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# Teachers' and School Directors' Perspectives on Standardizing a Learning Management System for Blended Learning

Alfredo Felipe Rivera-Mejías
*Walden University*

# Walden University

College of Education and Human Sciences

This is to certify that the doctoral dissertation by

Alfredo F. Rivera-Mejías

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Review Committee
Dr. Darci J. Harland, Committee Chairperson, Education Faculty
Dr. Leslie VanGelder, Committee Member, Education Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2024

Abstract

Teachers' and School Directors' Perspectives on Standardizing a Learning Management

System for Blended Learning

by

Alfredo F. Rivera-Mejías

MA, Inter American University of Puerto Rico, 2014

BA, Inter American University of Puerto Rico, 2010

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Educational Technology and Design

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Abstract

The introduction of standardized learning management systems (LMSs) for blended learning (BL) in K–12 education in Puerto Rico signifies a pivotal shift towards enhancing educational environments with technology. This qualitative study was conducted to understand the perspectives of teachers and school directors on the LMS adoption process. Grounded in the concerns-based adoption model as its conceptual framework, the study aimed to elucidate the stages of concern and levels of use among educational stakeholders, shedding light on the multifaceted challenges and opportunities that technology integration brings to schools. Employing semistructured interviews with a selection of seven teachers and school directors, this research embarked on a detailed analysis of the conversations to discern patterns and themes. The data collected from these interviews underwent rigorous deductive and inductive coding processes to systematically identify and categorize the concerns, facilitating a nuanced understanding of the stakeholders' perspectives. Key findings revealed a need for professional development, engagement of caregivers, and adequate financial support to address the identified concerns effectively. By focusing on the human aspects of integrating LMSs into teaching and learning practices, this study contributes to the broader discourse on educational technology for BL. This study also not only contributes to the academic discourse, but also serves as positive social change as a call to action for policymakers, educators, and leaders to forge a collaborative path toward a future where technology genuinely serves to enhance learning.

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Dedication

To my sons, my real-life embodiments of Woody and Buzz Lightyear, you have been my anchors and my inspiration. Your sacrifices did not go unnoticed; they were the silent force that propelled me forward, reminding me of the joys and adventures that await us beyond the pages of this academic endeavor. Your resilience and grace are my greatest motivations, making this dissertation a testament to the unwavering bond we share.

Dr. Jennifer Courduff, the Bo Peep of my academic journey, your guidance and wisdom have been my north star. In a narrative filled with challenges and discoveries, your mentorship provided the light in moments of doubt, offering clarity and direction with an unwavering belief in my potential. Your support, though we parted ways in the final act, has left an indelible mark on my work and my growth, shaping the scholar and person I have become. Your influence is a thread woven through the fabric of this dissertation, a symbol of the enduring impact of a truly dedicated mentor.

And to my wife, the Jessie of my story, whose tough love and straightforward support were the undercurrents of my perseverance. Your pragmatic encouragement was not just a push; it was the wind beneath my wings, propelling me to heights I could only imagine. In the quiet moments of doubt, your belief was my reassurance.

This dissertation is a mosaic of love, sacrifice, and unwavering support, each of you playing a pivotal role in the narrative of this academic quest. Like the cherished toys of Andy's room, you have been my companions, my guides, and my family, each contributing to this journey in irreplaceable ways. "To infinity and beyond!"

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The journey to the completion of this dissertation has been one marked by countless challenges, moments of introspection, and profound growth. It is a path I have not walked alone; along the way, I have been fortunate enough to be surrounded by individuals whose support, encouragement, and faith in my abilities have been the pillars upon which this achievement stands. It is with deep gratitude and respect that I acknowledge the contributions of these remarkable individuals.

Foremost among my pillars of support has been my dearest friend, Michelle Rivera. Michelle's role in this journey transcends mere friendship; her involvement has been nothing short of transformative. Her constant inquiries about my progress were not merely questions but reminders of the faith and expectation she had in my capabilities. Michelle's unwavering support extended beyond emotional encouragement; her active role in gathering participants crucial for my research was instrumental in enabling me to collect the data necessary for this dissertation. Moreover, witnessing her own academic and personal journey provided an unparalleled source of inspiration and motivation.

I must also extend my heartfelt thanks to Dr. Darci Harland, who stepped into the role of my dissertation chair at a critical juncture. Dr. Harland's mentorship was not just a professional courtesy; it was a lifeline that guided me to the end of my dissertation. When my previous chair had to leave the committee, Dr. Harland took me under her wing with a dedication and commitment that went above and beyond the call of duty. This accomplishment is not mine alone but a reflection of the collective spirit and support that has surrounded me throughout this journey.

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Chapter 1: Introduction to the Study

Learning management systems (LMSs) are platforms that distribute and oversee pedagogical materials to capture the learner's progress based on expectations (Bradley, 2020). Watson and Watson (2012) recommended that school districts integrate the use of an LMS as a functional requirement. I used a basic qualitative approach to explore teachers' and school directors' perspectives about standardizing an LMS to conduct the blended learning (BL) strategy in a K–12 scenario in Puerto Rico. During the recent COVID-19 pandemic, LMS and the BL strategy played a fundamental role in the continuity of education at all levels (Alturki & Aldraiweesh, 2021). However, research suggests that BL, when used in tandem with a learning management system, has the potential of being an essential part of education (Balkaya & Akkucuk, 2021; Benbaba & Lindner, 2021; Bordoloi et al., 2021; Bradley, 2020; Burrough, 2015).

Despite the multiple studies carried out, little is known about the perspectives of teachers and school directors on the standardization of an LMS in K–12. For this study, standardizing an LMS implies the use of a single LMS for the entire Department of Education of Puerto Rico. While this idea might seem too broad, Puerto Rico can be geographically and demographically compared to a district in one of the 50 U.S. states. Recent research has recommended that future studies examine teachers' perspectives regarding LMS (Aji et al., 2020; Amin et al., 2021; An et al., 2021; Balkaya & Akkucuk, 2021; Ivanjko & Grubjesic, 2019). Additionally, Aji et al. (2020), Amin et al. (2021), and Balkaya and Akkucuk (2021) suggested that future research should explore the motivation factors that contribute to the long-term sustainability of an LMS for BL

strategy in the K–12 educational environment. The gap in literature that this study helps to fill involves the perception of teachers and school directors about standardizing an LMS for BL. Finally, this study helped lay a strong foundation for the implementation of an LMS for BL in K–12 in Puerto Rico based on the perspectives of teachers and school directors, maximizing the chances of its dissemination. The positive social change implications were viewed from four different perspectives. First, the study advocates for the adoption of an LMS in Puerto Rico's K–12 education, emphasizing the need for comprehensive support for educators and strategic leadership. Second, it underscores the potential for enhanced educational equity, fostering a collaborative culture that empowers educators and prepares students for a digital future. Third, the research advocates for a technologically integrated educational environment that supports continuous learning and adaptation, contributing to societal progress and the betterment of the educational landscape. Finally, the study promotes positive social change, providing policymakers with information to develop regulations in favor of the deficiencies and strengths identified through the two main agents of change in the K–12 school environment (teachers and school directors). This implies an improvement to education and therefore to society.

In Chapter 1, I summarize existing background literature on the study's subject, the research's problem and purpose, the research question (RQ), and the conceptual framework that guided the research. In addition, I present the nature of the study, definitions of the key concepts, and the scope, limitations, and significance of the results.

## Background

Before addressing the research on this topic, it is necessary to provide some contextual background to what has happened in Puerto Rico in recent years. Due to the COVID-19 pandemic and its social distancing restrictions, many schools in public and private systems worldwide resorted to using educational platforms, also known as LMSs, to continue educational processes (Alturki & Aldraiweesh, 2021). Similarly, when restrictions allowed attendance in the classroom, many institutions continued to use the LMSs, now along with the BL strategy to reduce contagion and attend to the most vulnerable students (Parlakkılıç & Mertoğlu, 2020). Due to this situation, the phenomenon of LMS standardization has regained momentum in conversations between education practitioners and researchers (Prasetya et al., 2022).

During the first years of the COVID-19 pandemic, restrictions related to social distancing to avoid contagion of the virus caused educational problems in Puerto Rico, as well as other parts of the world (United National Educational, Scientific and Cultural Organization and United Nations Children's Fund, n.d.). However, for about 2 years, when many countries managed to establish a relatively effective system of distance education in universities and in K–12, Puerto Rico continued to face problems. One of the main problems presented by K–12 education in Puerto Rico was the lack of uniformity of educational platforms to educate virtually and at a distance. Teachers from the same school used different educational platforms, causing confusion and problems for parents and students in the educational system (Philipp, 2022).

To meet the needs mentioned above, the Puerto Rico Department of Education invested $1.6 billion to provide the different stakeholders with the necessary technological tools to support distance learning (Marachi & Quill, 2020; Torres-Gotay & Maldonado-Arrigoitía, 2020). On August 17, 2020, the Puerto Rico Department of Education sent a circular letter to teachers, administrators, and parents of students announcing the creation of their accounts for the Microsoft TEAMS educational platform and a manual for its use. This letter stated the tool's purpose, and that the Department's teachers and administrative staff were to use the TEAMS software as an LMS. However, while TEAMS can be used as a collaboration tool, it is more often a tool used in conjunction with a more robust LMS such as Moodle, Canvas, Blackboard, Schoology, or Google Classroom (Putro et al., 2021). Although TEAMS was made available, teachers could choose whether they wanted to implement TEAMS, or they might use other platforms. This freedom for teachers within a school district to use different LMSs led to inconsistent teaching methods and materials. With each teacher using a different LMS, students needed help navigating and adapting to multiple platforms, causing confusion, and hindering their learning experience. Additionally, parents faced challenges when trying to support their children's education. They needed to familiarize themselves with various LMS platforms, which was time-consuming and overwhelming. Inconsistent communication and resource access across different LMS platforms further complicated the parent–teacher relationship. This created a situation where some teachers who had chosen to use TEAMS as a solution to distance learning felt that the program alone was not robust enough to be used as the country's LMS for K–12 (Landivar et al., 2021).

The lack of uniformity regarding the tools used by teachers for distance and BL at the beginning of the pandemic and the nonconformity of using TEAMS as LMS sparked dialogues among teachers about the incorporation of a standardized LMS for the Department of Education of Puerto Rico (Echautegui-Román, n.d.; Meléndez, 2021; Méndez-Gracía, 2022; Usuarios lo confirman, n.d.). These dialogues led to the development of an academic plan by the Department of Education of Puerto Rico, specifically the Informatics Office, that was intended to provide teachers and students of the public education system with a 21st-century educational platform (Ortiz-Pizarro, 2021; Serrano, 2022). Due to the country's fiscal situation, the approval of this project by the Fiscal Control Board (federal body designated to the fiscal supervision of Puerto Rico) was delayed, and the contract to develop the platfom (LMS) was approved on February 20, 2023.

At the time of writing this final study, the Puerto Rico Department of Education still does not have a standardized LMS to offer courses in distance learning modalities. Nonetheless, the Fiscal Control Board approved a project and contract for the acquisition of an LMS for the Department. This section will present a summary of the existing literature for this study's two main components: LMS and the BL strategy.

Most of the research carried out about LMS revolves around students' satisfaction when using the tool, how the LMS improves student engagement with the course content, analysis of the social component using an LMS, and the impact of LMS on student academic achievement (Aldiab et al., 2019; Bradley, 2020; Holmes & Prieto-Rodriguez, 2018; Simanullang & Rajagukguk, 2020). Most of this research is at the higher education

level. However, there is little literature on implementing an LMS in higher education and even less on the same process at the K–12 level.

Recent events have caused an issue, especially in remote teaching at the K–12 level (Aji et al., 2020; Alserhan & Yahaya, 2021; Alturki & Aldraiweesh, 2021; Amin et al., 2021; An et al., 2021; Anderson, 2002; Balkaya & Akkucuk, 2021; Bordoloi et al., 2021; Huck & Jingshun Zhang, 2021; Mali & Lim, 2021; Megahed & Hassan, 2021). Sometimes, students must use multiple platforms to take their courses; because there was no standardized platform in the institutions, teachers used whichever suited them (Khanna & Prasad, 2020; Özüdoğru, 2021). Furthermore, recent studies about LMS use have shown an increment in the acceptance behavior toward LMS use at multiple educational levels (Kim et al., 2021). This study aimed to address the existing gap in literature on the implementation process of a standardized LMS for K–12 education, especially the one corresponding to the perspective of teachers and school directors.

The increased use of an LMS has provided an opportunity for increased use of BL strategy and students' willingness to use it (Finlay et al., 2022; Megahed & Hassan, 2021; Zheng et al., 2021). However, there is only a limited amount of literature corresponding to the perspective of teachers and school directors about the use of this strategy at the K–12 level (Bokolo et al., 2020). In addition, analyzing how teachers and school directors perceive the use of the BL strategy can help improve its implementation and dissemination to improve the teaching-learning process. Finally, the information gathered from this study could be used by policymakers, curriculum developers, administrators, and professional development coordinators to make informed decisions regarding the

implementation of an effective BL strategy and efficient LMS system in schools. In this way, this study can support social change.

## Problem Statement

The problem focused on in this basic qualitative study was the lack of literature about teachers' and school directors' perspectives about standardizing an LMS for BL strategy. This problem has two implications, one being the lack of uniformity it presents for stakeholders in the educational environment of Puerto Rico. The second implication is that the Department of Education, which governs and regulates public institutions in Puerto Rico, is in the process of developing a standardized LMS, and the information from this study can inform policymakers when developing policies related to the use of technology and LMS for BL because there is no literature about this process in Puerto Rican education. Currently, research about LMS has increased because of the COVID-19 pandemic, but most of this emerging literature is about student engagement and stakeholders' perspectives about LMS usage. Additionally, current literature shows that the issue of standardization of LMS use and BL strategies should be the focus for future studies, with greater emphasis on stakeholders' perspectives (Aji et al., 2020; Alsmadi et al., 2021; Alturki & Aldraiweesh, 2021; Amin et al., 2021; An et al., 2021; Balkaya & Akkucuk, 2021; Benbaba & Lindner, 2021; Bokolo, n.d.; Bordoloi et al., 2021; Hu et al., 2019; Huck & Jingshun Zhang, 2021; Megahed & Hassan, 2021; Mitsenko, 2019; Zhang et al., 2020; Zheng et al., 2021). Current research suggests that future studies should examine stakeholders' perspectives on the standardization of an LMS (Balkaya & Akkucuk, 2021; Ivanjko & Grubjesic, 2019). This aligns with the need for this study as I

explored two main stakeholders responsible for implementing and enforcing innovations in schools: teachers and school directors. The interviewed teachers and school directors provided insight into the positives, negatives, and opportunities in relationship to the problem.

## Purpose of the Study

The purpose of this basic qualitative study was to explore teachers' and school directors' perspectives about standardizing an LMS for BL in K–12 Puerto Rican education. As indicated before, little is known about teachers' and school directors' perspectives about the standardization of an LMS to conduct BL, and this study is now part of the existing literature about this gap. Additionally, events like the COVID-19 pandemic have increased conversations about this phenomenon; therefore, incorporating Puerto Rican teachers' and school directors' perspectives into the literature is pertinent. Exploring how K–12 teachers and school directors perceive the adoption of a standardized LMS provided a unique understanding about the process of adopting an LMS to support BL more broadly in K–12 Puerto Rican schools. This understanding might imply a better transition for implementing the innovation, which might enhance students' academic achievements, thus promoting social change.

## Research Questions

The following main RQ guided the study exploring the perspectives of teachers and school directors regarding the standardized implementation of an LMS for the BL strategy. The main RQ was divided into two subquestions (SQs), one for each

stakeholder, identified as essential for this study. The main RQ and the two SQs are presented below.

Main RQ: What are the perspectives of Puerto Rican teachers and school directors regarding the adoption of a standardized LMS to support BL in K–12 education?

SQ1: What are the perspectives of Puerto Rican *school teachers* pertaining to the adoption of a standardized LMS to support BL in K–12 education?

SQ2: What are the perspectives of Puerto Rican *school directors* pertaining to the adoption of a standardized LMS to support BL in K–12 education?

### Conceptual Framework for the Study

The conceptual framework provides the foundations for any qualitative study. A conceptual framework illustrates what is expected to be found in qualitative research by defining the study's relevant variables or key concepts and mapping out how they might relate to each other (Varpio et al., 2020). The purpose of this basic qualitative research study was to explore teachers' and school directors' perspectives about standardizing an LMS for BL strategy in K–12 Puerto Rican education. Due to the exploratory nature of this study, and the sparse literature relating to the topic, the conceptual framework needed to be robust. To map out how the different themes might emerge from the individual interviews, and because standardizing an LMS is an innovation, the conceptual framework used for this study was the concerns-based adoption model (CBAM; Hall &

Hord, 1987). CBAM delves into the complexities of educational change and adoption. The model consists of three constructs or dimensions: stages of concern, levels of use, and innovation configurations (Hall & Hord, 1987). These dimensions can be used to examine an innovation's components, track the implementation's progress, report findings objectively, and design interventions or strategies that will move the innovation process forward. For this study, I used the stages of concern and levels of use dimensions of the CBAM. CBAM is a widely recognized framework offering valuable insights into implementing educational innovations and the factors influencing the adoption process. Developed by George H. Hall and Shirley M. Hord in the late 1980s, CBAM provides a way to recognize the complexity of change in educational settings and provides a comprehensive understanding of the various levels of concern experienced by individuals during the adoption process (Hall & Hord, 1987). Stages of concern is related to an adoption process that individuals may progress at their own pace (Hall & Hord, 1987). For this study, the adoption process was the possibility of a standardized LMS. The stages of concern dimension is used to guide researchers and practitioners seeking to navigate the challenges associated with educational change. It offers a lens through which to analyze the concerns, attitudes, and behaviors of individuals involved in the adoption process. For this study, I used the stages of concern to explore teachers' and school directors' perspectives about the implementation of a standardized LMS for BL. I also used the stages of concern to develop interview questions.

I also used the levels of use dimension of the CBAM as part of the conceptual framework. The levels of use were used to assess the educational innovations' degree of

implementation and integration (Hall & Hord, 1987). CBAM's levels of use dimension allows researchers to explore the extent of implementation and identify factors that may impact utilization. In this study, I explored the current use of an LMS for BL among teachers and school directors. Through this research, I aimed to better understand the requirements for implementing a standardized LMS in Puerto Rico. Because the purpose of this study was to explore teachers' and school directors' perspectives about standardizing an LMS for BL in K–12 Puerto Rican education, the stages of concern and levels of use dimensions of the CBAM were the ideal fit to frame the study, develop the interview questions, and to code the data with a priori coding related to this framework. A further explanation of the stages of concern and levels of use is addressed in Chapter 2.

## Nature of the Study

The purpose of this basic qualitative research study was to explore teachers' and school directors' perspectives about standardizing an LMS for BL strategy in K–12 Puerto Rican education. Because this study focused on a specific population within a specific environment, basic qualitative methodology was the most appropriate research approach (Merriam, 2014). Based on this approach, I collected data using semistructured interviews with teachers and school directors, followed by a member checking strategy where the interviewees verified the transcripts and a short excerpt of their interview responses based on each question. I also used a reflective journal, which helped me mitigate my biases during the study.

**Definitions**

*Learning management systems (LMSs):* For this study, LMSs refers to software that allows the distribution of pedagogical materials using the internet as a medium while allowing the course's instructor to oversee the learners' progress based on the objectives (Bradley, 2020).

*Blended learning (BL):* For this study, BL refers to a strategy with a traditional face-to-face component combined with an online teaching modality (Garrison & Vaughan, 2008).

*School director:* Administrative teacher with at least 5 years of experience teaching in the K–12 environment with a master's degree in educational leadership and a government license that allows them to act as an administrative leader. Among the functions of the school director is that of liaison between teachers and those responsible for developing policies.

*Standardization of an LMS*: Process of implementing a single LMS for a state or educational region. Standardization implies a single LMS for the entire K–12 system of the educational region that implements or plans to implement it.

**Assumptions**

This assumptions section outlines the underlying beliefs and expectations that underpinned the research study investigating the perspectives of teachers and school directors regarding the standardization of an LMS for BL in Puerto Rican K–12 education. The assumptions outlined here served as a foundation for the study,

acknowledging the potential impact of various factors on participants' responses and the anticipated outcomes of standardizing an LMS in the educational context.

