Assignments	*			*							
8. Forum									*		
9. Content/Modules	*								*		
10. Turnitin				*					*	*	
11. PowerPoint				*					*	*	
12. Videos									*		
13. Gradebook											
Years using Moodle	10	0	3	3	3	0	2	2	9	3	3

P9 was the only participant using all the features with small classes. P9 shared that some groups are too large for Moodle teaching. In addition, P9 shared that Zoom is good because it provides live instruction like the pre-COVID-19 face-to-face synchronous teaching. P9 said. “Once I have a class because we operate online now, we use Zoom because that is how we meet.” P9 said. “Once I have a class because we operate online now, we use Zoom because that is how we meet.”

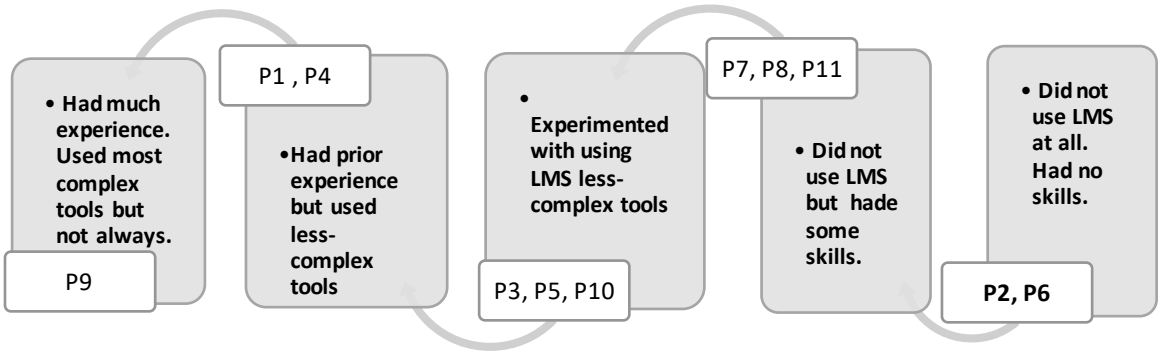
Adopter Categories

The results showed one of the 11 participants, P9, self-defined as very competent and used complex LMS features with small classes. Two participants, P1 and P4, had prior knowledge; they used Moodle LMS in a limited way as a repository for Zoom links

and sharing materials and may not be considered as part of the early majority as described by Rogers' (2003) DIT. Three participants. P3, P5 and P10, experimented with complex LMS tools and may be described as part of the early majority. Three participants, P7, P8 and P11, who said they had the skills but did not use the LMS, may be classified as part of the late majority. Two participants, P2 and P6, did not use Moodle at all and can be identified as laggards according to Rogers' DIT. Participants' levels of hesitation to use Moodle varied ranging from use to nonuse (see Figure 4).

Figure 4

Faculty Levels of Moodle Use



Note: This figure illustrates from left to right the possible adopter categories for 11 study participants.

Theme 2: Benefits of Using Moodle

Advantages & Disadvantages

The second interview question asked participants about the benefits of Moodle and whether the LMS was better than what they were using before Moodle. All participants agreed that Moodle was beneficial for facilitating and delivering instruction.

P2 said: “The benefits as I understand them are that you reach all the students and you can tell them what you want to tell them, put whatever you want to put there, any kind of information, any kind of handouts, it can work in the same way as giving handouts used to work in the days of printed paper.”

P7 said, “The easiest benefit was that the students didn't necessarily have to come to the live class.” In addition, P1 shared, “Moodle mostly provided evidence that I have taught the work, and students go back from time to time and cross-check what was being done.” Similarly, P4 acknowledged that Moodle, “could be used as an accountability tool so that no student can say you did not teach.” Students benefitted from the availability and accessibility of course material.” All eleven participants agreed that Moodle was beneficial for faculty and students.

Online Blended Learning

While addressing the benefits of Moodle, some respondents conflated Moodle with Zoom indicating that they use blended learning. For example, P7 said, “All the time, I’m responding to you. I’m like blending Moodle with the Zoom lecture. But I’m trying to keep it separate, right.” P4 also referred to Moodle as Zoom, saying: “I use it [Moodle] for a general teaching post in my lesson plan and for setting assignments. I use the breakout rooms; I use *Zoom*.” P9 also described the benefits of online blended learning:

> One of the main benefits is that it is very supportive of time. It’s convenient because people can access it. More students and lecturers can access it whenever they are ready or at their scheduled times; it's convenient in the sense that you

> know we do not always have to meet face-to-face, and we don't have to spend the extra dollar.

Using Moodle LMS and Zoom videoconferencing for blended learning allowed students and faculty to work remotely at any time and in any place using various online platforms the internet. P11 said, “I think it's convenient. I can send a notice to the entire class without having to, you know, send the notice to individual people. Yes, yeah, I just. I just put out an announcement, and it goes. I record sessions in Zoom and then upload it to the Moodle. So, I just teach the class as I normally would.” P9 said:

> For another class, I put them into the Zoom Rooms, and I made them read the content instead of me talking. I made them read it, and then move back and talk about it. So, I would use one session for those kinds of activities, and then the other session I'd use for a synchronous activity, so it allows them to read a chapter, or I'll ask them to put something in the discussion Forum, or something like that.

Relative Advantage

When asked whether Moodle was better than what faculty used previously, faculty members avoided comparing but shared that each platform had advantages. Probed about whether Moodle was better than what faculty used before, P3 said: “I think it comes down to a question of whether I think Moodle is better than the traditional chalk-and-talk method. P8 said: “I don't know if that's a fair comparison, because before you were face-to-face. In my opinion, I prefer the face-to-face interaction. We were forced to

use Moodle because of the pandemic. But I would say that it's a good resource to use and it has its own advantages.

Similarly, P3 shared: “Quite frankly I prefer the face-to-face method”. P4 explained: “Students need pastoral care and emotional support, especially since COVID has enforced social distancing. Students experience abuse. Moodle does not allow such care. Students want to relate to lecturers in person. Students need the teacher's physical presence. When doing presentations, I say, I would much prefer to see you, you know.”

Another participant, P5, said, “I don’t want to compare Moodle with face-to-face because I truly believe that there has to be some amount of face-to-face, even if you are using Moodle.” P8 said, “I prefer face-to-face interaction. We were forced to use Moodle because of the pandemic. But I would say that it's a good resource to use; it has its advantages. I think the benefit of Zoom is that students can use it anywhere. But, I prefer the face-to-face class where I can interact and see my students. Zoom doesn't allow me to do that.” These views reveal that Zoom was the preferred mode and as such maintained the relative advantage.

Theme 3: Moodle Use Comfort Levels

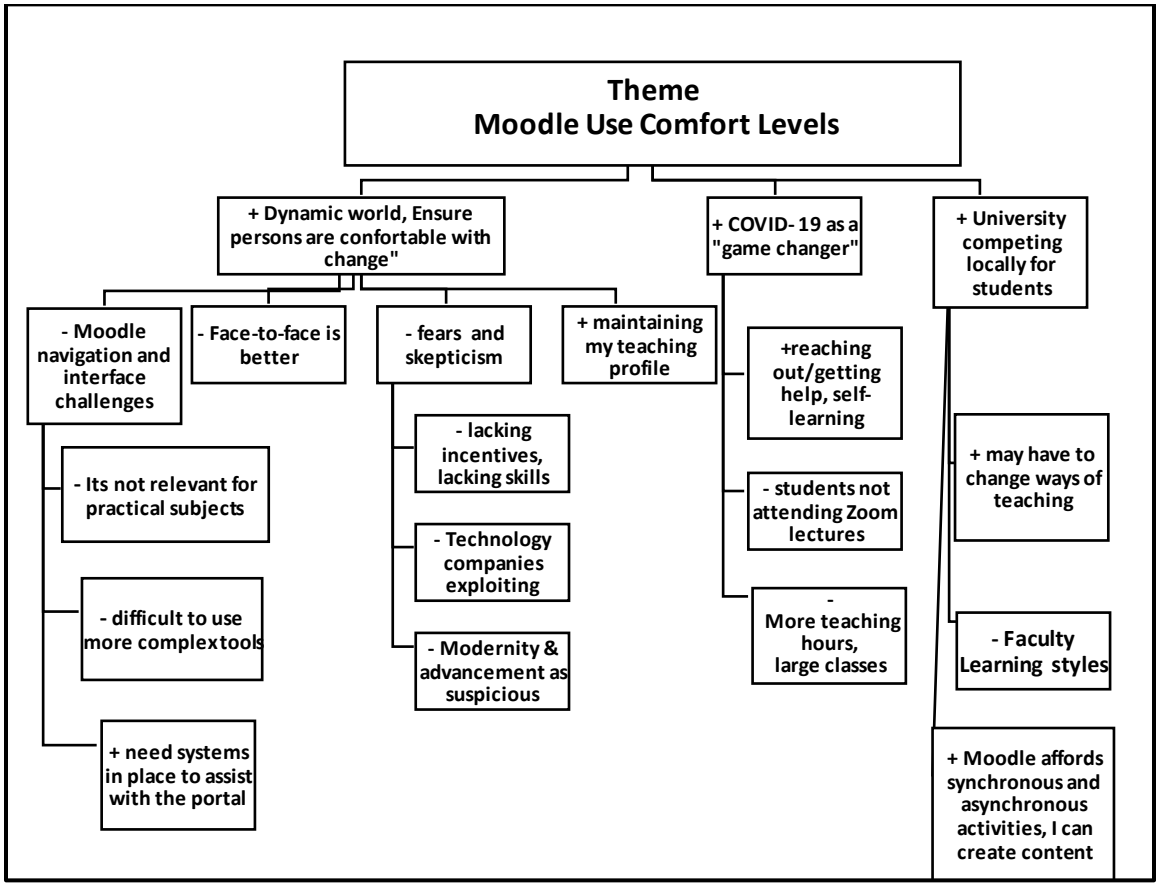
Negative and Positive Views

Question three asked participants how comfortable they were using Moodle LMS? On a positive note, P9 shared that “Moodle affords synchronous and asynchronous activities; I can create content. I enjoy working with Moodle. I have my own YouTube Channel. So, I might have a video that I might link to the page, or I might use other videos.” P9 also said, “I don't know if anything is challenging because I like to use

Moodle." P9's perspectives are a reference point for positive perspectives about Moodle use. P9 is a non-confirming, discrepant case. P9 confidently uses Moodle for delivering instruction to small classes. Figure 4 below organizes the various categories related to the salient theme: "Faculty Comfort Levels".

Figure 4

Categories Describing Faculty Comfort Levels



Note: This figure shows the positive (+) and negative (-) categories extracted from participants' In Vivo codes that informed theme three, "Comfort Levels."