First, I assumed that the participants involved in this study would provide truthful and objective responses. I expected that they would share their genuine perspectives and experiences regarding standardizing an LMS for BL. Additionally, I assumed that participants would engage with the research process in good faith, providing accurate and reliable information.

I also assumed that the responses obtained from the participants were meaningful and relevant to the research questions and objectives. I anticipated that the participants' insights and perspectives would contribute valuable information toward understanding the potential benefits, challenges, and implications of standardizing an LMS in Puerto Rican K–12 education. Because my research focused on standardizing an LMS for BL, participants may have reflected on the impact of government policies, educational reforms, and the recent shift to remote learning due to the pandemic. Therefore, I assumed that participants' responses would be influenced by the prevailing political climate and their experiences with the COVID-19 pandemic.

Finally, I assumed that standardizing an LMS for BL in Puerto Rican K–12 education could improve educational outcomes. A standardized LMS will enhance access to educational resources, facilitate effective communication and collaboration, and support personalized student learning experiences. The assumption is that adopting a standardized LMS will contribute positively to the overall quality of education in Puerto Rican schools.

By being conscious of these assumptions and preventing their interference, I created an environment conducive to gathering genuine and unbiased insights. I captured the authentic perspectives of teachers and school directors regarding LMS standardization for BL in Puerto Rican K–12 education, which allowed for a comprehensive analysis of the subject matter.

## Scope and Delimitations

This study included four teachers and three school directors who were working in a K–12 scenario in Puerto Rico during the time of the interviews. Due to the COVID-19 pandemic, teachers and school directors within the K–12 environment had resorted to different educational tools to provide online and BL classes. At the beginning of the pandemic, most schools in Puerto Rico did not have a standardized learning platform to teach remotely, creating a problem for students and parents. Even though face-to-face classes resumed, the contagion of the virus still posed a problem in education. Additionally, although TEAMS is offered as a tool for Puerto Rican schools to provide distance learning, the Department had yet to establish a more robust LMS by the time the research was conducted. This caused teachers to turn to free LMSs and technological tools such as Google Classroom, Google Meet, Class Dojo, Edmodo, and Microsoft Teams (Rodríguez-Pedró & Báez-Martínez, 2022). This created a problem of inconsistency relating to the learning platform for students. In some cases, a student had to use more than one LMS for their courses in the same academic term. Data gathering regarding teachers' and school directors' perspectives on standardizing an LMS was conducted through semistructured interviews with open questions. I interviewed

participants from both the public and private sectors who were active in the K–12

educational landscape and had worked during the COVID-19 pandemic across various

regions of Puerto Rico. A gatekeeper facilitated the process of contacting participants.

## Limitations

A potential limitation of this study was that not all participants were familiarized

with the BL strategy, especially school directors. Nevertheless, I successfully conducted

interviews with participants possessing a diverse range of experiences. This included

school directors who transitioned from teaching roles to administrative positions during

the pandemic. Additionally, the consent form included the minimum participation

requirements to avoid this limitation. This research was limited to teachers and school

directors in Puerto Rico. Because of this, the findings might not apply to educational

scenarios different from the United States and its federal districts.

I did not interview teachers or school directors who worked with me or were my

students to avoid bias. By maintaining a reflective journal, I prevented any biases from

influencing my data collecting strategies, which allowed the participants to express their

opinions and viewpoints without any fear or prejudice. I acknowledged my bias,

believing that the standardization of the LMS system would be beneficial, and I worked

to not impose that belief on participants who might think that the freedom to choose their

LMS was more beneficial.

## Significance

By exploring the teachers' and school directors' perspectives on standardizing an

LMS for BL, my study could set the foundations for further research about this

phenomenon. Additionally, by exploring the perspectives of the stakeholders mentioned above, this study's findings might provide a better understanding of their needs, thus allowing administrators to better implement educational strategies and promote social change. This study holds significant potential for social change because Puerto Rico's education system has been grappling with numerous challenges, including limited resources, disparities in educational opportunities, and the need for modernization. By investigating the views of teachers and school directors on standardizing an LMS, the study could shed light on the feasibility, advantages, and challenges of implementing technology-driven BL approaches in the Puerto Rican context. The findings may provide valuable insights for policymakers and educational stakeholders to make informed decisions about curriculum development, resource allocation, and professional development opportunities.

Standardizing an LMS by including teachers and school directors' perspectives can promote equity by ensuring that all stakeholders, regardless of their geographical location or socioeconomic status, have access to high-quality educational materials and interactive learning experiences. Moreover, such a study has the potential to empower teachers and school directors by giving them a voice in shaping the educational landscape and encouraging collaboration among stakeholders. By understanding the perspectives of these key actors, the study may contribute to fostering a supportive and inclusive environment that embraces innovation, enhances pedagogical practices, and ultimately leads to positive social change in Puerto Rican K–12 education.

**Summary**

In this chapter, I presented the problem, the gap in the literature, and a brief description of the background literature. Additionally, I described the framework, which consisted of Hall and Hord's (1987) CBAM. Finally, the study's purpose, research questions, key concepts, assumptions, scope and delimitations, limitations, and relevance were presented in this chapter. Chapter 2 includes a detailed discussion of each of the components of this framework as well as an overview of the literature search strategy used to find relevant articles to substantiate the importance of this study and the gap in literature.

Chapter 2: Literature Review

The problem focused on in this basic qualitative study was the lack of literature about teachers' and school directors' perspectives on standardizing an LMS for BL in K–12 education.  The purpose of this basic qualitative research study was to explore teachers' and school directors' perspectives about standardizing an LMS for BL strategy in K–12 Puerto Rican education. Teaching methods and structures of education systems are constantly evolving to improve teaching-learning processes, ease access to education, and prepare students for a society that is continually changing. A spike in the evolution of these methods and structures driven by the COVID-19 pandemic sparked a sudden adoption of technological tools by academic stakeholders at all levels. These technological tools kept education moving forward when everything else stood grounded to a halt. One of the most used technological tools has been the LMS in recent years (Alturki & Aldraiweesh, 2021). Exploring how Puerto Rican K–12 teachers and school directors perceive the adoption of a standardized LMS might provide unique perspectives about the process of adopting an LMS to support BL more broadly in U.S. K–12 schools. The literature review in this chapter shows the lack of research conducted relating to K–12 Puerto Rican teachers and administrators regarding the adoption of a standardized LMS for BL and how the conceptual framework directed the study.

**Gap Relating to Learning Management System Adoption in K–12**

LMSs are the foundation of contemporary distance learning. They are also heavily used to support traditional face-to-face modalities at universities and in a BL setting (Balkaya & Akkucuk, 2021). Recent events have led instructors and administrators from

universities and K–12 schools worldwide to look for effective alternatives to comply with social distancing while continuing education (Francis Amankwah et al., 2022). LMSs are an acceptable approach for fostering the dedication of students to content in education (Alturki & Aldraiweesh, 2021).

Furthermore, LMSs facilitate communication between stakeholders within the educational environment (Laho, 2019). Nonetheless, it has yet to prove easy when teachers are expected to embrace technology and adopt an LMS without being consulted about the innovation's compatibility with their teaching goals (Benbaba & Lindner, 2021). This situation frequently leads to a rift between pedagogical and technological interests (McLain, 2017). For this reason, research on the stakeholders' perspectives in adopting an LMS is worthwhile. This was sustained in Ivanjko and Grubjesic's (2019) article, which recommended that further research examine LMS motivation by measuring teachers' perspectives about the factors that contribute to the long-term sustainability of an LMS.

Despite the growing use of LMSs in higher education (Lasanthika & Tennakoon, 2019; Mohd Nasir et al., 2021), there needs to be more literature regarding their use in K–12 education. According to a recent report by the National Center for Education Statistics (NCES, 2018), the adoption of LMSs in K–12 schools is rapidly increasing, with more than half of all public schools in the United States using some form of LMS in 2018. However, the literature still needs to be improved when examining the effectiveness of LMS in K–12 education, especially regarding student outcomes.

Another gap in the literature is the need for more research on using LMSs in diverse student populations. As the use of LMSs becomes more widespread in K–12 education, examining how they can support learners with different backgrounds and needs is essential. For example, a study by Yao-Ping Peng et al. (2023) found that an LMS can support English language learners, but more research is needed to determine the best practices. Additionally, only some studies have examined using LMSs in rural or underresourced schools, where students may need more access to technology or reliable internet connections.

Another gap in the literature regarding LMSs involves how U.S. teachers and administrators perceive adopting a standardized LMS for BL in U.S. K–12 education (Johnson et al., 2023). This is primarily because of factors affecting primary and secondary teachers' behavioral intention (motivational factors that influence a given behavior) to adopt LMSs (Balkaya & Akkucuk, 2021). Nonetheless, recent articles are investigating feelings, experiences, and perspectives of K–12 teachers regarding the forced online modality shift caused by COVID (An et al., 2021; Aji et al., 2020; Alturki & Aldraiweesh, 2021; An et al., 2021). Various researchers (Aji et al., 2020; Amin et al., 2021; An et al., 2021; Balkaya & Akkucuk, 2021; Ivanjko & Grubjesic, 2019) stated the need for further research using larger samples, comparison of findings among different countries, and the inclusion of other stakeholders. Additionally, An et al. (2021) stated that analyzing data from later stages of the pandemic could shed a different light on the dynamics of teachers' experiences with online teaching. This research can help cover

these gaps in the literature. Additionally, this information is essential because, as stated before, one of the components of the BL strategy is the LMS.

## Gap Relating to Blended Learning Strategy in K–12

BL is an innovative concept that embraces the advantages of both synchronous and asynchronous learning (Lalima & Dangwal, 2017). BL has been implemented in K–12 using four models: the flex model, the La Carte model, the enriched virtual model, and the rotation model (Corrine & Raymond, 2020). Furthermore, the rotation model of BL is divided into four submodels: flipped classroom, individual rotation, station rotation, and lab rotation (Corrine & Raymond, 2020).

BL has grown in popularity in recent years in higher education and K–12, primarily due to the potential to increase active learning and student engagement and considering recent events. However, research on BL is more prevalent in postsecondary education, with only a limited amount focusing on K–12 schools (Means et al., 2013; Weldy, 2013).

One gap in the literature is the need for more research on the implementation of BL in specific subject areas or grade levels. While some studies have examined the use of BL in mathematics or science classes (Merritt et al., 2017), there is still a need for research on the effectiveness of BL in other subjects, such as English language arts or social studies.

Another area with a significant gap in the literature is using BL for students with disabilities or special education needs. While some studies have examined the effectiveness of BL for students with specific disabilities, such as autism or visual

impairments (Bouck et al., 2020; Wang et al., 2016), there is a need for research that explores the use of BL for a broader range of disabilities. Additionally, studies need to focus on implementing BL for students with disabilities in the K–12 classroom and the extent to which the blended approach can support their learning.

Additionally, the literature focuses primarily on using this strategy in teacher preparation programs (Wong & Estudillo, 2021) and higher education students' perspectives on using BL (Amin et al., 2021). Despite the growing popularity of BL in K–12 education, there is a need for further research on stakeholders' perspectives on its use in the classroom. Stakeholders in K–12 education, including teachers, students, parents, and administrators, can have different views on the benefits and challenges of BL. Understanding their perspectives can provide valuable insights into how BL can be effectively implemented and sustained in K–12 classrooms. Recent literature has highlighted the need to research stakeholders' perspectives on BL in K–12 education. For example, Zhou and Zhang (2022) suggested that more research is needed to understand the attitudes and perceptions of teachers and students towards BL, while Bozkurt (2022) recommended that future studies explore the views of parents and administrators on the use of BL in K–12 education.

In addition to understanding stakeholders' perspectives on BL in K–12 education, there is a need for research that explores the factors that influence their attitudes and perceptions. For example, teachers' and students' perceptions of BL can be influenced by factors such as the availability of technology and the level of support that administrators provide (Asif et al., 2020). Similarly, parents' and administrators' views on BL can be

influenced by factors such as the perceived impact on student learning outcomes and the cost of implementing BL (Huang, 2016). Understanding these factors can help identify the barriers and facilitators to implementing BL effectively in K–12 education. Therefore, further research is needed to explore the factors influencing stakeholders' perspectives on BL in K–12 education. Further research is needed to probe deeper into the perspectives of K–12 teachers using different BL methods (Aji et al., 2020). This research can help cover part of the literature needs outlined above.

This chapter presents information on the literature search strategy, the conceptual framework, and literature related to key variables, ending with a summary and conclusions section.

## Literature Search Strategy

The literature review for this research was obtained by searching for articles in the following databases and search engines: Educational Resource Information Center (ERIC), Directory of Open Access Journals, Google Scholar, and ProQuest Dissertations. The following keywords were used in the databases mentioned above to obtain articles related to the research topic: *LMS*, *BL*, *flipped classroom*, *K–12 education*, *change process in K–12*, *implementation of LMS*, *LMS adoption in higher education*, *BL in higher education*, and *BL in K–12*.

I conducted a thorough review of the literature focused on peer-reviewed articles about LMSs, BL strategies, and e-learning published between 2017 and 2023 to identify the gap in the literature and justify the need for this research. All articles used for this chapter were published less than 5 years from my anticipated graduation date, excluding

the articles related to methodology, conceptual frameworks, and theories used to develop the conceptual framework. After I had carried out this literature review, it was evident that previous research did not present information on the stakeholders' perspectives proposed in this research: teachers' and administrators' perspectives in adopting a standardized LMS for BL. Furthermore, many of the articles in the review contained recommendations that future researchers consider analyzing what was proposed in this research. Because information on the topic is scarce, my focus was on qualitative studies, with a lesser focus on quantitative articles. The literature saturation was evidenced by the citation of recent articles recommended by the study proposed for this research.

<div align="center">

**Conceptual Framework**

</div>

Ravitch and Riggan (2016) stated that a conceptual framework forms the design of a study and guides its direction (Jozkowski, 2017). Additionally, a conceptual framework accentuates exploring factors relating to the phenomenon and provides concepts that guide the study's approach. I used the stages of concern and levels of use dimensions of the CBAM (see Hall & Hord, 1987).

**History of the Concerns-Based Adoption Model**

Hall and Hord (1987) introduced the CBAM as a response to apprehensions surrounding implementing significant organizational changes. The origins of CBAM can be traced back to 1965, when the U.S. Elementary Secondary Education Act (ESEA) was enacted, calling for educational reform (Hall, 1987). Hall and Hord emphasized with CBAM the importance of proactively addressing educators' concerns and anxieties before introducing any innovation, challenge, or change, such as curriculum implementation.

Schools and their personnel usually embark on the change process to achieve classroom and school improvement. They introduce innovations with the expectation that the proposed change will lead to better student outcomes. However, as Lewin (1951) and Roger (2003) noted, innovation and change are complex processes.

Most of the time, these innovations do not result in widespread use or improvement (Jacobs et al., 2018; Nadelson et al., 2015; Sánchez-Prieto et al., 2019), and schools often try a different innovation to satisfy the needs intended by the previous one. Instead, school personnel need to understand the change process and the tools that will help them describe and measure the components of an innovation. CBAM is the model commonly used to describe and promote change in schools because it provides tools and techniques for assessing and facilitating innovations in an educational environment.

**Stages of Concern**

The stages of concern dimension of the CBAM includes seven stages of concern that individuals may experience when encountering a change or innovation (Hall & Hord, 1987). These stages range from no concern or awareness (Stage 0) to refocusing on the impact of the change on student learning (Stage 6). Each stage represents a different level of personal and professional engagement with the innovation, described as follows:

- *Awareness*: During the awareness stage, individuals become cognizant of the presence and significance of the innovation in their educational context (Hall & Hord, 1987).

- *Information*: In the information stage, individuals actively seek relevant data and resources to understand the nature and purpose of the innovation (Hall & Hord, 1987).

- *Personal*: The personal stage involves individuals reflecting on their own beliefs, values, and concerns regarding the implementation of the innovation (Hall & Hord, 1987).

- *Management*: At the management stage, individuals focus on the practical considerations of implementing the innovation, such as time, resources, and logistical aspects (Hall & Hord, 1987).

- *Consequence*: In the consequence stage, individuals evaluate the potential impact and outcomes of the innovation on students, colleagues, and the overall educational setting (Hall & Hord, 1987).

- *Collaboration*: The collaboration stage entails seeking and engaging in supportive relationships and interactions with colleagues and stakeholders to facilitate successful adoption (Hall & Hord, 1987).

- *Refocusing*: During the refocusing stage, individuals reflect on their experiences and adjust, refine, and enhance the implementation of the innovation (Hall & Hord, 1987).

Stages of concern make the first dimension of CBAM. The stages of concern make up the diagnostic dimensions of the model. There are seven categories of concerns related to innovation. Figure 1 explains these seven stages.

**Figure 1**

*CBAM Stages of Concern*



STAGES OF CONCERN (CBAM)

REFOCUSING — IS THERE ANYTHING ELSE THAT'S BETTER?

COLLABORATION — •IT'S WORKING FINE, BUT HOW DO OTHERS DO IT?

CONSEQUENCE — •IS THIS WORTH IT? •IS IT WORKING?

MANAGEMENT — •HOW CAN I MASTER THE SKILLS & FIT IT ALL IN?

PERSONAL — •HOW DOES THIS IMPACT ME? •WHAT'S MY PLAN TO DO IT?

INFORMATION — HOW DOES IT WORK?

AWARENESS — WHAT IS IT?
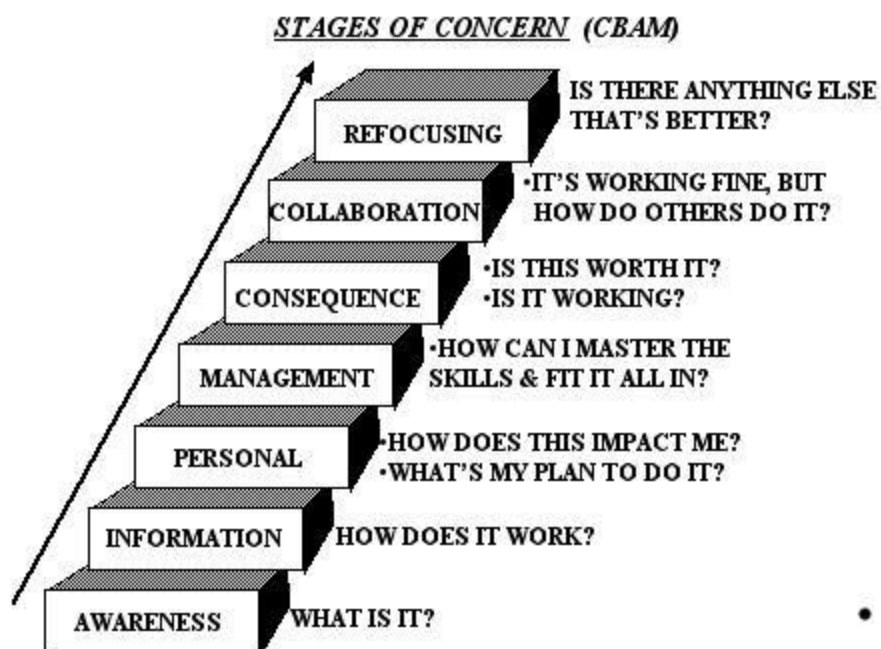
*Note*. From *Change in Schools: Facilitating the Process* (p. 208), by G. E. Hall and S. M. Hord, 1987, State University of New York Press. Copyright Educational Horizons.

In the context of my study, the CBAM was a valuable aspect of the conceptual framework. The stages of concern were closely tied to my research because the study explored teachers' and school directors' concerns and attitudes toward adopting a standardized LMS and its integration into their teaching practices. By employing the stages of concern from CBAM, I was able to explore the concern of teachers and school directors related to their acceptance and utilization of the potential LMS standardization and the BL strategy. As far as my study was concerned, part of the guiding questions for the interviews referred to the questionnaire used in the CBAM model to identify where teachers' and school directors' concerns fell related to the standardized implementation

of the LMS. Further details about the alignment of CBAM concepts, RQs, and interview questions are provided in Chapter 3.

Current research has utilized the stages of concern of CBAM to gain insights into the implementation of educational innovations. For example, a study by Faber et al. (2016) examined the adoption of a digital assessment tool in mathematics classrooms. The researchers used the CBAM framework to identify and analyze the concerns expressed by teachers at different stages of the implementation process. The findings highlighted the importance of addressing early-stage concerns, such as understanding and awareness, to facilitate successful adoption.

Another study conducted by Sarfo et al. (2017) investigated the implementation of a new science curriculum in elementary schools. The researchers employed the stages of concern model to assess teachers' perspectives and concerns during the transition. The study revealed that teachers' concerns shifted from personal issues, such as time and workload, to concerns about instructional strategies and student engagement as they progressed through the stages. By identifying and analyzing the stages of concern, this research can delve into the varying levels of apprehension, acceptance, and readiness exhibited by teachers and school directors about the standardization of an LMS for BL.

Overall, recent research that has utilized the CBAM model as a conceptual framework has demonstrated its relevance in understanding the stages of concern experienced by teachers and school directors during the adoption of educational innovations. By examining the progression of concerns from self-concern to task and impact concerns, researchers can gain insights into the factors influencing educators'

perspectives and engagement with the technology, enabling the development of targeted interventions and strategies to support successful implementation.

**Levels of Use**

The levels of use dimension of the CBAM provides a way to assess the extent to which individuals implement an innovation. Levels of use include five levels representing different degrees of integration and proficiency in using the innovation (Hall & Hord, 1987). These levels range from nonuse (Level 0) to renewal (Level 7). Each level reflects a different stage of adoption and utilization describe as following:

- Orientation: The orientation level of use involves individuals exploring innovation and its potential benefits through initial exposure and experimentation (Hall & Hord, 1987).

- Preparation: At the preparation level, individuals acquire the necessary skills and knowledge to effectively implement the innovation, often through training or professional development programs (Hall & Hord, 1987).

- Mechanical: The mechanical level of use refers to individuals using the innovation as intended, following prescribed procedures and guidelines without significant personalization or adaptation (Hall & Hord, 1987).

- Routine: The routine level involves individuals fully integrating the innovation into their regular practice, incorporating it into their instructional routines and adjusting as needed (Hall & Hord, 1987).

- Refinement: The refinement level involves individuals that make changes to the innovation to increase outcomes. These individuals actively seek ways to improve the results and effectiveness of their use of innovation.

- Integration: The integration level depicts users that make deliberate efforts to coordinate with others in using the innovation. This level emphasizes teamwork and collaboration.

- Renewal: The renewal stage describes individuals that seek effective alternatives to the established innovation.

Figure 2 includes the seven Levels of use and a description of each level.

**Figure 2**

*Levels of Use and Behaviors*
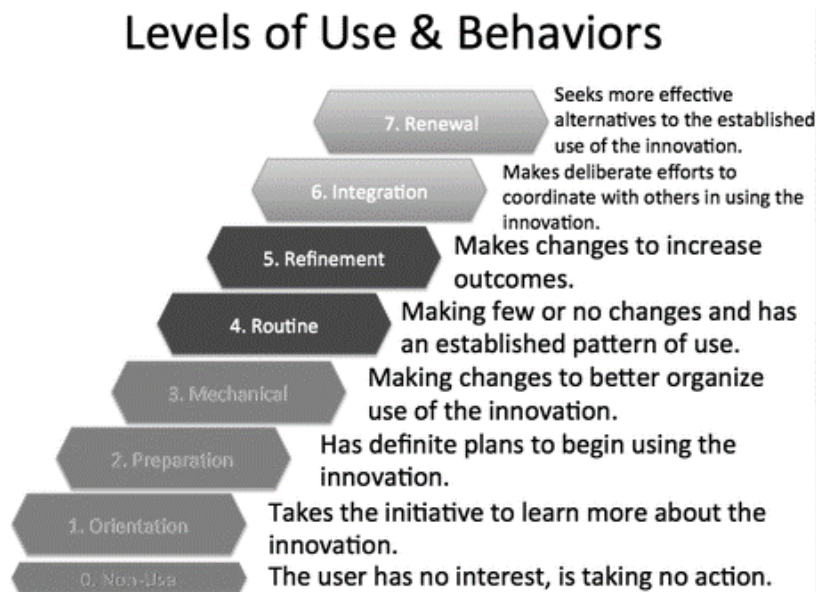


*Note*. From *Title Learning Outloud*, by T. Bell, 2015., Learning Outloud

In the context of my study, the levels of use dimension of CBAM were relevant since used them to explore the current use and implementation of an LMS and to identify factors that may hinder or facilitate higher levels of use.

**Application of Concerns-Based Adoption Model in Current Research**

Recent articles have applied the CBAM model as a conceptual framework to investigate the stages of concern among educators during the implementation of technological innovations. For example, Ogegbo and Ramnarain (2022) utilized CBAM to examine teachers' concerns and perceptions while integrating a digital learning platform in K–12 classrooms. Their study found that teachers progressed through the stages of concern outlined in the CBAM model, starting from self-concern, and gradually transitioning to task and impact concerns as they become more familiar and comfortable with the new technology. This research demonstrates how CBAM can be employed to understand teachers' evolving concerns and perspectives when implementing educational innovations, including the standardization of an LMS for BL.

Another study by Porter et al. (2014) explored the stages of concern among higher education faculty when adopting a BL approach. Using CBAM as a theoretical framework, the researchers identified the initial self-concerns of faculty regarding the change in instructional methods. They observed how their concerns shifted towards task and impact as they engaged more deeply with BL. The findings revealed the dynamic nature of concerns throughout the adoption process and highlighted the importance of addressing individual concerns to promote successful implementation. This study

illustrates how CBAM can be applied to investigate the stages of concern in a specific context, such as the standardization of an LMS for BL in higher education.

Researchers apply these stages of concern as data-gathering tools in questionnaires, interviews, and open-ended statements. These stages allow researchers to rate the extent to which stakeholders agree with various innovation-related statements. With these tools, researchers can examine the concerns of the staff across different sites in the institution. The data collection results allow researchers to identify where stakeholders fall within the seven stages and provide a map of their concerns. These tools are usually administrated at the start of a new project.

Al Masarweh (2019) used CBAM to assess how faculty members in Saudi Arabia were using an m-learning system with a new approach and methodology that have been used in the Gulf region. Al Masarweh (2019) used CBAM in this study to investigate m-learning adoption as an educational technology because the model provides tools to evaluate the use of educational technology within educational settings. Similarly, Pamuk (2022), designed a study to investigate teachers' reflections regarding technology integration in 52 Turkish schools within 17 cities. The researcher used CBAM to understand teachers' concerns regarding technology use. Finally, Francis Amankwah et al. (2022), used CBAM to explore university professors' stages of concerns about the adoption of the Moodle LMS at university in Ghana. This last study resembles my own in a higher education setting. Table 1 summarizes articles using CBAM in recent studies.

Table 1 evidenced that CBAM is still prevalent in recent research related to technology. In addition, it has been used in studies related to stakeholder perspectives on

implementing innovations. This research explores teachers' feelings concerning ICT

adoption in the classroom.

**Table 1**

*Peer-Reviewed Article and CBAM Use Summary*

| Research article | Citation | Summary |
|---|---|---|
| Evaluating M-Learning System Adoption by Faculty Members in Saudi Arabia Using Concern Based Adoption Model (CBAM) Stages of Concern | (Al Masarweh, 2019) | The study assesses the use of an m-learning system by faculty members using an innovative approach and methodology that has been used in the Gulf region. The CBAM was used in this study to investigate m-learning adoption as an educational technology. |
| Investigation of Teachers' Reflections on Countrywide Tablet PC and Interactive White Board Initiative in Turkish Schools | (Pamuk, 2022) | This research study assessed a project with the aim of providing each K–12 student with a Tablet PC and every classroom with an Interactive Board using a high-speed Internet connection. Researchers used the CBAM as part of a guiding framework to interpret this study's results. |
| Teachers who Initiate Changes with an eBook-Integrated Curriculum: Revisiting the Developmental Assumptions of Stages of Concerns in the Concerns-Based Adoption Model. | (Min, 2017) | This research study uses in-depth interviews to explore the concerns of teachers who attempted to initiate eBook integrated curriculum independently in a higher education setting and to examine how the Stages of Concerns (SoC) in the Concerns-Based Adoption Model (CBAM) explains the change processes among teachers. |
| Teachers' concerns about integrating information and communication technologies in the classrooms | (Dele-Ajayi et al., 2021) | This research explores teachers' feelings concerning ICT adoption in the classroom. |

Current research has utilized the levels of use framework of CBAM to examine the implementation of educational innovations. For instance, a study by Rogers (2021) examined the relationship between New Hampshire middle and high school teachers' beliefs about competency-based education impacts their classroom practices and students' adoption of a digital assessment tool in mathematics classrooms. The researchers employed the CBAM framework to determine the level of use among teachers and identify the factors influencing their adoption. The findings highlighted the importance of providing ongoing support and professional development to move teachers towards higher levels of use. Another study by Tafai (2017) investigated the implementation of a new science curriculum in elementary schools. The researchers utilized the levels of use model to assess the extent to which teachers were incorporating project-based learning into their instruction. The study revealed that teachers at higher levels of use demonstrated greater student engagement and achievement.

**Rationale for Framework**

The purpose and problem of study aligns with the stages of concern and levels of use dimensions of CBAM's framework in several ways. First, stages of concern emphasize the significance of addressing individual concerns, attitudes, and beliefs during the adoption process (Hall & Hord, 1987), which is directly applicable to understanding the perspectives of teachers and school directors regarding the standardized LMS. Second, the framework's concept of stages of concern provides a lens to analyze educators' varying degrees of apprehension and readiness toward adopting the standardized LMS (Hall & Hord, 1987). Lastly, CBAM's level of use dimension will

enable me to explore how teachers and school currently use LMSs for BL. This alignment with CBAM allows for a comprehensive examination of the factors influencing the potential adoption process in the specific context of standardizing an LMS for BL. The following sections detail the elements of CBAM related to my study.

In addition to alignment to the study's problem and purpose, CBAM is well established in educational technology research as a framework for examining impending or ongoing implementation. CBAM will allow me to explore concerns and level of use that I will gather in the interviews with teachers and school directors. Additionally, I plan to use the questions provided in the tools of CBAM to develop similar guiding questions for the teachers' and school directors' interviews.

## Key Variables and Concepts

Based on the literature and the conceptual framework elements, this study will focus on the following key concepts:

- learning management system

- blended learning

- K–12 education

- teachers' and administrators' perspectives

Each key concept will include a description of related studies, methodologies used to work with them, and how researchers in the discipline have approached the problem related to them. Also, each key concept will include the strengths and weaknesses of the different approaches used by researchers and justify why each key concept was selected

based on the existing literature. The description of the key concepts might intertwine

since, in most cases, these elements are combined and studied together.

**Learning Management Systems**

An LMS, often known as course management systems or virtual learning

environments, are software applications that enables the administration, documentation,

tracking, reporting, and delivery of educational content, training programs, or learning

and development programs. An LMS can be used by educational institutions,

corporations, and training organizations to facilitate distance learning, BL, and self-paced

learning. Almarashdeh (2016) concluded that an LMS can enhance the quality of

education, provide flexible learning opportunities, and improve students' satisfaction

with their learning experience. Due to the increased use of LMSs in higher education

(Mtebe, 2015), many organizations, academic institutions, and enterprises now use them.

Face-to-face instruction, blended instruction, virtual training, and remote teaching are

strategies and modalities that depend on an LMS (Singh et al., 2021). Educational

institutions and organizations have widely adopted LMSs to facilitate online learning and

training. Additionally, LMSs are used as a support and information technology resource.

Furthermore, the LMS industry will reach $325 billion (about $1,000 per person in the

US) by 2025 (McCue, n.d.), demonstrating its significance.

The current literature on LMS has focused on various aspects of their

implementation and effectiveness, including their impact on student learning outcomes

(Akay & Koral Gumusoglu, 2020; Aldiab et al., 2019; Alturki & Aldraiweesh, 2021;

Awad et al., 2022; Bradley, 2020), their usability and user satisfaction (Al Masarweh,

2019; Aldiab et al., 2019; Almarashdeh, 2016; Angel M. Ojeda-Castro et al., 2013; Asiri et al., 2012; Bassam et al., 2018; Daouk & Aldalaien, 2019; Dele-Ajayi et al., 2021), and the role of instructors in their use (Dias & Diniz, 2014; Eltahir et al., 2019; Gemin et al., 2018; Kim et al., 2021; Lasanthika & Tennakoon, 2019). Studies have found that LMS can positively impact student learning outcomes by providing opportunities for collaborative learning and personalized instruction (Furqon et al., 2023; Hew & Cheung, 2013). Additionally, LMS can enhance engagement and motivation using gamification and interactive multimedia (Jayalath & Esichaikul, 2022).

Usability (Aldiab et al., 2019; Alserhan & Yahaya, 2021; Benbaba & Lindner, 2021; Chien-Yuan Su et al., 2021) and user satisfaction (Mohd Nasir et al., 2021; Putro et al., 2021) have also been important research areas in the current literature on LMS. Studies have shown that the usability of LMS can significantly affect user satisfaction and adoption (Phongphaew & Jiamsanguanwong, 2018). Factors influencing usability include ease of use, interface design, and system reliability. Additionally, studies have highlighted the importance of user training and support to ensure successful implementation and user satisfaction (Cataldo et al., 2022).

The role of instructors in LMS implementation and use has also been a focus of research (Balkaya & Akkucuk, 2021; Crary, 2019; Huang, 2016; Ivanjko & Grubjesic, 2019). Instructors play a crucial role in designing and delivering content, as well as facilitating interaction and engagement among learners (Bahar et al., 2020; Zanjani et al., 2016). Studies have shown that instructors' attitudes and beliefs toward LMS can impact their use and effectiveness (Bassam et al., 2018). Furthermore, instructor training and

support are critical factors in promoting successful LMS implementation and use (Zheng et al., 2021).

Furthermore, the current literature on LMS has also examined the integration of emerging technologies, such as artificial intelligence (AI) and machine learning (ML), to enhance their functionality and effectiveness (Aldahwan & Alsaeed, 2020; Villegas-Ch et al., 2020). For instance, AI-powered LMS can provide personalized learning paths based on individual learner needs and preferences (Teslenko, 2021). Similarly, ML can be used to analyze learner data and provide insights for instructors to improve instruction and student outcomes (Teslenko, 2021).

Current literature on LMS has highlighted their potential to enhance student learning outcomes, user satisfaction, and instructor effectiveness. Usability, user training and support, instructor attitudes, and integration of emerging technologies are important factors to consider in successful LMS implementation and use (Kaewsaiha & Chanchalor, 2021). Various studies on LMS from qualitative and quantitative perspectives have been conducted since the COVID-19 pandemic (Alturki & Aldraiweesh, 2021; An et al., 2021; Awad et al., 2022; Bordoloi et al., 2021; Cobo-Rendón et al., 2022).

### *LMSs in Higher Education*

Ever since they first appeared, LMS has had a significant role in higher education (Ivanjko & Grubjesic, 2019). These systems' importance derives from the fact that they aid in activation of Bloom's six levels of the cognitive domain taxonomy, which helps and increases the process of knowledge acquisition (Ayyanathan, 2022). In particular, the emphasis placed by higher education institutions on LMS, and other tools associated with

collaboration is because they provide opportunities to share knowledge, create communities of leaders, and help a higher order of thinking and through conversations and collaboration (Martin et al., 2020; Zanjani, 2017). This technology, along with a BL strategy, has proven to increase student engagement in higher education, resulting in better student outcomes and retention (Sahni, 2019).

There are studies of the LMS in higher education from different perspectives, taking different variables and concepts as metrics to measure the effectiveness from different points of view. Nhu-Ty Nguyen (2021) studied users' satisfaction with the LMS at the International University, Vietnam National University HCMCCMC. In this study, the researcher used a survey to quantify students' reactions towards announcement systems, instruction information, interactions, technology quality within the LMS, and the impact of the LMS's usefulness on their satisfaction. The study suggests that the significant impact of the abovementioned factors are both direct and indirect relations. It was concluded that all the factors positively affected LMS usefulness which led to better student satisfaction.

Saygili and Çetin (2021) studied the effect of LMS use on students' mathematic achievement through a meta-analysis method. The researchers used 43 experimental studies with a data set that included standard deviations, mean scores, and sample sizes incorporated in the analysis. Data were analyzed using Comprehensive Meta-Analysis software and random effects model. The results indicated that mathematics achievement did not differ between subgroups relating to sample, type of population, duration of the

application, and method of application. However, there was a significant difference in the subgroups relating the variables of years, counter, subject, and education level.

Kwon et al. (2021) argue that the identity changes of three components, instructor, learner, and LMS, are inevitable for authentic online teaching and learning. The researchers collected study samples from an American college whose education type is traditional Face-to-face and used LMS in a nonintegrated way before the COVID-19 outbreak. The investigation results indicate that institutions with more traditional teaching methods that rely less on BL, flipped courses, and online courses, are limited to technical, administrative, and pedagogical support in the transition from offline to online, affecting both students and instructors.

Alserhan and Yahaya (2021) studied instructors' perspectives on using LMS for a personal learning environment (PLE). Their study concluded that teachers must apply a positive teaching approach, keeping in mind that knowledge comprises student-to-students interactions and student-to-teacher interactions. Additionally, the study revealed that teachers must deliver and support K–12 online and BL.

Jin et al. (2021) studied instructors' perspectives using sequential and clustering analysis techniques, specifically for teacher behavior, using an LMS. Teachers' behavior was classified into five categories, course content, assignment, communication and collaboration, assessment, and administration. Results from this study indicate that most teachers were used to communication channels and ls and assignments by the end of the course. Three distinct behavioral patterns were named as teachers preferred assessment, teachers of regular use, and teachers of less use. Most teachers could only use the

assessment functions to conduct assessment tasks but rarely demonstrated other operational behaviors when using LMSs. Moreover, the three diverse teacher clusters were identified via two-stage clustering.

Haggerty et al. (2022) studied the benefits and barriers to implementing library resources in LMSs. The study's results suggest substantial obstacles encountered while appropriately incorporating licensed library resources in a D2L LMS

These examples of LMS research in higher education highlight the advantages and difficulties stakeholders present while using an LMS. As a dependent and independent variable, these studies focused their research on students, teachers, and administrators' perspectives on using an already established LMS. Some of these studies focus on the LMS's impact on some courses. In contrast, other studies are more comprehensive regarding their implementation, use of other strategies, and effectiveness in different scenarios. In synthesis, all these studies found that there are barriers that have impact on the LMS use and students' outcomes but there is no study addressing the issue about teachers (instructors) saying in the selection of an LMS. These barriers are:

- Unequal access to technology and internet connectivity, particularly in underserved communities (Gemin et al., 2018). This can lead to disparities in students' ability to engage with LMS platforms, complete assignments, and access learning resources, consequently affecting their learning outcomes (Hébert et al., 2021; Norris et al., 2003; Wang et al., 2016).

- Technological infrastructure: Inadequate technological infrastructure within educational institutions, including slow or unreliable internet connections,

outdated hardware, or limited technical support, can hinder the effective use of LMS platforms (Cha & So, 2021; Machusky & Herbert-Berger, 2022; Schwartz et al., 2020; Tang & Bao, 2020). This can negatively impact user satisfaction and limit students' access to learning materials and activities.

- Digital literacy skills: Many students and even educators lack the necessary digital literacy skills to effectively navigate and utilize LMS platforms (De León et al., 2023; Rafi et al., 2019; Statti & Torres, 2020). Limited proficiency in using digital tools and resources can create barriers to engaging with course materials, participating in online discussions, and submitting assignments, ultimately affecting student outcomes (Dewi et al., 2021; Sadaf & Gezer, 2020).

- Resistance to Change: Resistance to change is a common barrier in both higher education and K–12 settings (Anastasiadou & Taraza, 2020; Basami, 2022; Masry-Herzalah & Dor-Haim, 2022). Some faculty members or teachers may be hesitant to adopt LMS platforms due to a preference for traditional teaching methods or a lack of familiarity with online learning environments (Lavidas et al., 2022). This resistance can impact the quality and effectiveness of LMS implementation and consequently affect student outcomes (Lavidas et al., 2022).

- Lack of Training and Professional Development: Insufficient training and professional development opportunities for teachers and faculty members on how to effectively use LMS platforms can impede their ability to fully

leverage the features and capabilities of these systems (Cooper et al., 2019; Liesa-Orús et al., 2020; Martin et al., 2019; Parsons et al., 2019). Without proper training, educators may struggle to create engaging online learning experiences, leading to lower student outcomes and reduced user satisfaction (Parsons et al., 2019).