Ten of eleven participants discussing their comfort levels said they experienced challenges with the Moodle interface; navigating to locate submitted assignments was

frustrating. P10 shared that navigating to find submitted assignments was challenging and took too much time. All participants said the Turnitin Software for detecting plagiarism had limitations. Moodle LMS system issues contributed to faculty hesitation to use the LMS for instructional delivery.

Increased Workload

All participants shared that Moodle use resulted in more work. Commenting on the increased workload, P3 said, "Online requires more planning and preparation. You need to get the materials to put on the platform. You need to research the material. It's like everything is a lot of work." Similarly, P1 shared:

> You would have prepared all these things before. Then you suffer burnout. If we have a system where somebody could prepare the lessons and the outlines and they upload it, that would be fine. I will be a facilitator of learning. I won't have to be teaching anymore. Because they will go through these things, I will facilitate the process of clarification, application, or whatever for the student. It should be a more student-centered learning platform.

P1, P3, P5, and P8 shared that students came to virtual classes unprepared or were often absent. Elaborating P1 continued:

> I'm probably in the old mode where I write lesson plans and then transfer that to the teaching platform. And then some students are saying you don't give us PowerPoint. So, I must take these lesson plans and turn them into a PowerPoint format, and I can't even send them to students telling them to look at it, and then when you come, we will talk about it. Students come unprepared. I would rather

have the lesson plan in my book and come to you. We will have a Zoom session, and I will have an interaction.

Technology Skills,

Weak technology skills also caused faculty hesitation to use Moodle LMS. The results of this study reveal that ten participants said they needed better educational technology skills. P5 said, "I am not very comfortable yet. I still reach out a lot for help. Well, I think my problem is technology. Could you imagine even something simple as putting general information on Moodle I found challenging?" P2, who had no technology skills, said, "Faculty are prevented from doing the things they used to do with pen and paper. I do not find some of these things [educational technology] faster. I would sit down and compose and mark faster than the electronic systems."

Resistance to Change

The results of this study reveal that resistance to change contributed to faculty hesitation to use Moodle LMS. P2 and P6 admitted that adapting to change was very difficult. P2 said: "I'm ashamed to say I have not used it. But the other lecturer I work with in teaching Law seems quite okay with putting things in Moodle for me." Those who were slow to adopt acknowledged having fears. P2 added: "The most crucial thing that caused it [faculty hesitation] was using the university email account. It did not go well when I first tried to use it."

P6 had different reasons for hesitating and said: "I went to some lecturers; there was a problem; some people didn't know how to use it at all, and those who knew would not share the skills." P6 added, "We must ensure that persons are comfortable with a

change. We, therefore, need to put steps in place to ensure that persons are comfortable." To illustrate, P6 spoke of a preference for hotel rooms on the ground floors or would "walk down the stairs" to alleviate claustrophobia and would not use elevators. P6 then suggested that "university administration can say - you know what man, we gonna send somebody to accompany you down anytime you want to come down. So, you'll get the support you need."

Other participants' provided reasons for their resistance to change. P5 said, "I was forced to use it," P3 said, "Quite frankly, I prefer the face-to-face method." P6 said, "Moodle should not be mandatory". P2 and P3 shared that COVID introduced all participants to mandatory Moodle use. With some ambivalence, P6 added: "The other side is that it's a dynamic world, and we are dealing with the need for change and the need for doing things differently, and therefore I agree that it [Moodle] is becoming a necessary tool. But I think, as in the case of vaccines, we have to be careful about making things too mandatory." P6 added that "I'm not a Luddite. But one of the things that Ludd's philosophy tends to resist is this notion of things becoming mandatory." All participants felt that faculty Moodle use should be voluntary instead of mandatory, and ten said they preferred face-to-face instructional delivery.

Theme 4: Social Influencers

Colleagues' Influencing LMS Use

Question four asked participants how colleagues, students, management, and the environment influenced their use of Moodle LMS. P1, P8, and P11 said colleagues did not influence their Moodle use at all. P2, P5, and P3 said they received help from

colleagues. P5 also shared, “One of the nice things about my colleagues is that we rally around each other using Moodle. So, if one person doesn't understand it, we call each other in our department.” P5 also received support from a relative who teaches in another faculty. P10 shared that on reaching out to a younger lecturer and a computer technician, help became available. A younger lecturer placed resources on Moodle for P2 and P7. P9 worked with Moodle independently and helped other faculty members.

Students Influencing LMS Use

Giving their views on how students influenced faculty Moodle use, nine of 11 participants said students did not influence their use. P2 shared, “Students ask why nothing is on Moodle. And I tell them, ok, I did not put anything on Moodle. Please look for your email messages because I have emailed you these things. I do not know if students do not check email or what, but that’s how I get around that. I'm not sure if students can influence me anymore to use it.” P2 said, “I have been into Zoom quite frequently without necessarily making the connection with and using Moodle.”

This evidence reveals that faculty hesitation in using Moodle LMS affected students negatively. P4 shared: “From the lens of an administrator, we still get complaints about faculty not posting information, not communicating with students, and the like.” Other participants shared that failing to consider student challenges invariably affected faculty LMS use. For example, P3 said, “We do not cater to students learning to use Moodle. We fail to consider students’ need for training. Students do not know how to use the features of Moodle.”

P3 introduced another perspective: “Sometimes students living in rural areas are disadvantaged and cannot access Moodle.” P1, P3, P5, and P9 shared similar views about students living away from towns and traveling long distances from home to access government-free wireless networking technology. “Sometimes setting cut-off limits for students’ submissions can be unfair for those without Wi-Fi or electricity,” P3 said.

Administrators’ Influencing LMS Use

When asked about the administration’s influence on Moodle use, P3 noted that administrators’ influence helped faculty use by providing access to Moodle and Zoom platforms. P5 said, “The administration has a strong influence.” P8 shared, “During COVID, administrators required that we use Moodle. They haven't given us an option, so we are mandated. Of course, there are other media we can use. Once you are staff, it allows you to sign in, and they give you a password and send you a link explaining how you should get into Moodle. So, in a way, they facilitate its use”.

P3 suggested that class sizes could be smaller. P5 spoke of having 100 students in one class, while P8 said, “I sometimes have over 200 students. [P7] had classes with more than a hundred students. P3 suggested that administrators could also make Moodle use attractive by providing incentives, “cash or otherwise.” P10 said, “I think the university can give a cash incentive.” P4 said, “Right now, I'm using one of the university’s laptops. We need something with more speed, with more stability. We could incentivize it. It does not have to be a monetary incentive.”

Despite the challenges of using Moodle LMS, some participants gave optimistic views. Recognizing the need to embrace innovative educational technology, P4 said:

"Wanting to maintain my teaching profile, I was forced to use it [Moodle]." Similarly, P1 said, "If the education trend is moving, I have to move with the trend. If I were teaching a fully online course, I would try to put discussions for students." P10 said, "We've got to change our teaching." P11 shared, "If lecturers could commit to using Moodle, the online teaching system would be more efficient." Sharing other optimistic views, P5 noted that LMS teaching opens avenues for collaboration with other universities. P4 shared that "We have students who sign up for online-only classes. Some of our courses are entirely online, and some are hybrid." P5 said, "COVID was a game-changer" and that the university has a policy for using Moodle as the preferred platform."

Environment Influencing LMS Use

Question 4 also elicited responses on how other environmental influencers affected faculty use of Moodle. P2 said, "It was COVID that introduced most of us to Moodle. Those social situations would have influenced my use. But because I have been getting along with using other things, the social situations have not caused me to go to Moodle." I do not think they are an influence on me. I think that if the Education trend is moving, I must move with the trend. So, if we have to integrate technology into teaching and learning, for me it is essential, and I need to know how to use it. It is not so much that it is a colleague or student making me use it. I feel that the education trend is changing and so I have to get on board."

Theme 5: Professional Development

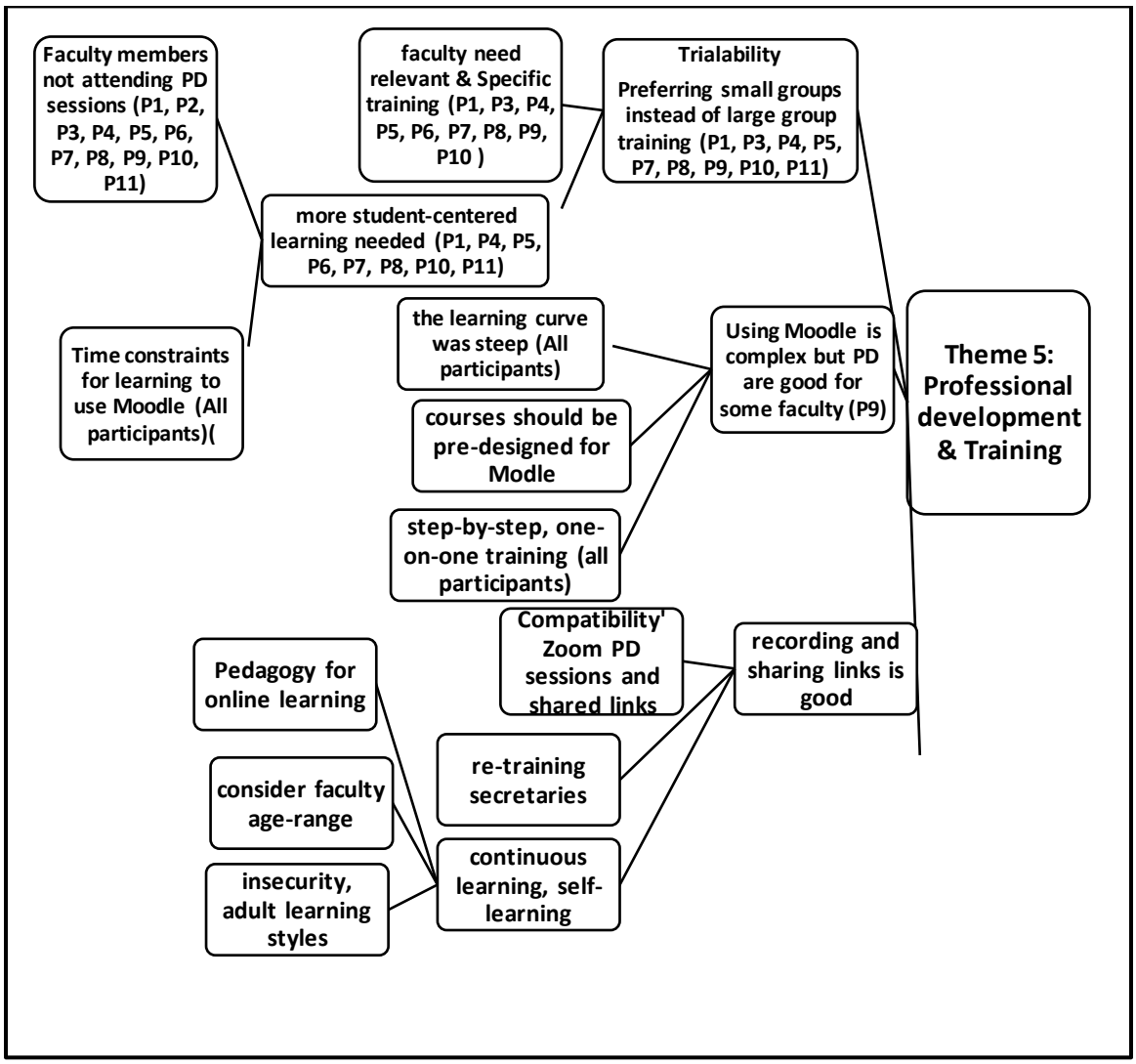
Time Constraints

Question five asked participants what professional development and training may help them fully utilize the Moodle LMS. Most participants noted that the university administration had provided virtual professional development sessions for all faculty members. P5 said, “We can’t complain at all about professional development and Moodle. P2 added, “Well, I want to believe the university has set up systems to teach people to use Moodle, but I just did not join.”