- Design and Usability: The design and usability of LMS platforms can significantly impact user satisfaction. Complex interfaces, unintuitive navigation, or confusing features can hinder user engagement and frustrate both students and educators (Alshira'h, 2021; Hasan, 2019; Salas et al., 2019; Torrisi-Steele & Atkinson, 2020). A poorly designed LMS can create barriers to effective learning experiences, potentially affecting student outcomes (Salas et al., 2019).

Similarly, there is sparse literature about LMS implementation in Puerto Rican higher education and K–12 education.

The previous citations demonstrate how LMSs have become an essential component of modern education, providing a platform for online teaching, BL, and assessment. This literature highlights the importance of LMS in facilitating student-centered learning and improving the overall educational experience. According to Veluvali & Surisetti (2021), LMS plays a crucial role in improving student engagement and satisfaction, leading to better academic performance. Furthermore, research by Dias & Diniz (2014) suggests that LMS can enhance teacher-student communication, which is essential for effective teaching and learning.

Another significant area highlighted in the current literature is the LMS impact on student learning outcomes (Ayyanathan, 2022; Tong et al., 2022). Several studies have shown that LMS can improve student learning outcomes by providing access to a range of educational resources, facilitating collaborative learning, and personalized learning (Rawashdeh et al., 2021; Wang et al., 2021). In addition, LMS can provide real-time feedback to students and teachers, which can help identify and address gaps in student learning.

Finally, LMS research has also highlighted the challenges and limitations of LMS implementation in educational institutions. Some of the challenges include the need for technical support, faculty resistance, lack of institutional support, and the need for continuous professional development (Martínez Monés et al., 2020). These challenges can impact the effective use of LMS and limit its potential to improve teaching and learning outcomes.

### LMSs in K–12

The purpose of this basic qualitative research study is to explore teachers' and school directors' perspectives about standardizing an LMS for BL strategy in K–12 Puerto Rican education. Research related to the use of LMS in the K–12 educational setting is scarce, this being one of the reasons that justify the proposed study. The literature review highlights the difficulty of a statewide implementation of LMS in public education systems, due to the economic factor (Yang et al., 2021). Another factor analyzed as a difficulty for the implementation is the time it would take to train the stakeholders. Both in the initial implementation procedure, as well as for those changes

that arise once the system is implemented, whether they are technological, or strategies derived from its implementation. In their research, Al Ohali et al. (2018) denotes the different stakeholders' challenges in a statewide implementation project. The study identifies as potential problems the system infrastructure, which must have the capacity to house substantial amounts of information, connectivity issues, compatibility with the network and electronic devices, training stakeholders, and the need for support personnel needed to support such system.

Even though there is research regarding LMS in K–12, the exiting literature centers in particular schools, the LMS impact on students' outcomes and engagement (Ayyanathan, 2022; Tong et al., 2022), effects on teaching strategies within a specific course at a specific level (Karaarslan Semiz & Isler Baykal, 2020; Saygili & Çetin, 2021; Tong et al., 2022; Yilmaz & Ay, 2018), the used given to an LMS as a personal learning network and LMS impact on student engagement (Alserhan & Yahaya, 2021; Burrough, 2015; Ivanjko & Grubjesic, 2019; Liu & Cavanaugh, 2012; Oguguo et al., 2021; Powell & Bodur, 2019; Saygili & Çetin, 2021). Only one article was found regarding an LMS implementation process, and its purpose was to identify the challenges this project could face from a technical point of view (Al Ohali et al., 2018). Al Ohali et al. (2018) mentions in this same article 14 benchmarks that the project must go through, where 13 of them relate to the teacher (Al Ohali et al., p. 5, 2018).

Based on the elements of my study's conceptual framework, the importance of the stakeholders' perspectives and its impact on the change process is crucial in any change process. Fullan (2016) says that educational change depends on what the teacher does and

thinks, in other words, the teacher's perspective. Lewin (1951) references the teachers'

behaviors as resisting or driving forces. Similarly, Rogers (2005) diffusion theory

mentions the concept of Relative Advantage, which is the degree to which an innovation

is perceived. These theories concepts make references to the importance of stakeholders'

perspectives. Finally, the last element of my study's conceptual framework, CBAM,

mentions the Stages of Concern, which can be translated as perspectives. Despite the

importance of the teacher's role in this process, the focus of Al Ohali et al.'s (2018) study

did not contemplate stakeholders' perspectives about the implementation process.

Additionally, Balkaya and Akkucuk (2021) state the need for future research on LMS

implementation and how BL couples with the diverse types of LMSs. Equally important,

future research should study other factors like teachers' attitude towards LMS and

motivations to use (Alturki & Aldraiweesh, 2021). The proposed study aims to fill that

gap.

**Blended Learning**

BL is an instructional strategy designed to facilitate the combination of benefits

related to technology and face-to-face instruction, to address the variance in student

learning (Yang et al., 2021). A meta-analysis of 47 studies found that BL has a small to

medium effect on student learning outcomes when compared to traditional instruction

(Means et al., 2010). Like the LMS, much research exists for the BL strategy from

various perspectives. Due to the current situation, the use of this strategy, both in higher

education and in the K–12 scenario, has become the norm of teaching modalities (Huck

& Jingshun Zhang, 2021; Balkaya & Akkucuk, 2021). Similarly, most of the literature on

BL focuses on its use at the higher education level since it depends on some system that allows the student and the instructor to carry out part of the teaching remotely. Even though Every Student Succeeds Act SA, 2015) of the United States emphasizes the need to support states for the implementation of BL by facilitating the use of technology, it is unclear how states intend to operationalize such strategy (Yang et al., 2021). Prior studies focused on issues related to students and academic staffs in improving teaching and learning effectiveness, only a few studies focused on institution's readiness and diffusion issues (Bokolo et al., 2020) and for this reason, administrators' perspectives about the use of such strategy is necessary.

*BL in Higher Education*

There has been a growing interest in BL in higher education in recent years. According to Castro (2019), BL can improve student engagement, learning outcomes, and retention rates. One of the key benefits of BL in higher education is its ability to provide students with more flexibility in their learning. According to a study Tong et al. (2022), BL can allow students to learn at their own pace and convenience. This flexibility can reduce stress levels and improve students' satisfaction with their learning experience.

Another area of research on BL in higher education focuses on its impact on student achievement (Aji et al., 2020; Amin et al., 2021; Angel M. Ojeda-Castro et al., 2013; Arslan, 2020; Asif et al., 2020; Bordoloi et al., 2021; Charbonneau-Gowdy & Herrera, 2019; Cobo-Rendón et al., 2022; Damanik, 2020; Finlay et al., 2022; Hu et al., 2019; Lalima & Dangwal, 2017; Mali & Lim, 2021; Manurung et al., 2020). A study by Dziuban et al. (2018) found that students who participated in BL had higher academic

achievement than those who received traditional face-to-face instruction. The authors suggest that BL may be more effective in helping students to develop critical thinking skills, as it allows for more significant interaction and collaboration.

BL can also be used to address challenges faced by underrepresented groups in higher education. O'Donnell et al. (2015) found that BL can help reduce the achievement gap between minority and nonminority students. BL can provide a more inclusive and equitable learning environment by offering students greater access to resources and support.

Additionally, research on BL in higher education has also explored the role of instructional design in developing practical BL courses. A study by Gedik et al. (2013) found that effective instructional design is crucial in ensuring the success of BL courses. The authors suggest that careful planning and consideration of learners' unique needs and preferences can help optimize the effectiveness of BL in higher education.

Current research on BL in higher education suggests that it can offer numerous benefits, including improved student engagement, academic achievement, and retention rates. BL can also help to address challenges faced by underrepresented groups in higher education and can be optimized through effective instructional design.

### *BL in K–12*

Like the LMS research, the literature related to the BL strategy in the K–12 setting is very particular. The existing literature relates to teacher preparation concerning technologies that allow asynchronous instruction and harmonize them with the synchronous part of the strategy using different models (Hall & Lei, 2020). Other

research focuses on the effectiveness of the strategy in student engagement and student outcomes (Yeigh et al., 2020). However, although the teacher is a fundamental piece in developing the BL strategy, there is no literature on the teachers' perspectives of its use.

Yang et al. (2021) used thematic analysis to investigate how many states referenced BL and how they operationalized BL in states based on Every Student Succeed Act (ESSA, 2015) plans. They identified in their study that (1) the definition of BL among stakeholders is ambiguous, (2) and a major theme that operationalizes the strategy is leveraging technologies to support it. Both points (the lack of a general definition for BL and the issue that always emerges related to leveraging technologies) support the need to study the perspectives of those involved, especially those who will manage the academic part (teachers) and those responsible for ensuring that technologies to support the strategy are available.

The existing literature on teachers' perspectives and the BL strategy relates to the preparation of teachers to conduct such strategy effectively, their opinions about different LMS, and on the effectiveness of the different variations and models of BL (Aji et al., 2020; Alturki & Aldraiweesh, 2021; Amin et al., 2021; An et al., 2021; Anderson, 2020). On the other hand, most of the research relating to teachers and LMS, revolves around their perspectives about the effectiveness of this technology for remote learning caused by COVID (Aji et al., 2020; Amin et al., 2021; An et al., 2021; Arslan, 2020; Bordoloi et al., 2021; Cardullo et al., 2021; Cobo-Rendón et al., 2022; Damanik, 2020; Lalima & Dangwal, 2017; Megahed & Hassan, 2021).

Although COVID forced the adoption of technologies that allow remote education, both synchronous and asynchronous, or in a combination of both (BL), research has been carried out based on the effectiveness of this process, the preparation of those involved in the management of technological tools, and comparisons between the different platforms available. This needs to adopt online, and BL modalities came with covid, but will not end with the pandemic, and knowing the perspective of teachers and school principals about a regional standardization of one of the tools for carrying out the BL strategy provides essential information for making this decision.

### Summary and Conclusions

This comprehensive literature review examined the research surrounding LMS and BL strategies. The review aimed to identify common findings and differences in research related to the use of LMS in BL contexts. Several key themes emerged from the literature, shedding light on the benefits and challenges of incorporating LMS in BL environments. The findings highlighted the positive impact of LMS on student engagement, flexibility, and access to learning resources (Kaewsaiha & Chanchalor, 2021; Rubin et al., 2010; Simanullang & Rajagukguk, 2020; Villegas-Ch et al., 2020). The review also revealed variations in research findings, emphasizing the need for contextual considerations in implementing LMS and BL strategies (Chien-Yuan Su et al., 2021; Francis Amankwah et al., 2022; Putro et al., 2021; Veluvali & Surisetti, 2021).

The literature consistently indicated that the integration of LMS in BL positively influenced student engagement and learning outcomes (Kocour, 2019; Nkomo & Nat, 2021; Sahni, 2019). LMS provided students with access to a wide range of resources,

collaborative tools, and interactive learning materials, enhancing their motivation and participation (Dias & Diniz, 2014; Furqon et al., 2023; Goh & Sigala, 2020). Additionally, the flexibility offered by LMS allowed students to learn at their own pace and access materials anytime and anywhere, accommodating diverse learning styles and preferences (Furqon et al., 2023).

While there were consistent findings regarding the benefits of LMS integration, differences in research findings emerged in several areas. One notable difference was observed in terms of student achievement outcomes. Some studies reported significant improvements in student performance and learning outcomes (Benbaba & Lindner, 2021; Zhou & Zhang, 2022), while others found more modest effects (Alshira'h, 2021; Angel M. Ojeda-Castro et al., 2013; Yilmaz & Ay, 2018). These variations may be attributed to variations in instructional design, teaching methods, type of course, and the degree of LMS integration.

Another difference in research findings pertained to the impact of LMS on student satisfaction. While some studies reported high levels of student satisfaction with the use of LMS (Crary, 2019; Jin et al., 2021; Powell & Bodur, 2019), others highlighted challenges such as technical issues, limited interaction, and the need for effective course design to maximize satisfaction (Hew & Cheung, 2014; Holmes & Prieto - Rodriguez, 2018; Liu & Cavanaugh, 2012). These differences underscore the importance of considering user experience, pedagogical approaches, and system usability in the successful implementation of LMS in BL environments.

In conclusion, this literature review presents a comprehensive overview of the research on LMSs and BL strategies. The findings underscore the positive impact of LMS on student engagement, flexibility, and access to resources. However, differences in research findings highlight the need for careful consideration of contextual factors, instructional design, and faculty readiness. After having carried out the literature review, the need to explore the perspectives of teachers and administrators related to the implementation of an LMS for BL in the K–12 environment is of paramount importance. Most articles associated with this problem refer to the transition to the online modality caused by the COVID 19 pandemic. In their future research sections, they highlight the need for research on stakeholders' feelings regarding the new forms of post-pandemic studies. This gap is what this study intends to fill, which is the perspective of those involved in education. In addition, the rise of the hybrid modality (BL) also requires research that highlights the perspectives of those stakeholders involved in the process so that both gaps can be satisfied with this study.

Consequently, the proposed study can lay the groundwork for future research using the proposed study as a model to analyze the perspectives of other stakeholders within the same K–12 environment.

Since this phenomenon to be studied is the first of its kind in the region, it requires a simple qualitative analysis that lays the literary foundations. The problem will be described and analyzed through individualized interviews, and the literature gathered could be used for future research. Additionally, the established methodology could be used as a research model for other derived phenomena.

Chapter 3: Research Method

The purpose of this basic qualitative research study was to explore teachers' and school directors' perspectives about standardizing an LMS for BL strategy in K–12 Puerto Rican education. The basic qualitative research methodology was selected for collecting information through interviews that allowed for answering the research questions related to the study. Because the standardization of an LMS from the Department of Education of Puerto Rico has been a relevant issue since the COVID-19 pandemic, I interviewed teachers and school directors from different regions of Puerto Rico rather than a specific site, whom I recruited using snowball sampling using social media. The information collected from this study could fill the gap identified through the literature review regarding teachers' and school directors' perspectives about standardizing an LMS and BL strategy in K–12 Puerto Rican education.

In this chapter, I provide descriptions of the concepts of the study, the methodology's rationale, the participants' selection explanation, the instruments used for data collection, and the role that I played as the researcher. Furthermore, the relationships, biases, and ethical issues that needed to be addressed for the study are detailed in this chapter. Finally, I will describe the issues of trustworthiness and ethical procedures necessary to protect the participants.

**Research Design and Rationale**

The purpose of this basic qualitative research study was to explore teachers' and school directors' perspectives about standardizing an LMS for BL strategy in K–12 Puerto Rican education. By examining the perspectives of teachers and school principals

regarding the issue mentioned above, my study could contribute insight into the literature gap related to the implementation of technological tools for K–12 education.

The Puerto Rico Department of Education established during the COVID-19 pandemic the use of Microsoft Teams as a learning platform or LMS for all public schools in the island. Although the TEAMS tool is not an LMS, the Puerto Rico Department of Education has stated it as the tool to conduct online and virtual modality classes. At the beginning of the pandemic, the Puerto Rico Department of Education offered workshops to teachers and administrative personnel about TEAMS use. At the time of this writing, TEAMS continues to be used as an LMS by teachers working with the BL strategy to allow the acquisition of the new educational platform.

This chapter includes the rationale for using the basic qualitative approach to explore the perspectives of teachers and school directors about standardizing an LMS for BL strategy. In addition, the chapter includes details related to participant selection, data collection, and data analysis procedures. Finally, the chapter concludes with a section explaining the issues of trustworthiness and ethical procedures throughout the study.

**Research Design**

The purpose of this basic qualitative research study was to explore teachers' and school directors' perspectives about standardizing an LMS for BL strategy in K–12 Puerto Rican education. The following main research question was used to gather data on teachers' and school directors' perspectives regarding standardization of an LMS for BL strategy. Apart from the main research question, there were two subquestions, one for

each stakeholder, identified as essential for this study. The main research question and the two subquestions are presented below.

Main RQ: What are the perspectives of Puerto Rican teachers and school directors regarding the adoption of a standardized LMS to support BL in K–12 education?

SQ1: What are the perspectives of Puerto Rican *school teachers* pertaining to the adoption of a standardized LMS to support BL in K–12 education?

SQ2: What are the perspectives of Puerto Rican *school directors* pertaining to the adoption of a standardized LMS to support BL in K–12 education?

I had chosen a qualitative research tradition for my study using a basic qualitative research design. Due to the nature of the study and its scant literature, the basic qualitative approach was the best option because it could lay the foundations for future research. Quantitative methods were not the best fit for my study because I intended to look for something other than relationships between variables, such as correlations or differences between them (Creswell, 2013; Patton, 2014). In the same way, the mixed methodology did not apply to my research because the problem did not have a quantitative component.

Instead, the study I conducted collected detailed descriptions of the perspectives of teachers and school directors regarding the implementation of a standardized LMS for the BL strategy in K–12 Puerto Rican education. Additionally, the perspectives of

teachers and school directors regarding the use of a standardized LMS for BL in Puerto Rico had yet to be investigated, so there were no numerical data, thus eliminating the possibility of using quantitative and mixed methods.

Qualitative analysis refers to a research approach that does not rely on numerical data but instead emphasizes the study and analysis of observations to uncover meaningful patterns and relationships (Babbie, 2016; Crawford, 2016). According to Crawford et al. (2016), qualitative research is primarily exploratory, aiming to generate theories and gain initial insights into a particular phenomenon. This type of research takes place in real-life settings, collects various forms of data for analysis (such as words or audio recordings), incorporates participants' perspectives, and aims to describe a phenomenon experienced by individuals or groups (Crawford, 2016). According to Crawford (2016), various qualitative research designs encompass case studies, ethnographies, phenomenology, narratives, and grounded theory. Table 2 shows a comparison of these different qualitative approaches along with a rationale for why they were not selected for this study. Basic qualitative is another qualitative design and is the one I chose for my study.

A basic qualitative methodology was well-suited for studying the perspectives of teachers and school directors regarding the standardization of an LMS for BL strategy. Qualitative research allows for an in-depth exploration of participants' experiences, attitudes, and beliefs in their own words, providing a holistic understanding of their perspectives (Creswell, 2013). Researchers can capture rich and nuanced data that may need to be more easily quantifiable by utilizing semistructured interviews or focus

groups. These methods enable participants to share their unique experiences and insights, shedding light on the complexities and challenges of adopting a standardized LMS in BL.

BL involves the integration of face-to-face and online learning components, making it essential to consider the perceptions and perspectives of teachers and school directors who play a crucial role in its implementation (Garrison & Vaughan, 2008). Qualitative research allows for a deep exploration of the underlying factors that influence participants' acceptance, resistance, or concerns regarding the standardization of an LMS for BL. Through open-ended interviews or focus groups, researchers can uncover the contextual nuances, instructional practices, and organizational factors that shape participants' perspectives, helping to inform decision-making processes and identify potential barriers and facilitators to successful implementation (Cohen et al., 2018).

Furthermore, qualitative research provides an opportunity to capture the voices and experiences of teachers and school directors in their unique contexts, such as the Puerto Rican K–12 education system. This is particularly relevant as each educational context may have specific challenges and considerations when adopting and standardizing an LMS for BL. By employing qualitative methods, researchers can gain a deeper understanding of the cultural, social, and educational factors influencing participants' perspectives, allowing for a more comprehensive and contextualized analysis (Merriam, 2014). This approach provides valuable insights that can inform the development of tailored strategies and interventions to enhance the successful integration of a standardized LMS in Puerto Rican K–12 education.

In addition to having discarded the quantitative and mixed approaches, I
considered other qualitative methodologies such as case study, grounded theory,
phenomenology, narrative, and ethnography. After conducting a comparative analysis of
the abovementioned methodologies, I decided that the basic qualitative approach was the
best option because it aligned with my research question. Table 2 shows the comparative
analysis between the selected methodologies.

**Table 2**

*Contrast Between Qualitative Research Approaches*

| Consideration | Narrative | Phenomenology | Grounded theory | Ethnographic | Case study |
|---|---|---|---|---|---|
| Research focus of approach | Used for exploring the experience of an individual in a specific problem. (Clandinin, 2000) | Understanding the essence of the experience. (Patton, 2014) | Used data gathered from the field to develop a theory based on the results. (Charmaz, 2014; Lincoln, 1985) | Focus on people in their cultural setting. | In-depth analysis of a case or multiple cases. (Patton, 2014; Yin, 2013) |
| Types of research problem | Needing to tell stories of individual experiences. | Needing to describe the essence of a lived phenomenon. | Grounding a theory in the views of participants. | Needing to narrate accounts of a particular culture to be compared to a theoretical backdrop. | Needing to provide a detailed analysis of a particular case. |
| Nature of disciplinary origins | Draw from humanities, including anthropology, literature, history, and sociology. | Draw from philosophy, psychology, and education. | Draw from sociology. | Draw from philosophy, psychology, and education. | Draw from psychology, law, political science, and medicine. |

One of the analyzed research approaches was the narrative approach. Based on its
nature, the types of research and the research focus of the narrative approach aim to
describe the experiences of a specific type of individual in a specific situation. Because I
sought to set the basis of this phenomenon, this approach did not fit my study. Another
research approach analyzed was the phenomenological approach, which focuses on

understanding the essence of an experience (Patton, 2014). Although the problem could be classified as a phenomenon, the background events differ from previous studies, so the phenomenology approach did not fit the study.

On the other hand, grounded theory is mostly used when the problem has been researched from different perspectives and involves developing a new theory (Creswell, 2013; Patton, 2014; Percy et al., 2015; Ravitch & Riggan, 2016), which was not the aim of my study. Due to the sparse literature regarding my study, there were better approaches than these. An ethnographic approach focuses on people in their cultural setting. However, the focus is to narrate accounts of a particular culture to be compared to a theoretical backdrop, which was different from the purpose of my research. Finally, I eliminated the case study approach because this methodology involves analyzing a specific educational setting (Creswell, 2013; Patton, 2015; Percy et al., 2014; Ravitch & Riggan, 2015), and my study concentrated on a broad range of educators in different regions of Puerto Rico.

After conducting this analysis, I selected the basic qualitative approach using semistructured interviews as a data collection instrument. In my study, I tried to make meaning, establish a procedure, and make sense of the experience lived by the participants, consistent with the objective of the basic qualitative approaches (Merriam, 2014). This approach allowed me to direct my study by aligning interview questions with the RQ and the conceptual framework because, in basic qualitative studies, RQs are broad and allow for an in-depth understanding of participants' ideas (Creswell, 2013; Lincoln & Guba, 1985; Patton, 2014; Percy et al., 2015; Ravitch & Riggan, 2015).

Furthermore, my selection of a basic qualitative approach was influenced by articles read during the literature review. Studies by Alford et al. (2021), Budhoo (2021), Everman (2020), Hastert et al. (2022), Karaman et al. (2022), and Tootian (2022) all explored teachers' perspectives on technology implementation using basic qualitative approaches, which are similar in nature to this study.

## Role of the Researcher

My role in this basic qualitative research study was that of a researcher. This role involved selecting the approach and study design; creating the data collection tool, the interview guideline; developing participant recruitment procedures; and interviewing participants who met the inclusion criteria. Additionally, I analyzed and interpreted the data gathered from the interviews. Qualitative research is essential for examining human experiences, attitudes, and perceptions, including those of the researcher (Caelli et al., 2003; Lincoln & Guba, 1985; Patton, 2015; Ravitch & Riggan, 2015); therefore, I was also responsible for making my experiences explicit in my research procedure. According to Creswell (2013), the researcher's role is essential in a qualitative study using interviews as the primary data collection method.

Because of this, I was responsible for conducting the interviews, establishing rapport with the participants, using probing techniques, and ensuring that the data collected aligned with the research question and conceptual framework. Additionally, Merriam (2014) noted that the researcher's responsibility includes accurately recording and transcribing the interviews to facilitate analysis and interpretation of the data. Among the other roles I assumed as a researcher, another important function was providing

participants with an ethically based safe environment to respond to my interview questions. My role, consequently, was crucial to the success of a basic qualitative study using interviews.

A common data-gathering tool in qualitative research is the interview. Interviews can be conducted in various forms, including structured, semistructured, and unstructured, and can be conducted in person or virtually. A qualitative researcher can use interviews as a data-gathering tool to generate rich and in-depth data that capture the nuances of participants' experiences and perspectives. The researcher must establish rapport and trust with the participants to encourage them to share their thoughts and feelings openly and honestly. The researcher must also be attentive to the social and cultural context in which the interviews occur to ensure that the participants feel comfortable and safe during the interview process.

Establishing a safe environment allowed the participants to express their experiences honestly. To ensure this, I created a consent form for participants to complete. This form included the basic characteristics participants must have had to participate in this study. In addition, I assured them of the confidentiality of whatever they said during the interview, including a promise that I would not disclose their identity to anyone, and that all information related to the study would be stored in a password-protected file on my computer.

I excluded candidates from participation who worked under my supervision. In this way, I reduced possible biases, which assisted me in maintaining the validity of my study. Additionally, I kept a reflective journal about my understanding of the interview

process. During the individual interviews, I took great care to keep my nonverbal communication, tone of voice, and body language neutral so that my reactions did not influence or affect participants' opinions.

Finally, as a researcher, I was open about my background and my biases. I am a proponent of including teachers in the decisions and process of implementing an LMS system and BL. I kept my biases to myself, especially when collecting data from people who disagreed with my positions, such as other administrators. Other biases that need to be clarified include my belief in using BL strategies and incorporating technology in education. It should also be clear that I work as an instructor in higher education, and in the past, I have utilized these types of strategies to enhance students' learning experiences and outcomes.

## Methodology

In this section, I explain the suggested methodology for my study, beginning with the logistics of participant selection and sampling strategies. In addition, I discuss the recruitment procedure and consent to participate along with the interview protocol, data collection procedure, and the data analysis plan for my study.

### Participant Selection Logic

I interviewed four K–12 teachers and three K–12 school directors who were working in a K–12 environment in Puerto Rico using gatekeepers and snowball sampling for recruitment. The inclusion criteria for the K–12 teachers included the following:

- Teaching experience: Teachers should have a minimum of 3 years of experience in teaching at a Puerto Rican K–12 educational institution.

- Familiarity with BL: Teachers should have experience or knowledge of implementing BL approaches in their teaching practice.

- Familiarity with LMS: Participants should have experience or knowledge of LMSs in their teaching practice or school administration. This criterion ensured that participants had a foundational understanding of the subject matter and could provide informed opinions on standardizing an LMS.

The inclusion criteria for the K–12 school directors included the following:

- Leadership position: School directors should hold a leadership position (e.g., principal, vice principal) in a Puerto Rican K–12 educational institution.

- Decision-making authority: School directors should have decision-making authority or influence over the adoption and implementation of educational technology, including LMS, in their respective schools.

- Familiarity with BL: School directors should have knowledge and experience with BL approaches and their potential impact on educational outcomes.

- Familiarity with LMS: School Directors should have knowledge of LMSs in their role as school administrators. This criterion ensures that participants have a foundational understanding of the subject matter and can provide informed opinions on standardizing an LMS.

The reason why I decided to select these stakeholders to study this problem was that the teacher must apply the use of the LMS while the school directors must enforce its use. In other words, the school director must ensure state policies are followed. Hall and Hord (1987) stated that teachers are end-users or nonusers, and school principals, who

function as school directors, are change facilitators. For this reason, these stakeholders become the central axis of the innovation process for this proposed study.

Considering the sparse literature on my topic and the purpose of gathering the above-mentioned stakeholders' perspectives on learning management standardization in K–12, the candidates for the study were selected using a gatekeeper and nonprobabilistic snowball sampling in social media like LinkedIn and Facebook

Data saturation, which is the stage in the research process when sufficient information has been gathered to reach the appropriate conclusions, and further data collecting will not yield valuable insights; is one of the most critical aspects of qualitative research (Yin, 2013). I estimated that saturation would occur by the time I finished interviewing 12 participants, six teachers and six school directors (Guest et al., 2006). Nonetheless, based on the interviews and diverse background of the participants, only 4 teachers and three school directors were needed to reach data saturation.

**Instrumentation**

I implemented semistructured interviews with an interview guide, an appropriate data collection tool in generic qualitative research methodologies (Patton, 2014; Percy et al., 2015). Experts recommend using open questions in qualitative research, whose intention is to explore a phenomenon (Castillo-Montoya, 2016; Patton, 2014). To ensure that the interview questions allowed for the collection of information to answer the RQ, I had aligned the interview questions to the conceptual framework by including key concepts related to the framework in the questions. Table 3 shows the alignment of the guiding open questions with the elements of the conceptual framework.

**Table 3**

*Alignment of Guiding Interview Questions With Elements of the CBAM*

| Element within CBAM | | Question |
|---|---|---|
| | Stage 0: Awareness | 1. What are your initial thoughts and reactions about the adoption of a standardized LMS for blended learning in Puerto Rican K–12 education? |
| | Stage 1: Informational | 2. How would you describe your current level of awareness and information regarding the benefits and challenges associated with using a standardized LMS for blended learning? |
| | Stage 3: Personal | 3. What specific concerns or questions do you have about the adoption and implementation of a standardized LMS for blended learning in Puerto Rican K–12 schools? |
| | Stage 2: Informational | 4. What do you still want to know about the features and functionalities of a standardized LMS and how it can enhance blended learning? |
| | Stage 4: Consequence | 5. How do you anticipate the adoption of a standardized LMS for blended learning would impact your role as a teacher or school director? |
| Stages of concern | Stage 5: Collaboration | 6. What personal and professional adjustments or adaptations do you think you might need to make when incorporating a standardized LMS into your teaching/director practices? |
| | Stage 6: Refocusing | 7. How confident are you in your ability to address any potential challenges or barriers that may arise during the implementation of a standardized LMS for blended learning? |
| | Stage 5: Collaboration | 8. What type of support or resources do you believe would be necessary to effectively implement and sustain the use of a standardized LMS in Puerto Rican K–12 schools? |
| | Stage 4: Consequence | 9. What are your expectations for student learning and outcomes by implementing a standardized LMS for blended learning in Puerto Rican K–12 education? |
| | Stage 4: Consequence | 10. How do you think the adoption of a standardized LMS will influence student engagement, motivation, and achievement in a blended learning environment? |
| | The levels identified in the coding process | 1. To what extent are you currently utilizing any type of learning management system or technology in your classroom/school? |
| | | 2. How comfortable do you feel with incorporating technology, such as a standardized LMS, into your instructional practices for blended learning? |
| | | 3. Have you actively explored and experimented with different features or tools within a learning management system before? If so, can you provide examples? |
| | | 4. How would you assess your current level of expertise in utilizing an LMS? |
| Levels of use | | 5. Can you provide examples of how you have observed or experienced the use of a learning management system in other classrooms or schools? What were the results or outcomes? |
| | | 6. Are you aware of any success stories or best practices related to the implementation of a standardized LMS for blended learning in Puerto Rican K–12 education? |
| | | 7. Have you had any opportunities for professional development or training related to using a standardized LMS for blended learning? If so, how has this training impacted your confidence and willingness to adopt such a system? |
| | | 8. What strategies or approaches do you think would be effective in promoting the use of a standardized LMS among your colleagues or staff? |
| | | 9. What criteria or indicators would you use to evaluate the success of implementing a standardized LMS for blended learning in Puerto Rican K–12 schools? |
| | | 10. How would you measure the impact of a standardized LMS on teaching practices and student learning in a blended learning setting? |

In addition to the questions in Table 3, at the beginning of the interviews, I asked the participants introductory questions to categorize the responses and describe the sample of participants. These introductory questions referred to years of experience that the interviewed stakeholders have been working, the level at which they teach, their subject, and their experience with the key concepts related to the study (LMS and BL strategy). After finishing the set of introductory questions, I started the set of open questions mentioned in Table 3. This procedure was followed for both teachers and school directors. Following the interview questions, I asked participants questions related to the BL strategy.

To ensure that participants' responses accurately reflected their intended thoughts and perspectives during the interview, transcripts were provided to them for review, thereby allowing them to confirm that their answers align with what they meant to convey. This methodology helped in getting a better understanding of teachers' and school directors' perspectives about the BL strategy and the implementation of a standardized LMS.

**Procedures for Participants' Recruitment, Participation, and Data Collection**

*Recruitment*

I implemented four phases for recruitment: direct contact with possible participants via e-mail, collaboration with educational institutions, professional networks and associations, and social media outreach like LinkedIn and Facebook groups related to stakeholders. These phases included detailed procedures describe as follow:

1. Direct contact via email:

a. Identify relevant stakeholders: Teachers and school directors in Puerto Rico who have knowledge about BL strategies and LMSs.

b. Obtain a list of email addresses of potential participants from educational institutions, professional associations, or departmental databases.

c. Draft an introductory email explaining the purpose and significance of the study, ensuring confidentiality and anonymity.

d. Clearly outline the criteria for participation as described above.

e. Request their voluntary participation, emphasizing the importance of their perspectives in the existing literature.

f. Provide my contact information for any questions or concerns.

g. Send the recruitment email to the identified stakeholders, using personalized subject lines and addressing each recipient by name.

2. Collaboration with educational institutions:

a. Establish partnerships with educational institutions, such as schools and educational departments, to gain access to potential participants.

b. Seek permission from the institutions to distribute recruitment materials, such as flyers or posters, in staff rooms or common areas.

c. Ensure that the recruitment materials clearly communicate the objectives, inclusion criteria, and benefits of participation.

3. Professional networks and associations:

a. Identify professional networks and associations related to teachers and school directors in Puerto Rico.

  b. Reach out to these organizations to seek their assistance in recruiting participants for the study.

  c. Request collaboration in sharing the recruitment announcement via their newsletters, mailing lists, or online platforms.

  d. Provide the organizations with necessary recruitment materials, including a summary of the study, inclusion criteria for participation, and my contact information.

  e. Encourage organizations to share study information through their own social media channels or websites.

 4. Social media outreach:

  a. Identify relevant social media groups, pages, or forums that cater to teachers and school directors in Puerto Rico.

  b. Join these groups or pages and establish communication with the group administrators to encourage them to share my study's information to recruit possible participants.

  c. Encourage members to share the post with their networks and peers who meet the criteria for participation.

  d. Monitor the social media platforms for any queries, respond promptly, and provide additional information when requested.

In the last phase, I advertised my study invitation on social media platforms like Facebook and LinkedIn using hashtags like: K–12 education, #maestrosdepuertorico, #educacionenpuertorico, among others. To maximize the probability of recruiting

participants, the *Call for Participation* infographic was published in the social media groups related to stakeholders' responsibilities such as Puerto Rico public school teachers and Puerto Rico educators and school directors of Puerto Rico and in school supplies in different educational regions.

The flyer and social media post included information related to the inclusion criteria, clearly stating that the qualifying participants hat to be active (currently working) teachers and school principals in the K–12 education system. Additionally, participants must have worked during the COVID-19 pandemic and had a basic understanding of LMS and BL strategy. Furthermore, the flyer and social media post included the researcher's contact information (e-mail and telephone number) so that the people interested in participating could contact the researcher.

The social media call for participation was written using common language, highlighting the research importance of attracting active teachers and school directors in the K–12 educational environment. Additionally, the people who agreed to participate recommended other possible candidates (snowball sampling), which sped up the process of identifying participants.

### *Participation*

Once potential candidates filled out the consent form, which included contact information, and followed the steps established therein to certify their voluntary participation in the study, they were contacted by the researcher to inform them about the interview process. This process included a description of participants' rights as volunteers, interview protocol, as well as an explanation of the software to use to record

the audio of the interviews (Zoom). Participants were also informed about the duration of the interviews (30-45 minutes). A follow-up e-mail or call was made to set a time and date for the interview and an e-amil with a reminder two days prior to the interview. The link to access these platforms was sent via email.

### *Data Collection*

Regarding the procedures related to data collection, I conducted virtual interviews with the software Zoom, keeping a reflective journal. This method of communication became normal for many stakeholders in education during the COVID-19 pandemic (Sharma & Sha, 2020), so it facilitated my ability to recruit participants and carry out data collection. Regarding the interview process, I devised a comprehensive protocol. Zoom interviews were saved as audio files on my computer and in NVivo 14 software. In this way, access to the virtual interview room and the saved files were password-protected to guarantee the participants' privacy.

The data collection plan also included the transcription of the interviews to analyze patterns and themes (Patton, 2014; Ravitch & Riggan, 2016). Most of the participants in my study preferred to answer the interview in Spanish, since it is the official language in Puerto Rico. I developed the interview questions in both languages (Spanish and English) since I am fully bilingual. Both the interviews in English and Spanish underwent the member-checking process, implying that the interviewees would certify that the code definitions accurately reflected their intended meanings. Member checking was done by email. Regarding the interviews in Spanish, after the interviewee performed the member checking, I translated the interviews conducted in Spanish, into

English using the software Sonix. This translation was verified to guarantee that it is a faithful representation of what was expressed in Spanish. Each participant had a pseudonym assigned as Participant 1 to ensure the confidentiality of the process. The transcripts, audio files, and translations have been stored in the NVivo14 and my laptop for a duration of 5 years.

Finally, my study's second source of information were the reflective journals and notes made during the interview process. These methods are accepted and can be used as part of data collection (Orange, 2016; Patton, 2014; Ravitch & Riggan, 2016; Rubin & Rubin, 2011), which helped me to ensure that my participants' experiences were accurately described. Generally, the interview transcripts, member checking strategy, and reflective journals and notes were part of the data gathering and confirmation procedures.

**Data Analysis Plan**

Rubin and Rubin (2011) established that data analysis in qualitative studies begins with transcribing recorded interviews. Since the interviews were carried out through Zoom, which provided a transcription service, after the interviews, I downloaded the transcripts provided by Zoom and saved them in a Word document format. To ensure precision and serve as a foundational reference throughout the coding phase, I meticulously aligned the Spanish and English transcripts adjacently within a Microsoft Word document, thereby facilitating a more profound comprehension of the dataset. I then listened to the audio again, editing for grammar, spelling errors, and adding punctuation, as recommended by Cibils (2019). That audio file was uploaded to Sonix for translation purposes. This transcription verification process allowed me to become

familiarized with the data, making it easier to apply deductive coding with the gathered information. However, it is important to note that deductive coding was able to capture all the nuances or emergent themes in the data (see Saldaña, 2021).

I used both deductive and inductive coding for data analysis. Deductive coding, also known as a priori coding, is a coding approach used in qualitative data analysis where predetermined categories or codes are applied to the gathered data based on an existing theoretical framework or prior knowledge (Saldaña, 2021). In deductive coding, the researcher develops a coding scheme before analyzing the data, drawing on established theories, models, or frameworks relevant to the research topic (Saldaña, 2021). For this study, the predetermine codes based on the framework of CBAM were related specifically to the stages of concern and levels of use. For example, during the deductive coding process, I identify sections or segments of data that might correspond to the preestablished stages of concern (See Table 4). I systematically applied codes to the data, identifying specific information related to the predetermined codes that helped me group together data related to teachers' concerns.

**Table 4**

*A Priori Codes for Data Analysis Related to Stages of Concern*

| A priori code | Definition of code |
| --- | --- |
| Awareness | This stage reflects when individuals become cognizant of the presence and significance of the innovation in their educational context (Hall & Hord, 1987). |
| Information | In this stage, individuals actively seek relevant data and resources to understand the nature and purpose of the innovation (Hall & Hord, 1987). |
| Personal | This stage involves individuals reflecting on their own beliefs, values, and concerns regarding the implementation of the innovation (Hall & Hord, 1987). |
| Management | In this stage, individuals focus on the practical considerations of implementing the innovation, such as time, resources, and logistical aspects (Hall & Hord, 1987) |
| Consequence | Stage where individuals evaluate the potential impact and outcomes of the innovation on students, colleagues, and the overall educational setting (Hall & Hord, 1987). |
| Collaboration | Stage entails seeking and engaging in supportive relationships and interactions with colleagues and stakeholders to facilitate successful adoption (Hall & Hord, 1987). |
| Refocusing | During the refocusing stage, individuals reflect on their experiences and adjust refine and enhance the implementation of the innovation (Hall & Hord, 1987). |

Additionally, I also had priori codes for levels of use. See Table 5. I identified which levels of use applied holistically to teachers' experiences. I applied the code to the individual, rather than to specific elements of the transcript data. Identifying which level of use a teacher fitted into allowed me to group together similar levels of use data and to determine if there were any differences in the Stages of Concern for each level of use.