Conversely, P8 said, “I see them do training, but when you have classes, you can't attend. I've tried to access their training through the videos they send after, but they were so poorly done that I had to abort the mission.” Figure 5 shows the several categories relating to the theme “Professional Development”.

Figure 5

Categories Informing Theme 5, Professional Development



Note. This figure demonstrates the various categories extracted from the codes for interview Question 5.

Relevant Step-by-step Training

P5, who introduced a different perspective, said, “I kept all the videos for the classes that I missed, but I still prefer the one-on-one I would have when facilitators are going through stuff. I prefer the one-on-one, you know. P6 shared, there is one precedent that deals with the notion of each-one-teach-one. Persons who are fully trained experts in the field should work in the departments. The training could be ongoing.” P3 said, “We can do some one-on-one sessions.” Eleven participants mentioned needing step-by-step, one-on-one training sessions to improve faculty Moodle use. P1 also commented on the need for individual attention and said:

> Unless you have relevant or aligned training - so that when you show me this step, I can follow it - to me as an older person, I don’t find it easy. Teaching me things that I don't see the relevance of doesn’t make sense. If you give me some information on how to prepare a video or how to prepare the media and upload it to the platform. once I can see the relevance, I will go along with that kind of training.

Speaking of group training, P3 said: “Now, if you do a large group training, they're not getting the actual practice. People want this personal hands-on. P6 said, For me, it depends on the age range that you're dealing with. Otherwise, you will find yourself in a session where persons will not learn at the same rate. Persons may feel a trifle insecure. You got to come up with different strategies when dealing with adult learning. That is my caution.”

Adult Learning Styles

Regarding adult learning, P7 said she attended some PD sessions but found that: "They do not teach the way I learn. Let me tell you the way I learn new things. You will have to demonstrate it to me, and I have to write it down step by step. Then in my own time, I practice the steps repeatedly until it becomes a part of me." Conversely, P9, who is self-taught, said,

> The way some people learn, they need somebody to show them. So, I show them without realizing how advantageous it is for other colleagues. But in my case, I think I'm not that kind of person. If you show me, I can get confused. I have to get the videos and go and see for myself. Or, I have to look at the video and pause it for myself. Look at it very closely. If someone shows it to me, I might not learn it.

Collective Responsibility

P10 pointed out a need for a policy on modes of teaching and faculty workload because some classes were huge. University administrators drafted a policy during the COVID-19 pandemic, said P4, and it stated that lecturers must use Moodle for instructional delivery and avail themselves of ongoing professional development to use blended and online teaching in course delivery. Though this policy exists, faculty are uncertain of the modus operandi. P6 said, I think we are in a state of crisis, and I say this candidly."

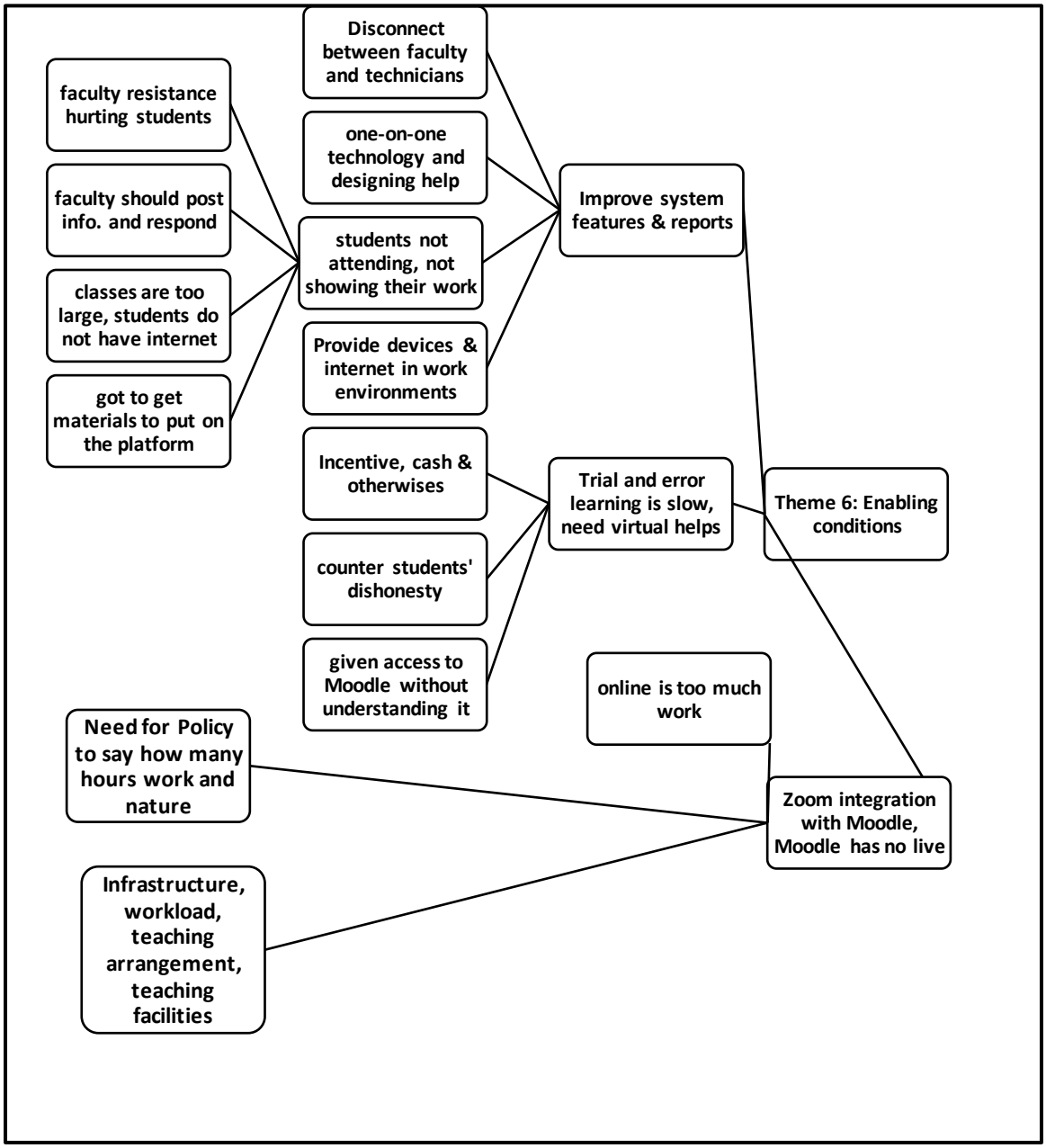
Theme 6: Enabling Conditions

Better Tools and Work Environment

In addition, most participants said they needed better technology devices and improved internet access. P6 also said virtual assistants should be available after regular working hours. P9 said: I think that the challenges might be related to software, or like the versions that our university chooses to use. Nine participants (P1, P3, P4, P5, P6, P7, P8, P9, P10) said the Learning Management System needed upgrading. P1 asked for improvement to the Moodle faculty alerts and reminders because lecturers were sometimes unaware of unmarked assignments. Searching for single submissions in Moodle presented problems. P10 found similar problems noting that faculty needed to return and thread through every assignment to locate some that needed marking. P9 and P10 shared that system upgrades would minimize faculty frustrations. Figure 6 illustrates the categories informing the theme, “Enabling conditions.”

Figure 6

Categories Informing Theme 6, "Enabling Conditions"



Note. This figure demonstrates the categories that emerged from participants In Vivo codes for interview question 6.

Another result from the data was faculty noted the need for improved teaching facilities. P3 said, “I want to emphasize more on technology needs. Some people don't even have a proper space that they could use.” Lecturers used personal devices, the internet, and private space in crowded homes. P10 said, “One student renting said the landlord would not allow her to install her internet. She could only use the landlord’s internet, which they share with others. The student could not access whatever you put on Moodle. For tests, she had to go where there was reliable internet service.”

In addition, P10 said, “As a faculty member, P2 also experienced internet connectivity issues. P2 said, “The service of the tech companies should do better. As a lecturer, I can’t be two weeks without the Internet. It doesn't make sense. The country realizes that and tries to put in services, but they got to do better. Some service providers are not serious about pushing affordable internet across the country.”

P9 shared concerns about faculty needing better work environments said:

> We have the Internet at home. Yes. But then sometimes your home is not even conducive kind of stuff of technology at work, right? Right like at the desk, not the desk, I mean, like a whole space where you have all these computers and software, and so on, that you could have access to regularly. That is high tech that, you know. You don't have to worry about black holes and all this stuff you have generators. You have all of these different things, but we don't have access to those things.

Requiring Expertise

Giving their views on conditions that may facilitate more faculty use of Moodle LMS, participants said they needed experts to assist them with using the platform. On the issue of needing experts, P3 also said: "The other thing about Moodle is that a certain generation of people has a difficulty, mostly older, with teaching using Moodle." P4 shared a similar view. She said, "We have a lot of older persons in the teaching, particularly within our faculty and departments. They are accustomed to the all-time classroom, chalk, and talk. They are not into online learning. Some professors and retired judges are accustomed to having an assistant. Another older colleague, an excellent lecturer, cannot grapple with Moodle." P3 said, "Those are critical people who need assistants for using Moodle. w to use it, my secretary can do it. It requires some amount of capacity building." P4 reiterated, "My only thinking is that we have to find ways of teaching some of our older lecturers or giving them an assistant."

Though P3 and P10 received some support from technicians, P1 said, "I have found, from my experience, that the people responsible for the computers have no idea about teaching and learning. Sometimes when you go to them, they can't teach you". Eight other participants share similar views. P6 said there was a need for "a pool of trainers" and thirty-minute departmental small group gatherings for individuals to show others what they have been able to do with Moodle." P6 shared: "there is one precedent that deals with the notion of each-one-teach-one."

Policy Matters

Another condition that contributed to faculty Moodle hesitation was students submitting plagiarized work. P1 observed that there was no firm determination on Turnitin use. Clarifying her point, P1 said, “I find people [students and administrators] do not want to accept the Turnitin percentage. So, it’s like you are always fighting.” In addition, P3, P4, P5, P7, P8, and P11 said many students did not attend Zoom classes. P3 added, "When you call for work, then you realize that they [students] were not doing their work. P4, an administrator, said, “Our lecturers don’t trust our students. There have been complaints about students cheating.” Maphosa et al (2022) found that the lack of digital skills, policies, devices, cost of data, and slow internet speed impacted negatively on Moodle adoption.

Identifying other discouraging conditions, P10 said, “We need better technical support. We need persons making videos. We need that kind of departmental technician to set up slides. We also need teaching support. Moodle teaching requires many hours of preparation and instruction. There should be a different arrangement. And that is why we need a policy.” Concerning the point of having a policy for technology use at the university, P4 shared that “UG has a policy for using Moodle as the preferred platform.”

The results of this qualitative study that explored faculty perceptions of using Moodle LMS in the Faculty of Social Sciences at a Caribbean university in Guyana to determine reasons for faculty hesitation are in-depth and informative, proving that qualitative data provides a better understanding of the problem of faculty hesitation to use LMSs. I used qualitative study with semi-structured interviews. I aligned seven interview

questions with the single research question and the conceptual framework, the DIT (Rogers, 2005). I observed and selected patterns and sorted categories in the second coding cycle.

Evidence of Trustworthiness

Lincoln and Guba (1985) identified four criteria for achieving trustworthiness: (a) credibility, (b) transferability, (c) dependability, and confirmability. To ensure trustworthiness in qualitative research, truth value should be evident; the findings should have applicability and consistency if the study is replicated under similar circumstances, and neutrality should be apparent. Researchers' biases, motivations, interests, and perspectives did not influence outcomes. In this research, I accounted for the complexities in the study by ensuring participants had used Moodle LMS at a higher educational institution for at least one year. Participants were, therefore, familiar with the problem faculty hesitation to use Moodle LMS. The questions of the survey were non-threatening. The interview protocol had enough overlapping questions to allow for consistency checks.

Additionally, I shared copies of individual interview transcripts so participants could review them for accuracy before the data analysis began. I conducted random sampling, interviews, and recorded codes, and monitored for data saturation. I collected detailed, rich descriptions to obtain maximum participant variation that would help generalize the results to similar contexts (Creswell & Poth, 2018). I provided information on the length of interviews, sharing details on how I conducted the study, the context, participants' descriptions, data collection methods, and limitations. By documenting the

findings, sharing insights, and providing the reasoning behind conclusions and analysis, I increased the trustworthiness of my findings. The data collection method is reasonable and answers the research question, ensuring consistency, stability, and dependability (Ravitch & Carl, 2016).

Summary

In Chapter Four, I reviewed the data analysis for this study. This study explored faculty perceptions of using Moodle LMS in the Faculty of Social Sciences at a Caribbean university in Guyana to determine reasons for faculty hesitation. I described how I used purposive sampling to obtain 11 participants with whom I conducted semi-structured, one-on-one interviews. I explained my engagement with the data and how I used Saldana's (2018) coding methods to familiarize myself with the data, generate first and second-cycle codes, extract categories, search for and define themes, identify categories and emerging six themes aligned with six interview questions using Rogers' diffusion of innovation theory (2003). In Chapter 5, I review my interpretation of the results and limitations of the study with implications and recommendations on what implications the findings of this research have for social change. I also explain how this research's findings can help higher education faculty confidently and competently use Learning Management Systems for delivering blended learning.

Chapter 5: Discussion, Conclusions, and Recommendations

In this qualitative research I aimed to explore faculty perceptions of using Moodle LMS in the Faculty of Social Sciences at a Caribbean university in Guyana to determine reasons for faculty hesitation. I gathered data using the Zoom videoconferencing platform to conduct one-on-one semistructured interviews. This qualitative design allowed faculty members at a Caribbean university in Guyana to describe their perceptions of using Moodle LMS to deliver instruction. Participants' responses provided rich information for data analysis. The findings of this research reveal that faculty hesitation to use Moodle LMS is a complex phenomenon. These qualitative results help us better understand faculty members' hesitation to use LMSs.

Interpretation of the Findings

Theme 1: Moodle Features Used

This theme was derived from the category "Moodle Use," and the data from the category defined participants as higher education faculty working in various departments such as sociology, law, and international affairs. The stakeholders were faculty, students, administrators, and informational technology assistants. The DIT refers to the setting as a social system (Rogers, 2003). This setting illustrates the interrelationship between social system members implementing Moodle's use for teaching. Ten participants described their hesitation to use Moodle LMS for instructional delivery throughout the data. Nevertheless, all 11 admitted they used Zoom videoconferencing to teach undergraduate students because it simulated face-to-face teaching. A single participant, P9, used the more complex features of Moodle LMS to teach small classes. According to the DIT's

adopter categories, P9 would be an innovator, two could be classified as early adopters, three in the early majority, three were in the late majority, and two were laggards, confirming the DIT's position that only a few will use innovative technologies early.

This finding that most faculty used the less complex LMS tools also corresponded to the literature. Bryson and Andres (2020) found that it was easier for faculty to use LMSs as a repository for delivering instruction during the COVID-19 pandemic. Washington (2019) found that instructors "used the LMS as a course management and administrative tool rather than pedagogical for transforming face-to-face courses" (p. 257). Further, the DIT theory suggests that technology use is a complex process determined by the low or high level of technical expertise required. (Rogers, 2003). Reporting on a national survey of schools adopting educational innovations, Rogers (2003) said, "fifty-six percent of the adopters implemented only selected aspects of an innovation" (p. 182). The findings of this study corroborate those of the DIT, which says approximately 2.5% of potential technology adopters will be innovators; the others will adopt later.

The data also revealed that psychological factors accounted for faculty hesitation to use Moodle LMS. For P2, it was the fear and frustration of using the university's email to access Moodle, but P6 experienced rebuff when he requested help from colleagues. P6's experience was in keeping with the DIT's position that. "An individual seeks innovation evaluation information to reduce uncertainty about an innovation's unexpected consequence" (Rogers, 2003, p. 21).

P6 also raised the issue of "manufacturers exploiting" higher education institutions, selling "every piece of technology" to gain market shares. P6 also said, "People will be forced to return to the good old-fashioned face-to-face". This evidence reveals faculty members' fear of the failure of technology-assisted teaching. Findings regarding the fear of technology are consistent with the literature where Sinclair and Aho (2018) noted that barriers such as "fear of the technology and apprehension concerning negative effects of adoption are still widespread" (p. 158).

Adopter Categories

The findings regarding Theme 1 described five possible ranges of faculty hesitation corresponding with the DIT's characterization of adopters as either innovators, early adopters, early majority, late majority, or laggards. An estimated 16% of the potential adopters in a social system (Rogers, 2003, p. 281) will use innovative technology early; the remaining 84% will use the technology later. According to the findings of this study, P9 is an innovator, and P4 f is possibly an early adopter. The other eight participants are among the late majority. P2 and P6 are laggards. Participants' levels of hesitation to use Moodle varied from use to non-use. Faculty hesitation corresponded with the rate of adoption according to Roger's DIT. There were fewer innovators and early adopters. Previous experience did not always result in LMS use. Other factors preventing faculty use were a lack of technology skills, training, and devices.

Theme 2: Benefits of Using Moodle

Advantages & Disadvantages

All participants agreed that Moodle was beneficial for facilitating and delivering instruction. For example, P7 said students benefitted from the "availability and accessibility of course material." Virtual teaching and learning were advantageous: "Students didn't necessarily have to come to the live class." This finding is like those of Bryson and Andres (2020), who found that Moodle, Canvas, and Microsoft Teams facilitated asynchronous and synchronous activities and benefitted students and faculty.

In addition, P1 shared, "Moodle mostly provided evidence that I have taught the work, and students go back from time to time and cross-check what was being done." Moodle "could be an accountability tool so that no student can say you did not teach." These perspectives corroborate the findings of Turnbull et al. (2021), who found that LMSs help track learners' progress and improve communication between educators and students. Pelletier et al. (2022) found that LMSs helped faculty manage student cases and predict student outcomes.

Online Blended Learning

Three types of online learning occurred: synchronous Zoom videoconferencing online learning, blended online learning, and fully asynchronous delivery using LMSs. According to the data, nine participants used a blend of Zoom and Moodle, with the LMS as a repository. This finding is consistent with the literature. Smith and Haughton (2021) also found that instructors at the University of West Indies used a blend of Zoom and Microsoft PowerPoint slides during the pandemic. Similarly, at a South African

university, Mpungose (2021) found that faculty used the Zoom chat room and the LMS discussion forums as a supplement to facilitate dialogue after or before content delivery. The learning curve was steep as faculty grappled with Canvas, Moodle, and Microsoft Teams to deliver online blended learning (Bryson & Andres, 2020). If faculty hesitation decreases, faculty and students could benefit from the LMS.

Relative Advantage

Evidence of faculty using multiple platforms draws attention to Rogers' (2003) discussion on how relative advantage influences technology adoption. Rogers defined relative advantage as the extent to which users perceive an innovation "as being better than the idea it supersedes" (p. 229). When asked whether Moodle was better than the teaching methods they used before, most faculty members avoided comparing but shared that each platform had advantages. When probed whether Moodle was better than what faculty had used before, most participants admitted that Zoom was better for achieving instructional objectives.

Since all 11 participants used the Zoom platform to deliver instruction, this platform Zoom had a comparative advantage because it allowed participants to simulate face-to-face teaching. Zoom use was primary; Moodle was secondary. Such data confirmed the DIT's position: "It does not matter so much whether an innovation has a great deal of objective advantage. What does matter is whether an individual perceives the innovation as advantageous" (Rogers, 2003, p. 15).

Zoom videoconferencing proved to be a more beneficial option. P9 shared,

> One of the main benefits is that it [Moodle] is very supportive of time. It's convenient because people can access it. More students and lecturers can access it whenever they are ready or at their scheduled times; it's convenient because you know we do not always have to meet face-to-face, and we don't have to spend the extra dollars on travel.

P4 said, "Moodle provides convenient access for students anywhere and anytime. They can work and study. Moodle is good because attending to family does not prevent studies." This finding confirms the DIT, which says that convenience and personal satisfaction could hamper the adoption of technology (Rogers, 2003).

There is an expectation that all potential adopters will agree and use the new technology, but Rogers (2003) criticized this expectation since it reveals a proinnovation bias (p. 106). Proinnovation bias "is the implication that an innovation should be diffused and adopted by all members of a social system, that it should be diffused more rapidly, and that the innovation should be neither re-invented nor be rejected" (Rogers, 2003, p. 106). Further, Rogers advised that even when new technologies have apparent benefits, they "are not always diffused and adopted rapidly (p. 106)." Although adopting LMSs was beneficial Zoom Videoconferencing was an attractive alternative that provided "synchronous communication for teaching and learning by transmitting video and audio . . . among geographically dispersed participants (students and teachers)" (Mpungose, 2021, p. 1).