**Table 5**

*A Priori Codes for Data Analysis Related to Levels of Use*

| A priori code | Definition of code |
|---|---|
| Non-Use | This level is characterized by individuals not engaging with innovation. It could be due to lack of awareness, resistance to change, or the perception that innovation does not add value to their current practices. At this stage, there is no active involvement or use of the new system, process, or tool. |
| Orientation | Exploring the innovation and its potential benefits through initial exposure and experimentation (Hall & Hord, 1987). |
| Preparation | Having the necessary skills and knowledge to effectively implement the innovation, often through training or professional development programs (Hall & Hord, 1987). |
| Mechanical | Using the innovation as intended, following prescribed procedures and guidelines without significant personalization or adaptation (Hall & Hord, 1987). |
| Routine | Fully integrating the innovation into their regular practice, incorporating it into their instructional routines and adjusting as needed (Hall & Hord, 1987). |
| Refinement | At this level, individuals have moved beyond merely integrating the innovation into their daily routines; they begin to optimize its use. This involves making modifications to improve outcomes, experimenting with different ways to enhance the effectiveness of the innovation, and adapting it to better fit their needs or the needs of the organization. |
| Integration | This level signifies a deeper level of assimilation of the innovation into the individual's or organization's practices. It involves the collaborative use of innovation, where it is not only embedded in the regular activities of the individual but also starts to influence the practices and behaviors of others. This level often reflects a shift towards a collective effort to leverage the innovation for broader goals and may include interdisciplinary collaboration or the innovation becoming a part of the organizational culture. |
| Renewal | The Renewal stage represents a mature stage of adoption where individuals or organizations critically assess the impact of the innovation and explore opportunities for significant redesign or replacement with more advanced alternatives. At this stage, there is an ongoing commitment to improvement and innovation, driven by reflective practice and the desire to achieve higher levels of effectiveness and efficiency. Renewal may involve revisiting the goals and outcomes associated with the innovation, considering new developments in the field, and integrating newer insights or technologies to ensure that the innovation remains relevant and effective. |

After I finished applying a priori codes to the data, I moved into the next phase of data analysis by applying inductive coding, also known as open coding. This is a coding approach used in qualitative data analysis where codes and categories are developed directly from the data itself, without being predetermined by existing theories or frameworks (Saldaña, 2016). This coding allowed patterns and themes to emerge from the data during the coding process (Charmaz, 2014).

During inductive coding, I engaged in a close and careful examination of the data gathered from the interview transcripts and gathered notes. During this coding process, I assigned descriptive codes or labels to these emerging themes and created a coding scheme that captures the richness and diversity of the participants' perspectives. I kept a codebook and define each code as it emerged as recommended by DeCuir-Gunby et al. (2011). This coding allowed me to explore and discover unexpected or unanticipated insights from the data gathered.

The process of inductive coding involves organizing and categorizing the data into meaningful groups based on shared characteristics or themes (Saldaña, 2016). I iteratively reviewed and refined the coding scheme as new patterns and themes emerged, ensuring that the analysis captured the nuances and variations presented in the data.

Employing a combination of deductive and inductive coding in analyzing teachers' and school directors' perspectives about standardizing an LMS for BL in K–12 Puerto Rican education allowed for a comprehensive and nuanced analysis. Utilizing CBAM's stages of concern and levels of use, the deductive coding approach provided a structured foundation to explore predetermined categories aligned with existing theories

and research questions. This process ensured capturing the key aspects and expected patterns related to the standardization of LMS for BL. Simultaneously, the inclusion of inductive coding allowed for the emergence of codes that then form categories, within an a priori code which allowed me to look at participants' perspectives unique to the context of Puerto Rican education and unique to their stages of concern and levels of use. By allowing the data to drive the identification of novel insights, the combination of deductive and inductive coding ensures a holistic understanding of the teachers' and school directors' perspectives, which resulted in a more robust analysis that accounts for both established theories and the complexities of the local educational landscape. I continued to use inductive reasoning to group codes into categories, eventually forming themes that answer the RQs. The findings were reported in a comprehensive narrative form, including rich quotes and examples that supported the themes and categories identified. (c) The analysis was also explored any contextual factors specific to Puerto Rican K–12 education that may influence the perspectives and adoption of a standardized LMS.

I maintained detailed notes and memos throughout both phases of coding process that documented participants' thought processes, interpretations, and insights. These notes served as a reflective tool and aided developing the final analysis (Creswell, 2013). I referred to these notes when analyzing and interpreting the data, to ensure the transparency and rigor of the research process. Ultimately, using both coding processes enabled me to uncover and present the diverse perspectives of teachers and school

directors, shedding light on their attitudes, experiences, and beliefs regarding the standardization of an LMS for BL strategy (Saldana, 2016).

## Trustworthiness

Qualitative researchers should ensure confidence, authenticity of results, and fairness to the findings based on truthful participants' experiences (Lincoln & Guba, 1985; Merriam & Tisdale, 2016; Patton, 2015; Ravitch & Carl, 2016). In this section I present the methods for ensuring credibility, transferability, dependability, and confirmability of my study.

### Credibility

To ensure credibility in my study, I implemented several key measures. First and foremost, it was essential to establish the researchers' credibility. This was achieved through the researchers' committee of experts guiding the research process and their background expertise in education and technology. This element ensured they possess the necessary knowledge and experience to conduct the study safely and effectively.

Another crucial aspect was the selection of participants. The sample was diverse, representative, and relevant to the research topic. This involved only teachers and school directors who had experience with BL and LMS implementation participating in the study, as explained in the participant selection section of this chapter. A varied sample helped capture a range of perspectives and provided a more comprehensive understanding of the topic.

The interview process itself was carefully designed to maintain credibility. Semistructured interviews offered a balance between flexibility and standardization.

Developing an interview protocol with a set of predefined questions while also allowing

for spontaneous follow-up inquiries helped elicit detailed and insightful responses from

participants. The questions were open-ended and unbiased, avoiding leading or

suggestive language which encouraged participants to express their genuine opinions and

experiences.

During the interview sessions, it was essential to establish a rapport with the

participants, thus creating an environment that promoted open and honest

communication. I accomplished this by actively listening to their perspectives, remaining

neutral, demonstrating genuine interest int their experiences and insights, and avoiding

imposing my beliefs or preferences (Horsfall et al., 2021). This approach fostered trust

and encouraged participants to share their true thoughts and experiences without fear of

judgment or repercussions. Additionally, I ensured a nonjudgmental and supportive

atmosphere, allowing participants to freely express their opinions and concerns. By

fostering a positive and comfortable interview setting, I encouraged participants to

provide valuable and candid responses, leading to a deeper understanding of their

perspectives. To further enhance credibility, I conducted a member-checking technique

that involved summaries with participants to ensure the accuracy and validity of the

collected data. Allowing participants to review their responses enabled them to verify the

researchers' interpretations and provide additional insights or clarifications.

Finally, reporting the findings transparently and thoroughly was essential to

establish credibility. Documenting the research methodology, including participant

recruitment, interview process, and data analysis techniques, allowed for transparency

and reproducibility. Including direct quotes from participants in the research report also added authenticity and strengthened the study's credibility. By implementing these measures, I enhanced the credibility of the study.

**Transferability**

Transferability in qualitative research refers to the extent to which the study's findings can be applied in other contexts and studies (Merriam & Grenier, 2019). To comply with this important criterion, I provided detailed descriptions of the study's methodology including participants' selection, data collection, and possible limitations. However, since this study was conducted in Puerto Rican context, direct transferability would be limited even though it is possible to adopt some aspects of the methodology to similar contexts.as suggested by Ravitch and Riggan (2016) who have stated that in qualitative studies transferability is possible to "broader contexts while still maintaining their context-specific richness" (p. 168).

**Dependability**

Dependability is defined by Patton (2014) as stability or "a systematic process systematically followed" (p. 684). In other words, the dependability of a study begins with a systematic, reasoned design and alignment of methods to the study's RQs (Lincoln & Guba, 1985; Ravitch & Riggan, 2016). Dependability in research refers to the consistency and replicability of the study's findings (Shenton, 2004). In my study, I aligned data collection, and analysis procedures to my RQs which included research design, research approach, conceptual framework, interview protocol, and interview

guiding questions. I also provided information about the selection procedure adopted to choose the participants for the study to maintain the dependability concept in my study.

**Confirmability**

The final element of trustworthiness that a qualitative researcher must prove is confirmability. The degree to which the research study's conclusions are founded on the participants' stories and statements rather than probable researcher biases is the focus of this criterion (Shenton, 2004). To comply with this criterion, I kept a reflective journal to ensure no biases diverged in the analysis of the data gathered. Additionally, I used member checking to provide reliability for the interpretation of the information shared in individual interviews.

<div align="center">

**Ethical Procedures**

</div>

Participation in this study was voluntary. The participants were informed that they could refuse to participate or end their participation in the study at any time. Participants signed a letter of consent where I am identified as a Walden University Ph.D. candidate, conducting research as part of a graduation requisite of my program of study including the certification and Institutional Review Board (IRB) approval. Another way participants consented was stating it in the audio recording. Participants' names and responses were confidential, and I was the only person that had access to the raw data excluding the data that must be shared with my dissertation committee. This data was stored in a password protected computer in my house and it will be discarded 5 years after the dissertation process has ended. There were no outside ethical considerations. I

did not entice or give incentives for participation, and there were no conflicts of interest between participants and researcher.

## Summary

This chapter included a description of the research design and the rationale used for this study. Additionally, I included my role as a researcher, the instrumentation that will be used to gather data, and the trustworthiness and ethical procedures. This basic qualitative research study will be conducted among K–12 teachers and school directors currently working in Puerto Rico using semistructure interviews. The participants will be recruited using snowball sampling via social networks. The conceptual framework for this study includes two dimensions of CBAM, stages of concern and levels of use.

Chapter 4: Results

The purpose of this basic qualitative study was to explore teachers' and school directors' perspectives about standardizing an LMS for BL in K–12 Puerto Rican education. Semistructured interviews were conducted using Zoom as the medium for data collection to answer the research question and subquestions:

RQ: What are the perspectives of Puerto Rican teachers and school directors regarding the adoption of a standardized LMS to support BL in K–12 education?

SQ1: What are the perspectives of Puerto Rican *school teachers* pertaining to the adoption of a standardized LMS to support BL in K–12 education?

SQ2: What are the perspectives of Puerto Rican *school directors* pertaining to the adoption of a standardized LMS to support BL in K–12 education?

The research questions in my study enabled an in-depth exploration of teachers' and school directors' perspectives regarding the standardization of an LMS for BL in K–12 education in Puerto Rico. This approach facilitated a comprehensive understanding of their perspectives on the use of such systems, particularly in the context of recent educational shifts and challenges.

This chapter outlines the outcomes of a qualitative study examining the views of teachers and school directors on the standardization of an LMS for BL in K–12 education in Puerto Rico. It details the study's setting, the demographics of the participants, and the

methods used for gathering and analyzing data. Additionally, the chapter discusses steps taken to maintain the study's credibility from the start to the end, including findings reporting. It concludes with a detailed presentation of the qualitative study's results.

## Setting

This qualitative study was conducted in a nontraditional, virtual setting, with participants recruited across Puerto Rico's north and west region using semistructured interviews as a data-gathering tool. Therefore, there was no single setting from which the data were collected. Instead, the collected data were enriched by the varied backgrounds of the participants, who spanned across K–12 levels, and included both public and private school sectors, as well as teachers and school directors.

## Demographics

In the initial phase of this study, the plan was to interview 13 participants. However, during the preliminary screening, it became evident that three of the prospective participants lacked a fundamental understanding of both the concept of BL and the implementation of an LMS. Given the critical nature of these concepts to the study, these three participants were subsequently excluded from the final sample. This decision was made to ensure the quality and relevance of the data collected, focusing on individuals who had a clear grasp of the key study areas. The final participant demographic, therefore, consisted of 10 individuals who provided informed and experienced perspectives on the standardization of an LMS for BL in Puerto Rican K–12 education.

The seven participants had professional educational experience ranging from 4 to 25 years in the educational field. These included teachers from both public and private K–12 institutions, specializing in mathematics, science, languages, and liberal arts (music and art). Additionally, the school director participants were drawn from K–12 levels in various geographical settings, including both rural and urban areas. Only directors from public schools volunteered to participate. Therefore, no private school directors were interviewed. This demographic composition provided a broad spectrum of perspectives for the research. Table 6 shows the participant demographics.

**Table 6**

*Participant Demographics*

| Participants | Sector | Years of experience | Area of expertise |
|---|---|---|---|
| Teacher 1 | Public | 25 | Music arts |
| Teacher 2 | Private | 4 | Math |
| Teacher 3 | Private | 4 | Math/Science |
| Teacher 4 | Both | 17 | Math |
| Director 1 | Both | 25 | Special education |
| Director 2 | Public | 13 | Leadership |
| Director 3 | Public | 23 | Leadership |

Teacher 1 was an experienced public-school teacher with 25 years in the profession, primarily teaching music arts at the high school level. The teacher had utilized BL strategies, especially during the pandemic, by incorporating the platforms Zoom and Google Classroom. The teacher saw value in adopting a standardized LMS for hybrid strategies, emphasizing the need for continuous training and adaptation. During the interview, the teacher highlighted the importance of simplicity for younger students and parental involvement, along with regular updates for teachers. The participant was

comfortable with technology but remained open to learning new features like augmented

reality. Based on this, the teacher's levels of use of the LMS for BL fell primarily under

the "routine" level of use of CBAM. The teacher demonstrated comfort and familiarity

with the technology and LMS, mentioning a mastery over the basic functionalities and

the integration of these systems into regular teaching practices, including adaptations to

specific situations like power outages. Furthermore, the teacher also showed elements of

the "preparation" level, as indicated by participation in workshops and a willingness to

explore advanced features such as augmented reality, suggesting ongoing development

and refinement of skills related to the innovation.

Teacher 2 was a private school teacher with 4 years of experience teaching

mathematics for seventh to 12th graders. The participant discussed experiences with BL

strategies, particularly during the pandemic. The teacher started with Edmodo and later

used Moodle and Edu System, noting the initial challenges students faced in mastering

these technologies. During the interview, the teacher emphasized the importance of

continuous adaptation to new platforms and tools in education, highlighting the need for

flexibility in teaching and the importance of supporting students and parents in navigating

these digital platforms. Teacher 2's engagement with the standardized LMS for BL

aligned predominantly within the level of "mechanical" in the levels of use. This teacher

shared about their proficiency in using digital platforms like Moodle and Edmodo, as

well as Microsoft TEAMS, primarily for content delivery and communication. However,

there was a notable focus on following existing procedures and guidelines without much

personalization or adaptation to these platforms. Additionally, there were elements of the

"preparation" level, as the teacher expressed a desire to learn more about specific features of these platforms, particularly for exam monitoring, indicating an ongoing effort to enhance skills and knowledge in this area.

Teacher 3 was a high school teacher with 13 years of experience in teaching science subjects such as physics, biology, and chemistry who had used various digital platforms such as Moodle and Edmodo for hybrid learning. The teacher believed in the effectiveness of one-on-one, live interaction over merely uploading documents. During the interview, the teacher also highlighted the challenges of online exams and the importance of teacher commitment to technology and hybrid learning. The participant emphasized the need for continuous learning and adaptation to new educational technologies. Teacher 3's use of the standardized LMS for BL demonstrated characteristics of both the "mechanical" and "orientation" levels of use. Initially, during the pandemic, the teacher employed hybrid learning primarily as a necessity, indicating a phase of orientation where the focus was on adapting to the situation and ensuring student understanding. However, the teacher's current usage seemed more aligned with the mechanical level, characterized by a systematic approach to using digital tools such as smart whiteboards for exercises and class participation. There was also evidence of seeking a balance between synchronous and asynchronous activities, adhering to a structured method without significant personalization or adaptation.

Teacher 4, a teacher with 12 years of experience in private schools and 5 in public schools, taught sixth and seventh grades, mainly intermediate level. The teacher had used hybrid learning strategies, primarily during the pandemic, and found that students

initially struggled to adapt. Teacher 4 used digital whiteboards for interactive lessons and balanced synchronous and asynchronous activities. Teacher 4 believed that standardized learning systems should be robust and easy to access for students and emphasized the need for parental involvement, especially for younger students, and the importance of teacher training on these platforms. Teacher 4's approach to the standardized LMS for BL in K–12 education demonstrated characteristics of the "routine" and "mechanical" levels of levels of use. The teacher had effectively integrated digital tools such as Edmodo, Edu System, and Microsoft Teams into their teaching practices, reflecting a routine use of these technologies. However, the teacher's approach also aligned with the mechanical level, as they followed specific processes for managing assignments and classroom activities without significant personalization or adaptation of these platforms. This indicated a consistent and structured use of the LMS in their teaching methodology.

Director 1 was a school director with 15 years of experience and 10 years as a teacher. Director 1 had worked in both public and private schools, including as a special education teacher. The participant had actively encouraged the use of hybrid learning, responding to challenges posed by hurricanes, earthquakes, and pandemics. The school director believed that hybrid learning is more effective for high school students and emphasized that each school community should choose its own learning management platform, tailored to their specific needs and circumstances. During the interview, the participant stressed the importance of face-to-face experiences for younger students and the need for continuous learning and adaptation among educators. Director 1's involvement with the standardized LMS for BL aligned with the "routine" and

"orientation" levels within the levels of use. Director 1 exhibited a comprehensive understanding and application of technology in education, integrating it as a fundamental tool for curriculum enrichment and crisis management. This reflected the routine stage of comfortably integrating the innovation into regular practice. Simultaneously, there was an ongoing exploration of potential benefits and adaptations to emerging challenges, like device maintenance and teacher training, which corresponded to the "orientation" level. Director 1's role involved not only routine use, but also a forward-looking approach to optimizing the system's efficacy and addressing future needs.

Director 2 was a public-school director with 13 years of experience at a primary school (K–5). The school director discussed during the interview experiences with hybrid learning, emphasizing the importance of adapting to new technologies, especially during unforeseen events such as pandemics, and the challenge of ensuring uniformity and connectivity. The school director highlighted concern about the need for budget autonomy to support technology implementation and the importance of professional development for teachers to integrate technology effectively in their teaching strategies. Director 2's approach to the standardized LMS for BL primarily reflected the "mechanical" level of use. The director acknowledged using the system for specific functions such as content delivery, communication, and administrative meetings, but there was a significant reliance on following established procedures without extensive customization or adaptation. There was also an element of "preparation" in Director 2's approach, as evidenced by participation in workshops for professional development and a

focus on improving the system's implementation and effectiveness, particularly in the context of emergency use such as during hurricanes.

Director 3 was a public-school director with 23 years of experience managing primary through eighth grade levels. During the interview, the school director discussed the use of hybrid learning strategies during emergencies such as pandemics and hurricanes. They noted that post pandemic, the use of hybrid learning had decreased, with a preference for face-to-face interaction, but acknowledged its utility in emergencies. The school director also commented on the challenges of online learning, particularly for younger students, and the need for good technological infrastructure to effectively implement hybrid learning. Director 3's approach to the standardized LMS for BL in K–12 education primarily reflected a blend of the "mechanical" and "orientation" levels of use. The director showed an established use of technologies such as Microsoft Teams for communication and administrative tasks, indicative of the mechanical level, with a systematic approach to managing school operations. Additionally, there's a strong element of orientation, as Director 3 expressed an ongoing need for learning and adaptation, particularly in relation to how BL strategy can be effectively implemented across different grades and subjects. This demonstrated a continuous exploration and assessment of the innovation's potential and challenges in the educational context.

Table 7 presents a summary of the diverse approaches of participants in integrating a standardized LMS for BL in Puerto Rican K–12 education. Each individual is categorized according to the primary and secondary levels of use.

**Table 7**

*Comparison Between Participants' Levels of Use of Standardized LMS for BL*

| Individual | Primary level | Secondary level | Notes |
|---|---|---|---|
| Teacher 1 | Routine | Preparation | Comfortable integration of LMS into regular teaching with ongoing skill development. |
| Teacher 2 | Mechanical | Preparation | Proficiency in using LMS as prescribed, with interest in learning more features. |
| Teacher 3 | Orientation | Mechanical | Initial adaptation to hybrid learning, currently using a systematic approach. |
| Teacher 4 | Routine | Mechanical | Effective integration of digital tools into teaching, following specific processes. |
| Director 1 | Routine | Orientation | Comprehensive use of technology with ongoing exploration of potential benefits. |
| Director 2 | Mechanical | Preparation | Systematic use of LMS with focus on improving implementation and effectiveness. |
| Director 3 | Mechanical | Orientation | Established use of technology with continuous exploration of effective implementation. |

The interviews with various teachers and school directors in Puerto Rican K–12 education provided valuable insights into the perspectives on standardizing an LMS for BL. The diverse experiences and viewpoints of these educators, encompassing both challenges and successes, offered a comprehensive understanding of the needs and considerations in implementing an LMS. These findings significantly contribute to answering the dissertation's research question about standardizing an LMS for BL in Puerto Rican K–12 education. Further details and an in-depth participant response will be elaborated in the data collection section.