Participants of this study agreed that they used Zoom more because it affords synchronous teaching. For example, P3 said, "It is not like we use Moodle to teach, you

know, as opposed to Zoom. I teach using Zoom but post materials and discussion on Moodle, making it accessible to the students." Faculty explored all forms of video-conferencing platforms in addition to the Moodle platform facilitating blended learning. Nevertheless, P11 echoed the views of all other participants, saying,

> I think Moodle is a good platform. And I think that if lecturers could commit to using Moodle, the whole online teaching system would be more efficient. For example, it would be advantageous if we could use the various features.

Theme 3: Moodle Use Comfort Levels

The DIT identifies five characteristics associated with new technology users. Complexity, relative advantage, and compatibility significantly influence users' satisfaction with adopting technologies (Rogers, 2003). Complexity refers to how easy or difficult it is to use LMSs; relative advantage is the comparative advantage individuals experience when using one or another technology; compatibility is the degree to which users find a good fit with using the new technology. Trialability and observability are interrelated principles that address users experimenting with technology, providing evidential examples (Rogers, 2003). Participants' views during interviews reflect these DIT principles contributing to their Moodle satisfaction experience.

Increased Workload & New Roles

All participants said that Moodle use resulted in more work and additional faculty roles, which caused faculty hesitation to use the LMS. As a solution, P1 suggested course designers should prepare the content since doing all the teaching preparation and loading it to the LMS causes faculty "to suffer burnout." P3 said, "It [teaching with Moodle]

requires research. It's like everything, a lot of work. After online teaching, you need to give regular assessment feedback sessions during the discussion." P1, P3, P4, P5, P7, P8, P9, P10, and P11 also argued that their new faculty roles were challenging. P3 said, "I think the faculty's role has changed. You see, you were lecturing face-to-face, but with online, you are facilitating." Resisting the new role, P1 said", I'm probably in the old mode where I write lesson plans and then transfer that to the teaching platform."

Nevertheless, P1 said that transferring the lesson to the Moodle platform is not the solution since

> Some students are saying you don't give us PowerPoint. So, I have to take these lesson plans and turn them into a PowerPoint format, and I can't even send them to students telling them to look at it, and then when you come, we will talk about it. Students come unprepared. I would rather have the lesson plan in my book and come to you. We will have a Zoom session, and I will have an interaction.

These perspectives on faculty discomfort with workload and new roles correspond with findings in the literature. For example, Bryson and Andres (2020) found that during COVID-19, "the shift transformed the role of the instructor from teacher to guide, facilitator, stimulator, encourager, or conductor, but in the context of ensuring effective interactions between students and instructors" (p. 615). Similarly, regarding the findings on increased workload, Elangovan et al. (2021) noted that faculty adopting new learning technologies needed to demonstrate significant faculty commitment. P1, P3, P5, and P8 observed that students came to virtual classes unprepared or were often absent. The literature confirms students' unpreparedness and absence. Still, Bryson and Andres found

that this resulted because “Students missed being on campus and being able to engage in proximate learning encounters” (Bryson & Andres, 2020, p. 621). Nevertheless, Bryson and Andres noted that online learning requires students to practice stronger self-discipline.

Weak Technology Skills

Weak technology skills were another factor causing faculty hesitation to use Moodle LMS. The results of this study reveal that 10 participants said they needed better educational technology skills. Participants’ admission of their lack of technology skills is consistent with the findings of George (2012), who reported that after benefitting from training at five Caribbean universities: “Except for the early adopters, who [were] already enthusiastic,” the other participants were doubtful and skeptical, “especially if they were not tech savvy” (George, 2021, p. 68).

Considering the difficulty some faculty experienced with transitioning to LMS use, Bryson and Andre (2020) proposed a need for improvisation and curation that will facilitate the rapid adoption of LMS in higher education, "The shift to online teaching requires adaptation in teaching practices” (Bryson & Andres, 2020, p. 609), where faculty who have mastered the skills do the following: (a) reflect on improvised practice, (b) reach out to help others, and (c) provide the narrative to aid student navigation and engagement. “Do not replicate face-to-face classroom practice” (Bryson & Andres, 2020, p. 609). Have others design and assemble manageable modules with learning outcomes aligned with content and evaluation,

Negative and Positive Views

While 10 of the 11 participants provided negative views regarding their comfort levels with Moodle use, P9's comments were optimistic. P9 shared,

> Faculty members need somebody to show them. So, I do it without realizing how advantageous it is for other colleagues. Somebody says I'm not getting through with this thing. And most times, I help because I'm a course coordinator. I go on video quickly and show them how to do it."

P9 was a discrepant case and self-defined as using knowledge and skills for extensive LMS use with small classes. P9's observations are beneficial for the results of this research, indicating what can solve the problem of faculty hesitation to use LMSs.

The suggestion is for a Caribbean university in Guyana to take positive steps to build capacity by identifying and incentivizing more course coordinators with requisite expertise and leadership skills in using Moodle LMS to provide valuable in-person help for faculty members who hesitate to use Moodle LMS. P9's self-identification is important for understanding not only the reasons for faculty hesitation to use the LMS but also important as it provides a solution to the problem of faculty hesitation to use LMSs. P9 fulfills the requirements detailed in the DIT for innovators who are essentially change agents.

Innovators

P9's role aligns with an innovator described in the DIT as among the first to use and is very comfortable using the new technology. Innovators create opinions and are inclined to propel new trends. They have "the highest degree of opinion leadership in

most systems [and] potential adopters look to early adopters for advice and information about an innovation" (Rogers, 2003, p. 283). Innovators/early adopters decrease the uncertainty about the new technology and function as types of change agents (Rogers, 2003). Early adopters "earn the respect of colleagues, maintaining a central position" in the social system (p. 283). Based on the DIT's adopter categories, P9 will likely be the technology user who removes doubt, alleviates fears, and lowers the threshold of faculty hesitation to use Moodle LMS.

The finding of this study shows that P9 had an advantage because she had designed modules for DL, which is essentially the solution Bryson and Andres (2020) validated. P9, an innovator within the faculty of Social Sciences at a Caribbean university in Guyana, illustrated the solution to faculty hesitation to use Moodle LMS. Coordinators as leaders, with oversight for specific courses taught, will provide the necessary one-on-one, step-by-step guidance. Furthermore, Bryson and Andres found that mentors focus on aligning learning outcomes with content in modules and provide all narrative to aid student navigation, understanding, and engagement. The pedagogy for LMS teaching is about learning through experience and proactive improvisation (Bryson & Andres, 2020).

Resistance to Change

The results of this study reveal that resistance to change contributed to faculty hesitation to use Moodle LMS. P2 and P6 admitted that adapting to change was very difficult. P2 said: "I'm ashamed to say I have not used it." When probed about whether standing and delivering modes of teaching restrict faculty Moodle use, P1 said, "I don't think like that. I'm not opposed to modernity. I'm not opposed to change when the

change is for the better or when the change is for our advantage. I have a problem with change for change sake. I'm quite willing to learn new things, and I have adapted to electronic systems, and I have seen where they are advantageous in many cases. So, when it comes to methods of delivering lectures, I don't have a problem with that. I can adapt." P6 said, "We must ensure that persons are comfortable with a change. We, therefore, need to put steps in place to ensure that persons are comfortable." P6 then suggested that "university could help make faculty comfortable with change."

This finding confirms that resistance to change is normal. "Diffusion, according to Rogers (2003), is a kind of "social change . . . a process by which alteration occurs in the structure and function of a social system. Social change occurs when new ideas are invented, diffused, and adopted or rejected, leading to certain consequences" (Rogers, 2003, p. 6). How can the administration help? Administrators should try to ensure faculty buy-in in diffusing and using Moodle LMSs. Administrators need to galvanize more faculty awareness of the draft policy on professional development for LMS use. Having a written policy is good, but knowledge awareness and discussions on this policy at every level of the organizational hierarchy will contribute to bottom-level stakeholders such as coordinators, heads of departments, faculty members, and students having a vested interest in realizing the LMS use policy.

Darling-Hammond et al. (2017) endorsed the need for faculty transitional assistance in the literature; they found that: "coaching or other expert scaffolding can support the effective implementation of new tools" (p. 13). Expert coaches and teachers would help by working together, selecting specific instructional practices, showing

faculty the way, observing and eliciting practitioner feedback while supporting progress, and providing constructive coaching (Darling-Hammond et al., 2017).

Essential coaching and expert scaffolding will empower faculty and students, leading to the realization of The United Nations' Sustainable Development Goal #4, which speaks of ensuring inclusive and equitable quality education that promotes lifelong learning opportunities for all. Using LMSs for e-learning is a flexible pathway enabling the inclusion of learning for everyone and positive social change for administrators, faculty, and students. Rogers' DIT also emphasizes that transitions facilitating innovative technology use should be comfortable and compatible; lowering uncertainty levels improves the technology adoption rate (Rogers, 2003). The actions of the discrepant case, P9, in this study, indicate that essential coaching and expert scaffolding solve faculty hesitation to use LMSs.

Mandatory or Voluntary

Participants provided reasons for their resistance to change. P5 said, "I was forced to use it," P3 said, "Quite frankly, I prefer the face-to-face method." P6 said, "Moodle should not be mandatory." P2 and P3 shared that COVID-19 introduced all participants to mandatory Moodle use. The DIT affirms that less resistance to change will result in greater user compatibility with innovative technology. "Individuals cannot deal with the innovation except based on the familiar" and that the degree of compatibility "can either speed up or retard the rate of adoption (Rogers, 2003, p. 242). Individuals use their experience to judge new ideas. The DIT affirms that less resistance to change will result in greater user compatibility with innovative technology. Nevertheless, participants

shared the view that there was a need for faculty to adjust to change but allow faculty some choice in decision-making. With some ambivalence, P6 added: "The other side is that it's a dynamic world, and we are dealing with the need for change and the need for doing things differently, and therefore I agree that it [Moodle] is becoming a necessary tool. But as in the case of vaccines, we must be careful about making things too mandatory." All participants felt that faculty Moodle use should be voluntary instead of mandatory, and ten said they preferred face-to-face instructional delivery.