## Data Collection

I received IRB approval in July 2023 (approval number 08-17-23-0580040) and began data collection in September 2023, as availability of teachers and school directors was limited until then. For this study, I collected data from interview transcripts and

memos created during the interviews. An important aspect of my data collection involved

translating the Spanish transcripts into English because all participants communicated in

Spanish. This added step ensured clarity and accuracy in data interpretation. During the

data collection process, I encountered several challenges, which are comprehensively

detailed in the "unusual circumstances" section of the study.

**Interviews**

The sole data collection tool for this study was the interview protocol. I collected

data as described in Chapter 3 using virtual interviews. I conducted interviews between

August 24, 2023, and January 2024. Once I downloaded the audio files from Zoom, I

used Sonix to process these audio files and convert them into text. Sonix employs AI-

powered transcription technologies renowned for their speed, accuracy, and user-friendly

interface. Despite the high accuracy of Sonix's transcriptions, the unique linguistic

nuances inherent in Puerto Rican Spanish—marked using colloquialisms and

idiosyncratic expressions—necessitated a thorough review and revision of each

transcript. This step was crucial to ensure the authenticity and accuracy of the data,

reflecting the participants' genuine expressions and meanings.

Following the refinement of the Spanish transcripts, the subsequent stage

involved translating these documents into English. I used Sonix's translation feature,

designed to handle bilingual data conversion efficiently. Post translation, I went through

each transcript with a meticulous review process. This review was essential to identify

and rectify instances of literal translations, which often fail to convey the contextual and

cultural subtleties of the original language. The adjustments ensured that the translated

text accurately represented the intended meaning of the participants' responses, thus maintaining the integrity and authenticity of the data for analysis within this study. Table 8 summarizes the interviews' length for each participant.

**Table 8**

*Interview Length in Minutes*

| Participants | Interview length in minutes |
|---|---|
| Teacher 1 | 22:18 |
| Teacher 2 | 28:03 |
| Teacher 3 | 17:41 |
| Teacher 4 | 42:00 |
| Director 1 | 20:43 |
| Director 2 | 21:59 |
| Director 3 | 34:44 |

**Reflective Journal**

As the interviewer for the seven participants in the study, my reflective journal would encapsulate my experiences and observations from these interactions. Engaging with both teachers and directors provided a multifaceted view of the challenges and opportunities in adopting a standardized LMS for BL in K–12 education in Puerto Rico.

Each interview was enlightening, revealing the complexity of opinions and experiences within the educational community. The teachers, for instance, varied in their readiness and enthusiasm for integrating technology into their teaching practices. Their concerns about professional development and resource allocation resonated deeply, highlighting systemic issues in educational technology implementation.

The directors, on the other hand, offered a strategic perspective. Their focus on administrative autonomy and fiscal constraints underscored the bureaucratic challenges in adapting to technological advancements in education. Their preference for face-to-face learning, despite recognizing the benefits of BL, revealed a tension between traditional and modern educational methodologies.

Overall, these interviews were a profound learning experience. They not only provided valuable data for the study but also broadened my understanding of the diverse perspectives within the educational sector regarding technology adoption. This process has reinforced the importance of considering multiple viewpoints in educational research and policymaking.

**Unusual Circumstances**

While conducting interviews for this study, I encountered several instances that deviated from initial expectations, particularly concerning one of my core assumptions: participants' familiarity with LMS and BL strategies. I observed that a subset of participants, predominantly among school directors with extensive years of experience, exhibited a conceptual misunderstanding of BL. They appeared to conflate BL with simply substituting traditional face-to-face instruction for online learning. This misconception was unexpected, especially given that preliminary screening questions had been posed to potential participants to ascertain their knowledge of LMS and BL, as detailed in Chapter 3. In consultation with my dissertation chair, we determined that these interviews did not align with previously established inclusion criteria. Consequently, I

decided to exclude these three interviews from the study to maintain the integrity and relevance of the data concerning the study's objectives.

Another notable incident occurred during an interview with a school director. In response to a query regarding LMS usage, the participant expressed concern that the proposed approach might reduce critical face-to-face interactions, especially in kindergarten through third grade. This response indicated a misinterpretation of the study's purpose; the participant perceived my research as proposing a specific educational change rather than understanding it as an academic inquiry for a dissertation. This misunderstanding persisted despite attempts to clarify the objective and nature of the study since the participant stated I was proposing something that would not work. Therefore, in keeping with the research's methodological rigor and to uphold the clarity of its purpose, this interview was also excluded from the analysis.

These experiences underscore the importance of clear communication regarding the study's aims and the need for precise participants' understanding of the research's scope. They also highlight the challenges inherent in qualitative research, particularly when exploring complex and multifaceted educational concepts like LMS and BL.

**Data Analysis**

In the analysis of interview transcripts with teachers and school directors, I implemented a dual approach, integrating both deductive and inductive coding techniques using the qualitative management software (QMS) NVivo 14. This methodology strategy was pivotal in evaluating their perspectives on standardizing an LMS for BL within the K–12 education system in Puerto Rico. The QMS helped me to facilitate the

establishment of codes and cases; however, for the purpose of methodological clarity and

organization, I determined that use two distinct files to segregate the data corresponding

to each coding methodology (deductive and inductive). Figure 3 illustrates this process.

**Figure 3**

*Data Analysis Diagram*
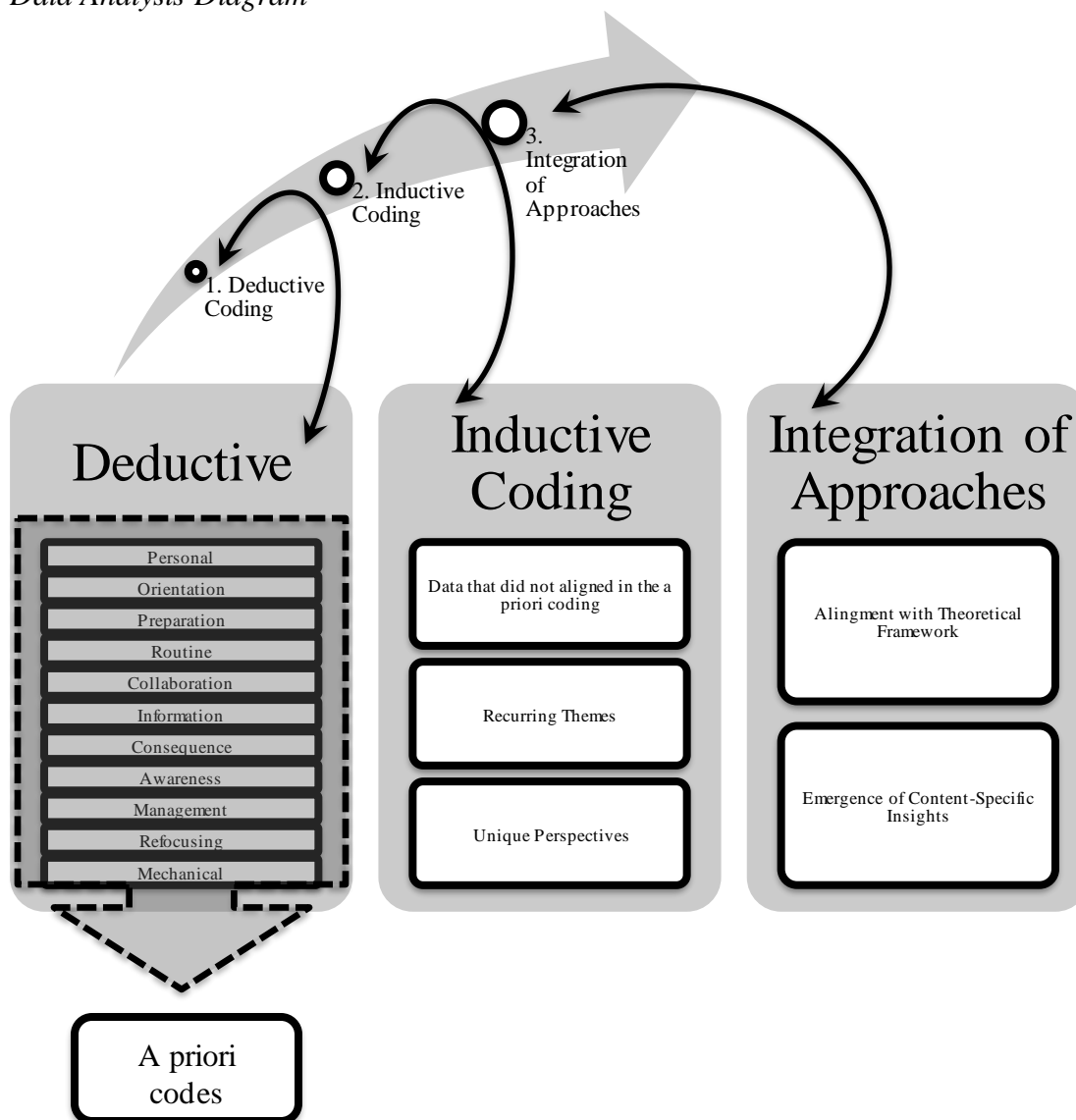
**Deductive Coding With A Priori Codes**

In the first phase of my analysis, I employed a deductive approach, guided by my initial research questions and the theoretical framework described in Chapter 3. I had developed a set of predefined codes based on literature review and existing theories about educational technology implementation. The coding was guided by the theoretical framework of Hall and Hord (1987), which delineates various stages of concern regarding educational innovations. These stages, each with their unique focus and characteristics, provided a structured lens for analyzing participants' responses within a defined theoretical context. The a priori codes and their definitions are described in Table 4 in Chapter 3.

Applying these codes, I systematically categorized participants' responses, enabling a direct comparison of their perspectives with established theoretical constructs. Table 9 summarizes the coding of the transcripts according to a priori codes aligned to the stage of concern as described in the CBAM (Hall & Hord, 1987). The table presents a structured view of how each participant's responses aligned with the seven stages of innovation adoption. Directors 1 and 2 and Teachers 2, 4, and 5 primarily engage with four of the seven stages (Awareness, Personal, Management, Consequence), with variations in focus. Director 1's insights predominantly pertain to the Management and Consequence stages, highlighting practical implementation challenges and the impact on students. Director 2 showed a keen awareness of innovation, personal reflections on its utility, and a concern for the consequences it bears on the educational process. Teachers 2 and 4 reflected mainly on the Personal and Management concerns, indicating their focus

on individual beliefs and practical application challenges, while Teacher 5 extends this to include Awareness and Information stages, demonstrating a broader engagement with the innovation process. In contrast, Director 3 exhibits a comprehensive engagement across all stages, from initial Awareness to Refocusing, indicating a deep and holistic involvement in the innovation process. Teacher 1 uniquely exhibited a profound understanding of LMS and BL strategies, closely aligning with the refocusing stage of the CBAM stages of concern. This varied engagement across the participants underscores the multifaceted nature of innovation adoption in educational settings.

**Table 9**

*Alignment of Participants to Stages of Concern*

| Participants | Awareness | Information | Personal | Management | Consequence | Collaboration | Refocusing |
|---|---|---|---|---|---|---|---|
| Teacher 1 | | ✓ | | | | ✓ | ✓ |
| Teacher 2 | | | ✓ | ✓ | ✓ | | |
| Teacher 4 | | ✓ | ✓ | ✓ | | | |
| Teacher 5 | ✓ | ✓ | ✓ | ✓ | | | |
| Director 1 | | | | ✓ | ✓ | | |
| Director 2 | ✓ | | ✓ | | ✓ | | |
| Director 3 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

**Inductive Coding**

On the second phase, I employed inductive coding to identify themes and patterns that emerged organically from the data. This approach allowed for the discovery of new insights, particularly those that extend beyond the predefined theoretical framework. Through meticulous examination of each transcript, I identified recurring ideas or patterns, unique perspectives, and nuanced understandings of the participants' experiences and attitudes toward the standardization of an LMS for BL. Once I read all

the transcripts, I started developing the new codes as they emerged from the data. Table

10 shows the codebook developed from the inductive coding. The categories are the one

further to the left and the corresponding codes are indented in the first column.

**Table 10**

*Inductive Coding Codebook*

| Name | Description |
|---|---|
| Category: Educational outcomes and expectations | Suggested criteria or indicators to assess the success of LMS implementation |
| Evaluation of implementations | Believes of indicators to assess the success of hybrid learning implementation |
| Student engagement in hybrid learning | Reflects how different age groups adapt to and engage with hybrid learning |
| Caregivers' implication in BL strategy | Reflects the concern regarding the need of caregivers' support to students during the BL strategy |
| Platform standardization | Reflects perspectives (benefits and drawbacks) on the standardization of a single LMS (impact on teaching, learning, and administrating) |
| Different types of LMS depending on the level | Makes references to the type and complexity of LMS that should be used in different levels among K–12 education |
| Professional development | Reflects the nature and effectiveness of professional development opportunities provided to teachers for using LMS and blended learning methods |
| Peer support in the use of LMS | Idea that teachers that understand the platform should be used as peer mentors for other teachers. |
| Resource allocation | Reflects the concerns regarding the allocation of resources for technology, training, and support |
| Fiscal constraints and planning | Reflects the challenges related to budgeting and long-term planning for technological adoption in schools |
| Administrative autonomy | Reflects the role and limitations of school principals in decision-making and implementation of technology strategies |
| Infrastructure and support | Reflects the need for improved infrastructure and technical support for successful technology integration |
| Technological challenges | Reflects practical challenges and difficulties faced in terms of technology infrastructure, including issues like internet connectivity, device availability, and technical support. |
| Teacher adaptation | Reflects how teachers adapted (readiness, willingness, and capacity to transition to blended learning, and their needs for support and training) to new technologies and methods. |
| Hybrid learning adoption | Attitudes and experiences regarding effectiveness and challenges regarding the shift to BL. |
| More experienced teachers rejecting the implementation | Believe that teachers with more years in the Department of Education of Puerto Rico might not like or use the LMS and the BL strategy. |
| Teachers with less teaching experience accepting the integration | Recent recruited teachers are more acceptable of the use of technology in the classroom. |
| Teachers' commitment with the use of an LMS and BL strategy | Believe regarding the effectiveness of the use of LMS and BL strategy depends on the teacher's commitment with its use. |

In accordance with the established codebook, the transcripts were meticulously reviewed a second time, and each respective file was subsequently subjected to the coding process utilizing NVivo 14. Table 11 delineates the frequency of each code's occurrence within the transcripts of individual participants.

**Table 11**

*Inductive Coding Occurrences*

| Categories/Codes | Teacher 5 | Teacher 4 | Director 1 | Director 3 | Director 2 | Teacher 2 | Teacher 1 |
|---|---|---|---|---|---|---|---|
| Category: Teacher adaptation | 0 | 0 | 2 | 1 | 2 | 1 | 0 |
| Code: Teachers' commitment with the use of an LMS and BL strategy | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Code: Hybrid learning adoption | 3 | 2 | 2 | 1 | 4 | 5 | 0 |
| Subcode: Teachers with less teaching experience accepting the integration | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Subcode: More experienced teachers rejecting the implementation | 0 | 2 | 0 | 1 | 0 | 0 | 0 |
| Category: Resource allocation | 1 | 1 | 1 | 0 | 3 | 2 | 0 |
| Code: Fiscal constraints and planning | 1 | 0 | 2 | 2 | 0 | 0 | 2 |
| Subcode: Administrative autonomy | 0 | 0 | 2 | 2 | 0 | 0 | 0 |
| Code: Infrastructure and support | 5 | 3 | 1 | 0 | 5 | 0 | 0 |
| Subcode: Technological challenges | 3 | 2 | 1 | 0 | 2 | 0 | 0 |
| Category: Educational outcomes and expectations | 3 | 0 | 1 | 2 | 2 | 0 | 0 |
| Code: Evaluation of Implementations | 2 | 1 | 1 | 0 | 3 | 3 | 1 |
| Code: Student engagement in hybrid learning | 8 | 2 | 2 | 1 | 1 | 0 | 0 |
| Subcode: Caregivers' implication in BL strategy | 5 | 2 | 1 | 1 | 1 | 0 | 2 |
| Category: Platform standardization | 2 | 2 | 1 | 3 | 2 | 2 | 2 |
| Code: Different types of LMS depending on the level | 2 | 5 | 0 | 4 | 0 | 4 | 2 |
| Category: Professional development | 2 | 4 | 1 | 2 | 3 | 4 | 3 |
| Code: Peer support in the use of LMS | 2 | 1 | 0 | 1 | 0 | 0 | 1 |

Table 11 illustrates the hierarchical code diagram developed for the final codebook utilizing an inductive coding approach. This diagram represents the culmination of a rigorous qualitative analysis process. The primary nodes branching out

from the center signify the categories identified through a thorough examination of the data. These categories include resource allocation, student engagement in hybrid learning, professional development, teacher adaptation, and platform standardization, each of which encapsulates a spectrum of subthemes and related concepts.

The hierarchical structure was constructed iteratively, where initial coding began with broad categorizations that were refined as patterns and connections in the data emerged. For instance, professional development derived from grouping the codes hybrid learning adoption and peer support in the use of an LMS, indicating a nuanced understanding of the professional growth avenues for educators in a BL context. Similarly, resource allocation expanded into discussions surrounding infrastructure and support as well as fiscal constraints and planning, reflecting the multifaceted nature of resource management within educational institutions.

The codes were systematically derived from the data, with lower-level codes such as caregivers' implication in BL strategy and technological challenges providing specific insights into the broader thematic concerns. This inductive approach ensured that the final codebook was deeply rooted in the empirical data, accurately reflecting the complexities and realities experienced by the educators in the BL environments under study.

**Figure 4**

*Hierarchical Code Diagram for Final Codebook Using Inductive Coding*
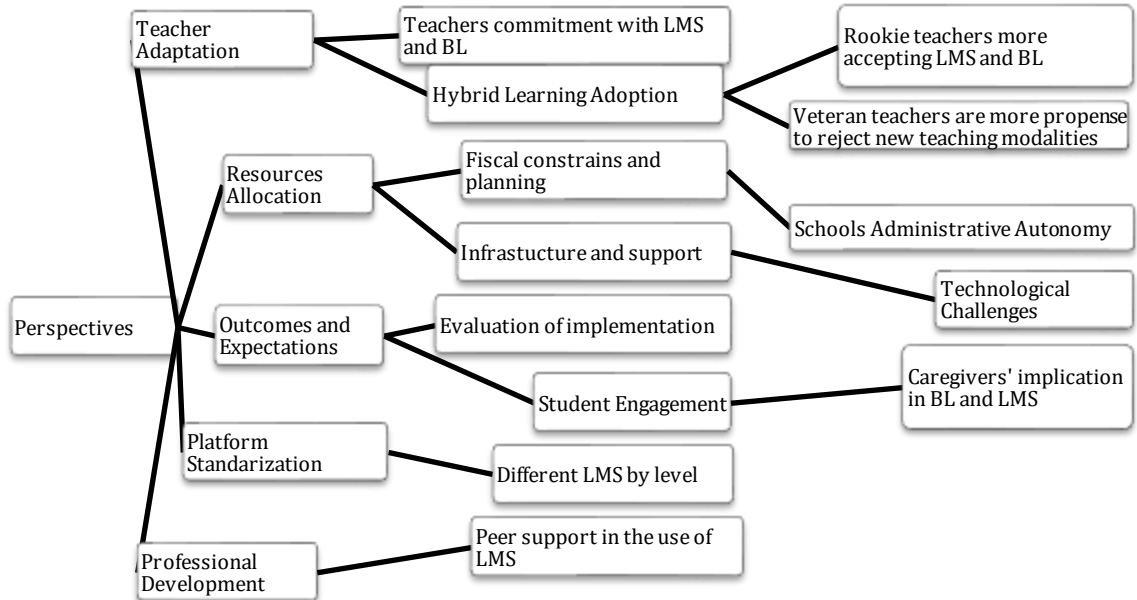


## Integrative Analysis of Deductive and Inductive Coding Approaches

This combination of deductive and inductive coding provided a comprehensive and robust analysis. The deductive aspect ensured alignment with the theoretical framework of Hall and Hord (1987), while the inductive component allowed for the emergence of context-specific insights, enriching the overall understanding of the perspectives of teachers and school directors on this important educational topic. Figure 5 is a structured conceptual map that visually represents the coding approach taken in my research, specifically showing the points of convergence and divergence between deductive and inductive coding approaches.