Theme 4: Social Influencers

Colleagues' Influencing LMS Use

Regarding the influence of colleagues on faculty use of Moodle LMS, P2, P5, and P3 said they received help from colleagues. P1, P8, and P11 said colleagues did not influence their Moodle use at all. This evidence confirms the DIT's principle that the members of a social system influence "the relative speed with which members of a social system adopt an innovation" (Rogers, 2003, p. 221). The social system relations participants described confirmed two prominent characteristics of DIT: trialability and observability. According to the DIT, individuals experimenting with technology help to "dispel uncertainty about a new idea" (Rogers, 2003, p. 258), leading to an uptake in technology use. The adoption rate will likely increase when innovation results are visible to others (Rogers, 2003). On a positive note, P9 shared, "Faculty members need somebody to show them. So, I do it without realizing how advantageous it is for other colleagues. Somebody says I'm not getting through with this thing. And most times, I help because I'm a course coordinator. I go on video quickly and show them how to do

it." P9 is a likely discrepant case, self-defined as using knowledge and skills for extensive use of Moodle tools, especially when teaching small classes. The finding of this study shows that P9 had an advantage because she had designed Modules for Distance Learning (DL). P9 is a non-confirming case, an innovator and change agent. Most importantly, P9, role (a) confirms the DIT theory and (b) holds significant implications for this study. P9 is an innovator, early adopter, coordinator, and leader in a department that benefits from her expertise. P9 is a change agent.

Students Influencing LMS Use

Giving their views on how students influenced faculty Moodle use, nine of 11 participants said students did not influence their use. P9, pondering, said, "I guess maybe the students influenced me with their behavior. When they don't want to do these activities, I would like to find a balance." P2's comments provided a perspective that illuminates the comments of P4, an administrator. P2 said: "Students ask why nothing is on Moodle. And I say to them, ok, I did not put anything on Moodle. Please look for your email messages because I have sent you these things by email. So that has happened more than once, where a student would have said, look, I didn't find anything on Moodle. When I don't put anything on Moodle, I have it on email. So, it seems they have been tutored to go to Moodle to get any information on the course. And I do not know if students do not check email or what, but that's how I get around that." This evidence serves as internal triangulation, verifying P4's point that faculty hesitation affected students negatively. P4 shared: "From the lens of an administrator, we still get complaints about faculty not posting information, not communicating with students, and the like."

Recognizing students as essential stakeholders using LMSs, other participants shared that failing to consider student challenges invariably affected faculty LMS use. For example, P3 said, “We do not cater to students learning to use Moodle. We fail to consider students’ need for training. Students do not know how to use the features of Moodle.”

The literature corroborates this finding. “Most students in developing nations were struggling to learn and use computer tools effectively” (Oyedotun (2020, p. 3). In the literature, García and Weiss (2020) found that the pandemic “exacerbated well-documented opportunity gaps that put low-income students at a disadvantage relative to their better-off peers” (p. 2). Therefore, access to devices, stable internet, and technology training are necessary for students to participate in online learning using Moodle LMS. García and Weiss (2020) found that students in the USA found using educational technology difficult; it was a novel experience, and students needed technology skills.

Agormedah et al. (2021) found that university students could not afford internet access, and though the Ghanian government provided free internet access, it was inadequate. Addressing the interrelated nature of students and faculty's influence on LMS adoption, Maphala and Adigun (2021) found that technology adoption is a two-way process; student LMS use depends on faculty use. The results showed that though students knew about the university’s LMS, they lacked orientation, training, and constant access to the internet. Furthermore, students could not afford internet access (Agormedah et al., 2020). The government provided monthly data for students at universities in Ghana and South Africa to alleviate this problem, but it was inadequate (Adarkwah, 2021; Hedding et al., 2020).

The results of this study showed that though students knew about the university's LMS, they lacked orientation, training, and constant access to the internet. Furthermore, students could not afford internet access (Agormedah et al., 2020). The government provided monthly data for students at universities in Ghana and South Africa to alleviate this problem, but it was inadequate (Adarkwah, 2021; Hedding et al., 2020). Addressing the interrelationship between students and faculty on LMS adoption, Maphala and Adigun (2021) reiterated that technology adoption is a two-way process; student LMS use depends on faculty use.

P3 introduced another perspective and said: "Sometimes students living in rural areas are disadvantaged and cannot access Moodle." P1, P3, P5, and P9 shared similar views about students living away from towns and traveling long distances from home to access government-free wireless networking technology. "Sometimes setting cut-off limits for students' submissions can be unfair for those without Wi-Fi or electricity," P3 said: "Sometimes students living in rural areas are disadvantaged and cannot access Moodle." P1, P3, P5, and P9 shared similar views about students living away from towns and traveling long distances from home to access government-free wireless networking technology. "Sometimes setting cut-off limits for students' submissions can be unfair for those without Wi-Fi or electricity," P3 said.

Administrators' Influencing LMS Use

Participants suggested that administrators can facilitate the use of Moodle LMS by providing incentives and reducing class sizes. Addressing the role incentives play in the use of technology, Rogers' DIT (2003) noted that "The main function of an incentive

for adopters is to increase the degree of relative advantage of the new idea" (p. 236). Awarding incentives speeds up the adoption rate. According to Rogers (2003), "Incentives are direct or indirect payments of cash or in kind that are given to an individual or a system to encourage behavioral change" (p. 236).

Incentives could be positive or negative, producing desirable or no effect. For example, there is a policy that every faculty member at a Caribbean university in Guyana must use Moodle LMS for delivering instruction. P6 shared that it was unfortunate that the way the policy works, "you get something coming in the form of an email directive, basically tapping someone on the shoulder and say, hey, what's up?" P6 said it would be better if administrators helped faculty by providing support. Bryson & Andres (2020) found that it was vital to work with smaller groups since teaching methods and learning outcomes depended on class size. Having smaller classes could serve as motivation to encourage faculty to use the LMS.

Regarding unmanageable class sizes, Bryson and Andres (2020) recommended working with smaller groups since teaching methods and achieving learning outcomes depend on class size. Having smaller classes could serve as positive motivation, encouraging faculty to use Moodle LMS more. P3 suggested that administrators could also make Moodle use attractive by providing incentives, "cash or otherwise." P10 said, "I think the university can give a cash incentive." P4 said, "Right now, I'm using one of the university's laptops. We need something with more speed, with more stability. We could incentivize it. It does not have to be a monetary incentive."

Rogers (2003) defines incentives as “direct or indirect payments of cash or in kind that are given to an individual or a system to encourage behavioral change” (p. 236). Incentives could be positive or negative, producing desirable or no effect. For example, there is a policy that every faculty member at a Caribbean university in Guyana must use Moodle LMS for delivering instruction. P6 shared that it was unfortunate that “you get something coming in the form of an email directive, basically tapping someone on the shoulder and say, hey, what's up?” P6 said it would be better if administrators helped faculty by providing support. Since higher educators are potential “change agents” (Rogers, p. 368), incentivizing LMS use should decrease faculty hesitation. Therefore, a Caribbean university in Guyana must incentivize faculty LMS use.

Incentives could be positive or negative, producing desirable or no effect. For example, there is a policy that every faculty member at a Caribbean university in Guyana should use Moodle LMS for delivering instruction. Nevertheless, it is challenging to enforce the policy. P8 said, “During COVID, administrators required that we use Moodle. Well, they haven't given us an option, so we are mandated. Of course, there are other media we can use. Once you are staff, it allows you to sign in, and they give you a password and send you a link explaining how you should get into Moodle. So, in a way, they facilitated its use.

These results reveal that the top-down administrative approach mandates Moodle use. To alleviate faculty hesitation, P3 suggested that (1) administrators should provide incentives, “cash or otherwise,” and that (2) class sizes could be smaller. P5 said it was difficult working with 100 students in one class. P8 said, “I sometimes have over 200

students." P7 had classes with more than a hundred students. Regarding the role incentives play, since higher educational faculty are potential "change agents" (Rogers, p. 368), incentivizing LMS use should decrease faculty hesitation.

Environment Influencing LMS Use

Question 4 also elicited responses on how other environmental influences affected faculty use of LMSs. The COVID-19 pandemic was responsible for all participants gravitating to Moodle use. All participants agreed that social distancing caused administrators to mandate Moodle use. "The COVID-19 pandemic closed university campuses, forcing rapid improvisation and adoption of online teaching (Bryson & Andres, 2020, p. 609). The outbreak of the pandemic, a natural disaster, was the main push factor for adopting innovative virtual learning platforms."

The urgent move to online learning disrupted normal instructional delivery because of the forced closure of educational institutions and social distancing. Pivoting to online learning with the new use of LMSs and other platforms became defined as disruptive innovations. This defining aligns with the descriptions presented in the DIT. According to Rogers (2003), "Some innovations create a high degree of uncertainty in an organization, an uncomfortable state that may foster resistance to the technology . . . a radical innovation also called a *disruptive innovation* (Rogers, 2003, p. 426). Nevertheless, the pandemic provided opportunities for all stakeholders to rise to the challenge and experience the benefits of LMS instructional delivery (Adov & Mäeots, 2021).

Theme 5: Professional Development

Time Constraints

Professional development promises to help faculty gain knowledge and skills for Moodle use. "The university had set up systems and a policy to teach faculty to use Moodle" (P2), but I did not join." Though there is a policy requiring all faculty to attend PD sessions, time constraints, and teaching commitments prevented all participants from attending regularly. Video recordings were poor, and faculty could not benefit. These findings corroborate what is in the extant literature.

Sinclair & Aho (2018) found that teaching large online classes with rigid timetable lecture slots prevented faculty participation in large group online professional development sessions. The poor quality of PD sessions corroborated George's (2012) finding that time constraints prevented faculty from benefitting from Moodle training at five Caribbean universities. "Participatory training events that address learners' expressed needs are more useful than 'packaged' learning that presumes what instructors need to know" (George, 2012, p. 66).

Similarly, in the literature, Richardson et al. (2020) found that manuals and webinars did not fill the gap at a university in Toronto because of "the ever-changing nature of online and blended learning" (p. 69). Van Nuland et al. (2020) found that faculty did not attend PD sessions because they were "first and foremost academics, and often [were] not familiar with the technology required to conduct online courses or to develop webinars and resource material for student learning unless this [was] their particular area of expertise" (p. 445). While innovators will be more inclined to use the

system the two other groups, others "will require additional resources and social pressure to influence their intentions regarding innovating." (Garone et al., 2019).

Relevant Step-by-step Training

P1, P3, P5, P6, P7, P8, P10, and P11 preferred working in one-one wone sessions. P6 introduced the practical suggestion of the each-one-teach-one idea. Saying it differently, P1 asked for "step-by-step training." The argument is that such training will provide individual attention and address relevant areas. Unless you have relevant or aligned training - so that when you show me this step, I can follow it - to me, as an older person, I don't find it easy. Teaching me things that I don't see the relevance of doesn't make sense." P6 also noted that "people want this personal hands-on." P6 said, "For me, it depends on the age range that you're dealing with. Otherwise, you will find yourself in a session where persons will not learn at the same rate. Persons may feel a trifle insecure. You got to come up with different strategies when dealing with adult learning. That is my caution." Speaking of group training, P3 said: "Now, if you do a large group training, they're not getting the actual practice.

These findings are consistent with the literature on Professional Development (PD). Darling-Hammond et al. (2017) found that good faculty PD should provide pedagogy needs instead of non-specific training and that teacher educators need support. They needed to create learning material and understand how to use the technology. PD and training should cater to specific individual needs and "should be sustained to have an impact" (Darling-Hammond et al., 2017, p. 15). The findings of this research confirm

those of Garone et al. (2019); there should be separate groups for professional development instead of a one-size-fits-all approach.

Adult Learning Styles

Regarding adult learning, P7 attended some PD sessions but found: “They do not teach the way I learn. Let me tell you the way I learn new things. You will have to demonstrate it to me, and I have to write it down step by step. Then, in my own time, I practice the steps repeatedly until it becomes a part of me.” Conversely, P9, who is self-taught, said,

> The way some people learn, they need somebody to show them. So, I show them without realizing how advantageous it is for other colleagues. But in my case, I think I'm not that kind of person. If you show me, I can get confused. I have to get the videos and go and see for myself. Or, I have to look at the video and pause it for myself. Look at it very closely. If someone shows it to me, I might not learn it.

In addition, P9 said: “I find that I have not been able to go to those workshops. What I do is I go online. They look on. I look at videos, and so on. It’s like self-teaching. Yeah, that's interesting. I could go to the video, too, and follow this. And even if they've got to do this thing four times. There are so many recordings from the sessions, you know, I look through some of those and try to learn something.”

The literature on PD addressed differences in adult learning styles. Van Nuland et al. (2022) submitted that PD should address how teachers learn, as well as what teachers learn. “Active learning in sharp contrast to sit-and-listen lectures engages educators using authentic artifacts, interactive activities, and other strategies to provide deeply embedded,

highly contextualized professional learning" (Van Nuland et al., (p. 7). It is also important to consider individuals' age range as this has implications. "Policymakers can provide flexible funding and continuing education units for learning opportunities that include sustained engagement in collaboration, mentoring, and coaching, as well as institute workshops and seminars" (Van Nuland et al. 2020, p. vii).

Collective Responsibility

P10 pointed out a need for a policy on modes of teaching and faculty workload because some classes were huge. University administrators drafted a policy during the COVID-19 pandemic, said P4, and it stated that lecturers must use Moodle for instructional delivery and avail themselves of ongoing professional development to use blended and online teaching for course delivery. Though this policy exists, faculty are not fully aware of the uncertainty of the *modus operandi*. P6 said, I think we are in a state of crisis, and I say this candidly."

Without clear direction and structure, members of social systems adopting educational technology may feel alienated and confused. The literature reviewed bears this out, and to address such situations, Thurab Nkhosi (2018) advised that "administrators need to provide clear direction, and senior management has a role in ensuring that there is additional team support to increase program development" (p. 133). One of the main reasons for the low success rate of the CUPIDE Professional development intervention (George, 2012) was the lack of buy-in, only "peripheral involvement" of managers and implementers (p. 30).

Rogers' DIT addresses the importance of human behavior within a social system adopting new technology. The units of a social system form a structure of "patterned arrangements" that "gives regularity and stability to human behavior." In such structures, there are "hierarchical positions, giving individuals in higher-ranked positions the right to issue orders to individuals of lower rank." (Rogers, 2003, p. 24). The adoption and use of innovation depend on the interaction of individuals in the social system. As Dintoe (2018) acknowledges, "change management requires a team approach: top-down, bottom-up, inside-out for success (p. 123). Professional Development interventions should ensure that all stakeholders participate in policymaking so that they have a vested interest in managing change.

Theme 6: Enabling Conditions

Requiring Expertise

Giving their views on conditions that may facilitate more faculty use of Moodle LMS, participants said they needed experts to assist them with using the platform. P3 and P10 said the computer technicians could not assist teachers with using Moodle for teaching because they had no pedagogical skills. Small groups facilitating trialability and observability would be better. This point P1 reflects two essential characteristics of Rogers' DIT, trialability and *observability* (Rogers, 2003, p. 259). According to the DIT, when innovation results are visible to members of a social system, the adoption rate improves. Experimentation and sharing results encourage and convince non-user users to try out the new technology. Change agents, such as P9, promote trialability and observability, two interconnected characteristics of the DIT.

In addition, most participants said they needed better technology devices and improved internet access. P6 also said he needed virtual assistants available after regular working hours. Nine participants (P1, P3, P4, P5, P6, P7, P8, P9, P10) said Moodle LMS needed upgrading. P1 asked for improvement to the Moodle faculty alerts and reminders because lecturers were sometimes unaware of unmarked assignments. Searching for single submissions in Moodle presented problems. P10 found similar problems, noting that faculty needed to return and thread through every assignment to locate some that needed marking. P9 and P10 shared that system upgrades would minimize faculty frustrations. Figure 6 illustrates the categories informing the theme, "Enabling conditions."

Each-one-teach-one

Regarding needing experts, P3 also said: "The other thing about Moodle is that a certain generation of people has a difficulty, mostly older, with teaching using Moodle." P4 shared a similar view. She said, "We have a lot of older persons in the teaching, particularly within our faculty and departments. They are accustomed to the all-time classroom, chalk, and talk. They are not into online learning. Some professors and retired judges are accustomed to having an assistant. Another older colleague, an excellent lecturer, cannot grapple with Moodle." P3 said, "Those are critical people who need assistance for using Moodle. It requires some amount of capacity building. My only thinking is that we have to find ways of teaching some of our older lecturers or giving them an assistant." Persons facilitating change should have a high degree of empathy and communication to accurately assess potential technology adopters' needs.

Policy Matters

Another condition that contributed to faculty Moodle hesitation was students submitting plagiarized work. P1 observed that there was no firm determination on Turnitin use. Clarifying her point, P1 said, “I find people [students and administrators] do not want to accept the Turnitin percentage. So, it’s like you are always fighting.” In addition, P3, P4, P5, P7, P8, and P11 said many students did not attend Zoom classes. P3 added, "When you call for work, then you realize that they [students] were not doing their work. P4, an administrator, said, “Our lecturers don’t trust our students. There have been complaints about students cheating.”

Another result from the data was faculty noted the need for improved teaching facilities. Lecturers used personal devices, the internet, and private space in crowded homes. P3 said, “I want to emphasize more on technology needs. Some people don't even have a proper space that they could use.” P10 said, “One student renting said the landlord would not allow her to install her internet. She could only use the landlord’s internet, which they share with others. The student could not access whatever you put on Moodle. For tests, she had to go where there was reliable internet service.” As a faculty member, P2 also experienced internet connectivity issues. P2 said, “The service of the tech companies should do better. As a lecturer, I can’t be two weeks without the Internet. It doesn't make sense. The country realizes that and tries to put in services, but they got to do better. Some service providers are not serious about pushing affordable internet across the country.”

Identifying other discouraging conditions, P10 asked for better technical support, "We need persons making videos. We need that kind of departmental technician to set up slides. We also need teaching support. Moodle teaching requires many hours of preparation and instruction. There should be a different arrangement. And that is why we need a policy." Concerning the point of having a policy for technology use at the university, P4 shared that "UG has a policy for using Moodle as the preferred platform."

Findings reveal an existing comprehensive policy on the University's Human Resources Management Information System (HRMIS), Titled Policy and Orientation Manual for Lecturers (2020), accessible to university lecturers and administration only. As noted by Thurab Nkhosi (2018), there was a need for change management strategies and support systems to enhance pedagogy. Organizational structures, change management, and the need for strategic goals and policies should undergird PD programs. George (2012) noted that "administrators need to provide clear direction on who should lead the initiative, and senior management has a role in ensuring that there is additional team support to increase program development" (Thurab Nkhosi, 2018, p. 133)

Limitations of the Study

The possible limitations of this study included working with faculty perspectives on using Learning Management Systems to deliver instruction. Despite the limitation of the researchers' presence as the interviewer, participants cooperated, providing candid views on their hesitation to use Moodle LMS. Attesting to rising beyond these limitations, P2 and P6 provided reasons facilitating an in-depth understanding of faculty why some faculty completely avoid using Moodle LMS. Researcher bias was controlled

by promising confidentially and trust. Member checking also allowed participants to verify the data collected, contributing to the data's validity.

As an educator, I had personal views regarding faculty hesitation to use LMSs. However, I realized that my initial position was based on personal experience that could not be taken for granted, as was the experience of others experiencing faculty hesitation. It was humbling to listen to and empathize with each participant's challenges. I was able to control for researcher bias by returning repeatedly to the data on the Microsoft Excel spreadsheets, rehearsing original codes, and carefully ensuring that the emerging categories and themes were accurately represented. Collaborating with participants to review the data contributed to confirmability.

Recommendations

The results from this study can add to the limited qualitative research on faculty use of educational technologies, LMSs, for delivering instruction at higher educational institutions. It is recommended that since educational technology use is a complex process (Rogers, 2003), a Caribbean university in Guyana should build capacity using members of the social system with high levels of expertise, coordinators such as P9, to provide in-person help facilitating increased faculty Moodle use. This initiative may require incentivization in some form. A Caribbean university in Guyana should invest in building capacity using change agents such as P9.

Online blended learning is a viable option at a Caribbean university in Guyana and should be vigorously encouraged. When faculty hesitation decreases, faculty and students could derive the full benefits of the LMS. Zoom simulates face-to-face teaching,

while Moodle's advantages will accrue over time if faculty develop expertise in using complex Moodle features for interactive asynchronous teaching.

Faculty and student commitment to using educational technology is important. There must be a strong participatory agreement to use Moodle for instructional delivery. This recommendation is similar to that of (George, 2012), who noted a grave need for faculty buy-in for Moodle use at a Caribbean university in Guyana. Administrators should put serious measures in place to build capacity for faculty and students' LMS use. Faculty need coaching and opportunities for feedback. PD needs to be content-oriented and specific. Experts should provide training. Internet facilities and infrastructure are weak in developing countries, but faculty hesitation to use LMSs will decrease if improved.

Faculty buy-in and participation are critical. LMS use should be incentivized. Careful strategic planning and top-down, bottom, and inside-out leadership and management should produce success. Faculty members need to be less resistant to change. Training should address individual needs. Considering that the current findings of this research confirm the findings of an evaluation of the CUPIDE program done by George (2012), a Caribbean university in Guyana should put active measures in place to change its approach to facilitating faculty LMS adoption. Faculty need coaching and opportunities for feedback. PD needs to be content-oriented and specific. Experts should provide training. Careful strategic planning involving top-down, bottom, and inside-out leadership and management should produce success. Faculty members need to be less resistant to change. Training should address individual needs.

Implications

These findings of this study provide higher education stakeholders with considerations to include in planning that will bring about long-term solutions to the problem of faculty hesitation to use LMSs. Initiatives such as having more course coordinators as change agents providing step-by-step and individualized help for faculty members who hesitate to use LMSs will contribute to positive social change on several levels. The knowledge can be applied in real-life situations, such as the "each-one-teach one" approach to solving technology use problems.

On reflecting on the process of conducting this study, I have become more understanding of the complex nature of faculty hesitation to use LMSs. Earlier evaluation of the problem was premature. Having experienced the problem of faculty hesitation in the past, the threat was looking back after surmounting my difficulty and concluding that LMS use was easy and that everyone should be able to acquire the skills when exposed to training. However, I needed to empathize with the faculty, expressing their fear of change and inadequacy.

I have now become the voice for faculty members who requested experts to provide step-by-step training. I can now return to participants, build relationships of trust and confidence and work behind the scenes to assist study participants and other faculty members with their use of Moodle for blended learning instructional delivery. I am a change agent with the necessary expertise and understanding to build confidence and help faculty take the next step.

This brings significant social change among my peers and at my workplace. I am called upon to lead the way and realize the positive social change that contributes to the realization of the United Nations Sustainable Goal #4 of ensuring inclusive quality education using innovative learning technologies such as LMSs. I empathize with and consider individuals' comfort levels, fear of change, fear of rebuff, and fear of using technology and being ashamed to acknowledge that they have not managed to use simple aspects such as email sign-in. I have become an agent for positive social change.

Conclusion

This study's results answer the research question: RQ1: How do faculty perspectives on hesitation to use the university's Moodle LMS in the Faculty of Social Sciences at a Caribbean university in Guyana reflect the tenets of Rogers' Diffusion of Innovation theory? Emergent themes in the data that answered the research question focused on (a) Moodle features used, (b) Benefits of using Moodle, (c) Moodle use comfort levels, (d) Social influencers (e) Professional Development and (f) Enabling conditions. The findings of this qualitative study has fulfilled its purpose by identifying the each-one-teach-one initiative to fill the gap in practice. This research also provides reliable data, adding to the slim body of qualitative research literature on faculty use and adoption of LMSs.

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Appendix A: Email Seeking Permission to Solicit Participants

The Dean and Program Directors
Date:
Dear Managers,

I am Ms. Gentian Miller, a doctoral candidate studying Educational Technology at Walden University. I am writing to you requesting permission to recruit and interview participants from the Faculty of Social Sciences for my doctoral study. I am conducting an original qualitative research study exploring faculty perspectives on using Moodle LMS for teaching undergraduate programs. The title of my research is "Understanding Faculty Perspectives on Adopting a Learning Management System at a Caribbean university in Guyana." The study has implications for positive social change because it will increase awareness of faculty needs for using the various tools of the LMS.

The participants of this study should have experience using Moodle LMS for instructional delivery. Participants may engage in interviews via the internet using Zoom video conferencing or participate in individual telephone interviews. The interviews will be audio-taped and then transcribed using the App "Live Transcribe & Notification" by Google. Each interview should last no longer than one hour. All information will be kept confidential and secure. I will only share de-identified data with Walden University dissertation committee members as appropriate for completing the dissertation process.

Thank you in advance for your assistance in allowing me to collect data for my research that will fill an important knowledge gap. I sincerely request participants from the Faculty of Social Sciences. I look forward to continued communication with you. Thanks for your consideration.

Regards
Ms. Gentian Miller B. Ed, M. A.

Appendix B: Recruitment Email

Recruiting volunteers for a study exploring faculty perspectives on the use of Moodle LMS.

- I am Ms. Gentian Miller, a doctoral candidate studying Educational Technology at Walden University.
- The title of my qualitative research is "*Understanding Faculty Perspectives on Adopting a Learning Management System at a Caribbean university in Guyana*."
- Please share your experiences with using Moodle LMS for teaching.
- I will do Zoom Interviews, audiotape and transcribe narratives. Each interview. should last no longer than forty-five minutes.
- Data collection will be conducted over one month during hours convenient to you.
- Your data will contribute to identifying areas where administrators can provide help for the full utilization of Moodle LMS.
- All information will be kept confidential and secure. I will only share de-identified data with Walden University dissertation committee members as appropriate for completing the dissertation process. Thank you!

Appendix C: Interview Questions for Faculty use of LMSs

Questions

1. How long have you been using Moodle LMS and what features do you use? In which department do you teach?
2. What are the benefits (advantages and disadvantages) of using Moodle LMS for delivering instruction?
3. Please tell me how comfortable you are with using the various tools of Moodle LMS? What is easy and what is challenging to use?
4. (a) How do others influence your full use of Moodle LMS? Colleagues, Students, Administrators? (b) How do social situations affect your use of Moodle LMS?
1. What professional development and training may help you fully utilize Moodle LMS tools?
2. What other conditions may facilitate your use of Moodle LMS for blended? learning?
3. What other comments would you like to share?

Appendix D: Introductory Brief

Faculty Perspectives on Using Moodle

Overview: LMS Use in Higher Education

LMSs are valuable tools for organizing instructional delivery globally (Asamoah, 2020; Buabeng-Andoh, 2022) and are available at most colleges and universities. However, faculty resist adopting LMSs (Abu-Snoubar, 2021; Simelane-Mnisi & Mokgala-Fleischmann, 2022; Washington, 2019). This faculty hesitation (Fearnley & Amora, 2020; Guppy et al., 2022; Jackson, 2022) is the gap in practice my research will address.

Educators use LMSs to design and deliver courses and programs for eLearning and Mobile learning (Adeola et al., 2022; Barclay et al., 2018; Oyedotun, 2020; Washington, 2019). LMSs are also accessible on mobile learning devices such as smartphones and tablets. This availability allows students to access and engage in learning as they travel (Huang et al., 2020; Samsudeen & Mohamed, 2019). Instructors may use LMSs for virtual-only or hybrid teaching (Muniasamy & Alasiry, 2020).

Research findings indicate that lecturers' use of LMSs does not always meet institutions' expectations (Bryson & Andres, 2020; Liu et al., 2020; Yakubu et al., 2020). Research also shows that, generally, faculty LMS adoption was low (de los Santos & Rosser, 2021; Fearnley & Amora, 2020; Leacock & Warrican, 2020; Mansbach & Austin, 2018; Oyedotun, 2020; Simelane-Mnisi & Mokgala-Fleischmann, 2022; Yakubu et al., 2020).

More quantitative research is available on LMS adoption. Moreover, most studies investigate student adoption instead of faculty adoption (Fearnley & Amora, 2020; Mansbach & Austin, 2018; Simelane-Mnisi & Mokgala-Fleischmann, 2022; Yakubu et al., 2020). My qualitative study on faculty use will fill the gap in practice and the gap in the literature. Before the pandemic, traditional teaching methods remained the norm at a Caribbean university in Guyana (George, 2012; Livingstone, 2015, 2019; Oyedotun, 2020). Though COVID- 19 required virtual instructional delivery, lecturers and students found Moodle LMS challenging to use (Oyedotun, 2020). LMS adoption was low, and lecturers adopted more Zoom Video conferencing instead (Diaz, 2022; Oyedotun, 2020).

Appendix E: Zoom Participation Guide

1. You do not have to have a Zoom account to attend a zoom meeting or interview.
2. You will be prompted to download the software once you have clicked on the link that was sent to you.
3. You may also wish to create an account, but that is not required for participating in a Zoom meeting. Please see the System Requirements as the following URL to ensure that you are ready to go: https://support.zoom.us/hc/en-us/articles/201362202-.Systems-Requirements-for-PC-and-Mac
4. You will need a computer or device with a webcam and microphone to participate in a Zoom session.
5. If you do not wish to have an account, all you'll need to do to participate is click on the link for the meeting that your contact will send to you via an email invitation.

Step 1: Click on the link provided in the email.

Step 2: Download the Zoom Desktop Client. Follow the prompts to download the correct Zoom desktop client for your computer and operating system.

Step 3: Your Zoom Desktop client will download. You will then need to install the Client.

Step 4: once you have downloaded the desktop client, you can now join the meeting.

NOTE: You may have to click the link again in the email to connect to the meeting once you have installed the client.

- You need a working web camera. If your computer is less than three years old, the built-in camera (if it has one) should be adequate.
- Using a headset will significantly reduce the chance of feedback and improve your voice quality during the interview. Headsets that connect via USB are the best choice.

- When possible, connect to the internet with a physical cable connection, not just Wi-Fi, to improve speed and service.
- Use a laptop or desktop instead of a smartphone or a tablet.
- Don't be outside. Wind and background noise make your device's microphone adjust, and your voice may sound muffled.
- Don't have several programs running while using Zoom.
- Close all unnecessary applications during your call so that all processing power can be used to the maximum for your zoom session.
- Too much light behind you will make you appear only as a dark figure.
- To counteract backlighting, make sure you have a good light source in front of you, and behind the camera, you are using on your computer.
- Pay attention to your attire. Don't wear stripes or anything too bright and dizzying. Solid colors are best.
- Do not have anything behind you because this may serve as a distraction.
- Avoid moving your head too much or "talking with your hands."

Appendix F: Invitation to Join the Meeting

Dear Colleague,

Thanks for agreeing to participate in my study. I realize that participating in this study takes time, and I respect your right to withdraw from the interview at any time. Your interview is scheduled for (date and time). If you are unable to attend this meeting physically, please get in touch with me to reschedule.

I will call you on (date and time) for the one-hour interview. If you need to cancel for any reason, please contact me as soon as possible. If you choose to interview online using Zoom, please refer to the Zoom Appointment Participation Guide that I have sent. I will send you a Zoom email to direct you to the link to join the meeting. If you prefer a telephone interview, I will call via WhatsApp.

Thanks for your participation in the study. I look forward to meeting with you. If you have questions or concerns, please get in touch with me.

Sincerely,
Ms. Gentian Miller
Walden University Doctoral Student

Appendix G: Thank You Email

Dear colleague,

I want to express my deepest gratitude for your participation in my research study on "Understanding faculty Attitude for Adopting a Learning Management System during COVID- 19 at a Caribbean University." I was happy to conduct this research and raise awareness of lecturers' experiences when adopting an LMS in higher education institutions.

I am attaching a copy of the transcript that was created based on our interview. Please review it for accuracy. If any errors or changes need to be made, please use the Track Changes tool in Word to make them. When finished, please return a copy of the transcript with your edits within two weeks of receiving this communication. If I do not hear from you in the next two weeks, I will assume that the transcription is accurate.

Your input and perceptions were critical. Participating in this study made demands on your time. I value the time you have committed to my research efforts. If you wish to receive the report's final draft, it will be provided to you at your request upon completion of the study. Thanks, and please email me with any questions or concerns about this research study.

Sincerely,
Ms. Gentian Miller
Walden University Doctoral Student

Appendix H: Ethical Procedures

Please find a copy of Walden's list of ethical procedures at this link.

https://docs.google.com/document/d/1Cg3RdXJIWCtYen82VFggjmH3H7hIN61Q/edit?usp=sharing&ouid=105883427232446032268&rtpof=true&sd=true