**Figure 5**

*Similarities and Differences Among Codes From the Deductive and Inductive Approach*
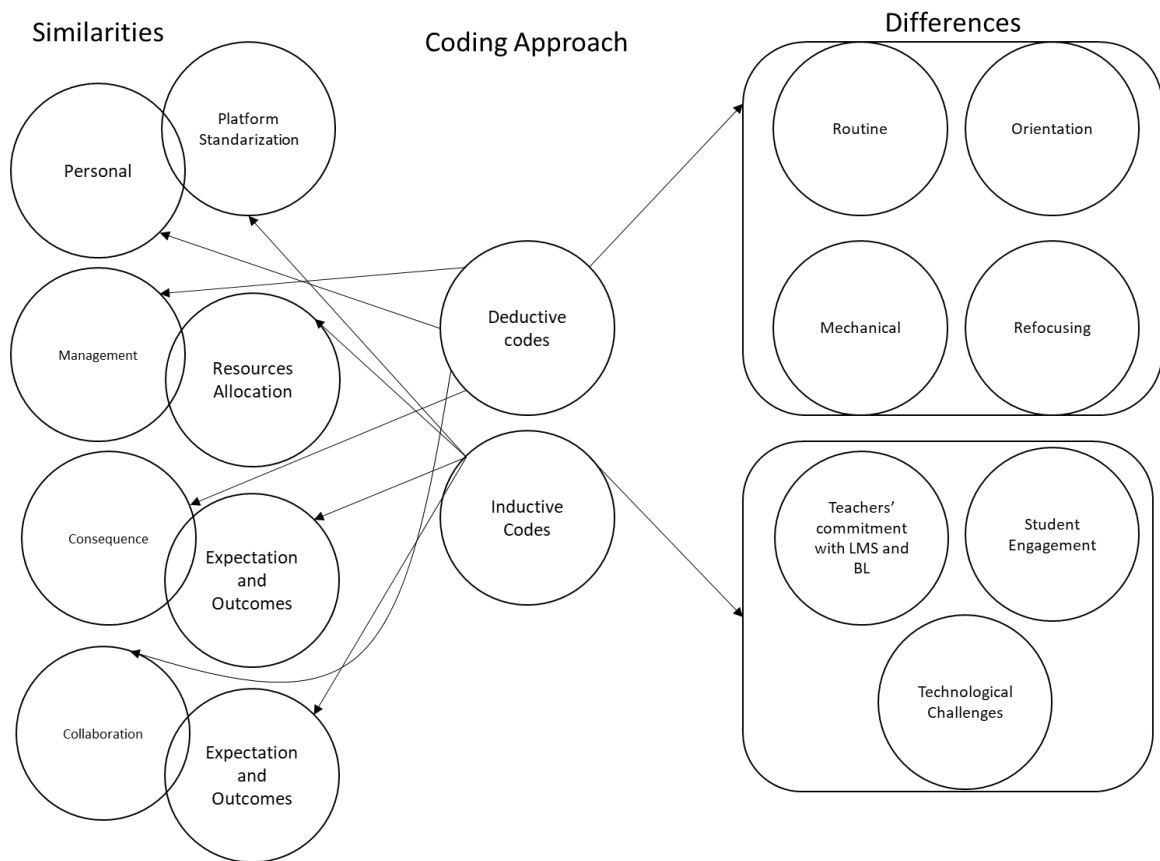


The diagram uses arrows to depict the interconnectivity and flow between concepts, illustrating how different elements are associated with each other. At the center of the map, there is a section labeled Coding Approach which branches out into two distinct areas: Similarities on the left and Differences on the right. This central positioning emphasizes the pivotal role of the coding approach in the research process.

The Similarities section features several interconnected circles, indicating key aspects where deductive and inductive coding overlap. These aspects include platform standardization and personal, which are directly linked to both deductive codes and

inductive codes. This suggests that regardless of the coding strategy, certain foundational elements remain consistent. Additionally, expectation and outcomes are a recurring theme in this section, suggesting a common goal for both approaches in terms of what is anticipated and what the results might be.

On the right, the differences section delineates the unique characteristics of each approach. Here, paired circles indicate distinct gathered data for deductive and inductive methods. Routine, Orientation, Refocusing, and Mechanical reflect the methodological nuances and the nature of the deductive coding process. Teachers' commitment with LMS and BL, student engagement, and technological challenges are linked specifically to inductive codes, indicating that these factors are particularly pertinent when generating codes from the data itself, highlighting the inductive method's responsiveness to specific data contexts.

Finally, I aligned the themes and codes to the research question and sub questions. Table 12 encapsulates these findings, offering a synthesized view of the diverse perspectives of the stakeholders. This table serves as a cornerstone in understanding the multifaceted implications of LMS integration in the Puerto Rican educational context, highlighting the nuanced interplay between technology, pedagogy, and administrative strategy.

**Table 12**

*Categories and Themes Aligned to Subquestions With Participants' Sample Responses*

| Research question | Categories | Themes | Sample quotations |
|---|---|---|---|
| SQ1: Perspectives of teachers on adopting a standardized LMS for BL in K–12 education | Teacher adaptation, Professional development | Theme A: Teachers emphasized concern for adapting to new LMS platforms, highlighting the necessity of professional development, and addressing technological challenges.<br><br>Theme B: Teachers express concerns about the administrative challenges that may arise when implementing BL strategy.<br><br>Theme C: Teachers shared concerns about adequate resource allocation for effective implementation of BL. | Teacher 2: "It took us a little bit of work to understand it because it's quite a complex, but workshops made it possible. If we do not have a good system and a good technological service, I understand that we are not going to have 100% effectiveness in this type of learning management" |
| | Resource allocation | | |
| SQ2: Perspectives of school directors on adopting a standardized LMS for BL in K–12 education | Educational outcomes and expectations, Platform standardization, Administrative resources allocation | Theme D: Directors supported the need for standardized platform but recognized the importance of administrative autonomy in relation to the resource's allocation and its implications on LMS and BL adoption.<br><br>Theme E: School directors voiced apprehensions that more seasoned educators might exhibit reluctance towards adopting a new learning management system (LMS) and integrating blended learning methodologies, suggesting potential challenges in transitioning from traditional teaching practices to innovative, technology-driven approaches. | Director 1: "if it is not aligned with that fiscal autonomy that allows the director to know the need and meet it, the project will fail."<br><br>Director 3: The older ones, who have been in school longer, are probably going to reject it at first, I would say. At least at the beginning. |
| | Teacher Adaptation | | |

## Evidence of Trustworthiness

I have employed several rigorous strategies to ensure the trustworthiness of the study, following the guiding principles set out by notable scholars in qualitative research methods (Lincoln & Guba, 1985; Merriam & Tisdale, 2016; Patton, 2015; Ravitch & Carl, 2016).

### Credibility

To establish credibility, I took a multifaceted approach. My research committee, comprising experts in education and technology, provides essential guidance, ensuring

that the study adheres to the highest academic standards. Their expertise in these fields underpins the credibility of the research process and outcomes. The selection of participants is another critical aspect. By focusing solely on teachers and school directors with direct experience in BL and LMS, the study draws on rich, firsthand insights. This diverse and experienced group of participants ensures a comprehensive understanding of the topic. Furthermore, the interview process was meticulously designed. Using semistructured interviews, I balanced the need for structured inquiry with the flexibility to explore emergent themes. This approach, coupled with open-ended and unbiased questioning, enabled the participants to share their authentic experiences and perspectives. Establishing a rapport with participants was paramount. Through active listening and neutrality, I created an environment of trust and openness, allowing participants to express themselves freely and honestly, enriching the data with genuine insights.

**Transferability**

Addressing transferability in qualitative research is crucial, especially in a study contextualized within the unique educational landscape of Puerto Rico. While acknowledging that direct transferability may be limited due to the specific context, the detailed description of the study's methodology, including participant selection and data collection processes, allows for the possibility of adapting aspects of this research to similar contexts (Merriam & Grenier, 2019). This approach aligns with the notion that qualitative studies can be transferable to broader contexts while maintaining their rich, context-specific insights. The careful documentation of the study's methodology

enhances its applicability to other settings, contributing to the broader discourse on educational technology adoption.

**Dependability and Confirmability**

Dependability in this study is rooted in a consistent and systematic approach to the research design. Aligning data collection and analysis procedures closely with the research questions ensures that the study's findings are stable and replicable. Detailed documentation of the research process, including the selection of participants and the development of the interview protocol, further strengthens this aspect. Confirmability is addressed by maintaining a reflective journal throughout the research process. This practice helps in identifying and mitigating any potential biases, ensuring that the findings are solely based on the participants' experiences and narratives. Additionally, the use of member checking adds another layer of reliability to the interpretation of the data. By allowing participants to review and verify the researchers' interpretations, the study upholds a high standard of confirmability, grounding its conclusions firmly in the participants' experiences.

These strategies collectively enhance the trustworthiness of the research, ensuring that the study's findings are credible, transferable, dependable, and confirmable. This rigorous approach underscores the commitment to producing a study that not only respects the experiences of its participants but also contributes meaningfully to the field of educational technology.

**Results**

In this section, I present and organize the results obtained based on the research question and its two subquestions. I will discuss the sub questions first, ending with the results related to the main RQ. Additionally, tables are included that identify the behavior of the results and the process of the coding carried out.

**Subquestion 1**

SQ 1 was: What are the perspectives of Puerto Rican *school teachers* pertaining to the adoption of a standardized LMS to support BL in K–12 education? From the data analysis, themes A through C emerged as key factors in answering this question. The subsequent analysis is structured around these identified themes.

*Theme A*

The first theme to answer SQ 1, was that teachers emphasized concern for adapting to new LMS platforms, highlighting the necessity of professional development, and addressing technological challenges. Figure 6 displays the categories of Teacher Adaptation and Resources Allocation, detailing the specific codes that constitute each category. Figure 5 depicts a conceptual map for Theme C, which focuses on the perspectives of teachers concerning the adoption of an LMS, specifically about the need for continues professional development.

**Figure 6**

*Code Tree for Theme A*
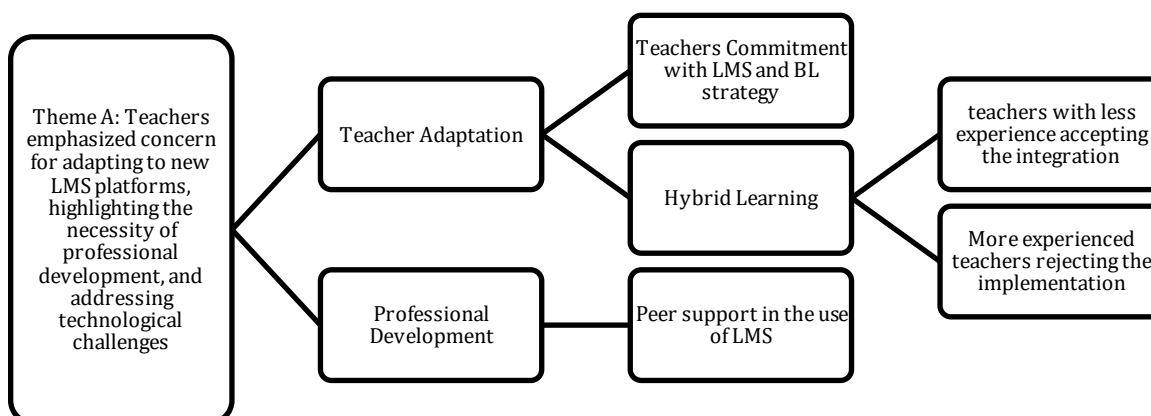


**Teacher Adaptation.** LMS. Theme C is divided into two categories: *Teacher Adaptation* and *Professional Development*. Within Teacher Adaptation, there are further subdivisions into codes, capturing teachers' commitment to the LMS and BL strategy, the adoption of hybrid learning, and a dichotomy based on experience, with less experienced teachers accepting the integration and more experienced teachers potentially rejecting it. Professional Development is connected to the idea of peer support in using the LMS, suggesting a collaborative approach to learning and mastery of the new system.

In Theme A, *Teacher Adaptation* is the first category that was raised, and it was analyzed through two codes: teachers' commitment to LMS and BL strategies, and the practice of hybrid learning. For instance, two participants highlighted the necessity of commitment to advance these educational strategies. Teacher 3 emphasized that without such commitment, there can be no development indicating that the success of

implementing LMSs and BL strategies hinges significantly on the dedication and willingness of educators to integrate these technologies effectively into their teaching practices. This commitment is essential not only for the initial adoption but also for the sustained utilization and optimization of these digital tools to enhance educational outcomes. This commitment was also mentioned by Director 2.

In contrast, six out of the seven participants made references coded under hybrid learning. Teacher 5 recalled how during the 2020 pandemic, classes moved to Zoom and Edmodo was used for assignments, centralizing digital education. Teacher 2 said "In my case, I had to open a YouTube channel where I did teach the classes on that channel. I recorded myself and sent them to these different platforms." The recurrence of these points among the responses highlights a collective focus on the critical role of teacher engagement in the successful adoption of LMS and BL approaches.

Additionally, Director 3 and Teacher 4 highlighted a nuanced understanding of the challenges and resistance that may come from peers with more years in the field. They acknowledged that while students and younger teachers might readily accept and be motivated by the shift to digital platforms, some teachers with more years in the field of education could find the adjustment uncomfortable due to their resistance to change and technology. This suggests a divide where seasoned educators, despite recognizing the benefits of LMS and BL, may still hold reservations, rooted perhaps in a traditional approach to education. This contrasts with the perspectives of less experienced teachers, who might be more adaptable and willing to integrate new technologies into their teaching practices.

**Professional Development**. Professional Development was the second category that emerged from the data and through the code peer support. All teachers and school directors mentioned this category highlighting its implication on the need of preparation for an adequate LMS and BL implementation. Teachers indicated a need for structured training to navigate new technologies and teaching methods effectively. For example, Teacher 2's initiative to create a YouTube channel for class instruction underscores the proactive steps teachers are willing to take. However, Teacher 1 referred to the pace of training during the pandemic where everything unfolded so rapidly that there were more questions about how to utilize the technology than the opportunities they had to use it. This implies a gap in formal professional development programs, suggesting that institutional support in the form of continued comprehensive training could enhance the successful integration of LMS and BL strategies across the board. An example of this was Teacher 4's statement that said, "sometimes they go so fast that maybe those of us who are technologists understand it, we are doing well, but for those who do not, go more calmly with them." The teachers' efforts to adapt independently to digital platforms highlight the importance of professional development as a crucial element for educational innovation.

*Theme B and C*

The next themes that answered SQ1, were Themes B and C. Theme B as that teachers express concerns about the administration challenges that may arise when implementing BL strategies and Theme C was that teachers shared concerns about adequate resource allocation for effective implementation of BL. Teachers express

concerns about the technological challenges that may arise when implementing BL

strategy was the second theme that emerged to answer SQ 1. Additionally, Theme C

presents a close resemblance to Theme B, only varying on the codes that describe it.

Figure 6 illustrates the categories and codes related to these themes.

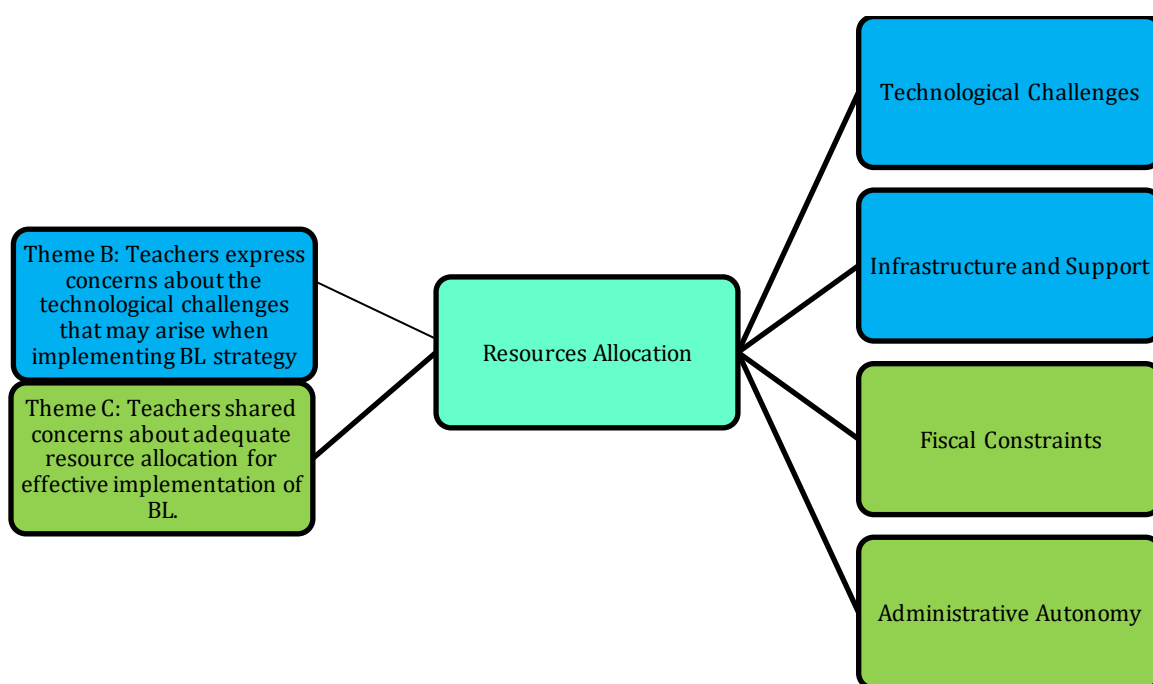**Figure 7**

*Code Tree for Theme B and C*



Figure 7 presents a code tree that visualizes the thematic concerns of teachers

regarding the technological challenges of implementing a BL strategy (Theme B), as well

as concerns about resource allocation for its effective implementation (Theme C). The

category Resources Allocation serves as a link between both themes, indicating its

significance in addressing the challenges and effectiveness of BL strategy

implementation. Within Theme B, Resources Allocation was specifically directed to

Technological Challenges and Infrastructure and Support, whereas Theme C linked

directly with Fiscal Constraints, and Administrative Autonomy. Each of these codes under Theme B reflects a dimension of the resources needed to overcome technological barriers, ensure sufficient support and infrastructure, manage budget limitations, and maintain decision-making power within schools. This overlap between themes suggests that resource allocation is a critical factor for teachers when considering the practicalities of adopting new BL strategies.

**Category Resources Allocation.** Resources Allocation was recognized as a crucial category in addressing Sub-Research Question 1, particularly noted by teachers and school directors. This category highlights the essential need for adequate funding and resources for the effective implementation of LMS and BL initiatives. Five out of seven participants emphasized the importance of ensuring that all educators and students have access to the necessary technological tools and platforms. For example, Teacher 3 underscored the importance of reliable internet and modern devices for the smooth functioning of BL environments. Teacher 6 addressed the issue of unequal distribution of resources, which could result in unfair educational opportunities. Statements from Teacher 4 and Teacher 5 further illustrated this concern, with Teacher 4 emphasizing the need for proper equipment provided by the administration, and Teacher 5 discussing the importance of having access to the required electronic equipment for platform usage. This is evidence with quotes from both Teacher 4 who shared; "the administration has to provide you with the appropriate equipment" and Teacher 5 who said, "I think having that access to electronic equipment needed for those platforms is a must."

**Subquestion 2**

SQ 2 was What are the perspectives of Puerto Rican *school directors* pertaining to the adoption of a standardized LMS to support BL in K–12 education? This question delved into the perspectives of school directors on the same topic. Themes F and G answer SQ 2.

*Theme D*

The first theme to answer SQ 2 was theme D, which was that directors supported the need for standardized platform but recognized the importance of administrative autonomy in relation to the resource's allocation and its implications on LMS and BL adoption. School directors support the standardization of an LMS, specially during emergency times, yet they also emphasize the crucial role of administrative autonomy in the context of resource allocation and its impact on the adoption of LMS and BL. Directors acknowledge the benefits of a standardized platform in streamlining educational processes but also highlight the importance of maintaining decision-making power within schools to effectively manage resources and adapt the LMS to their unique educational needs. This theme underscores a balance between the advantages of standardization and the need for local autonomy in educational technology implementation. Figure 8 presents the code tree for theme D.
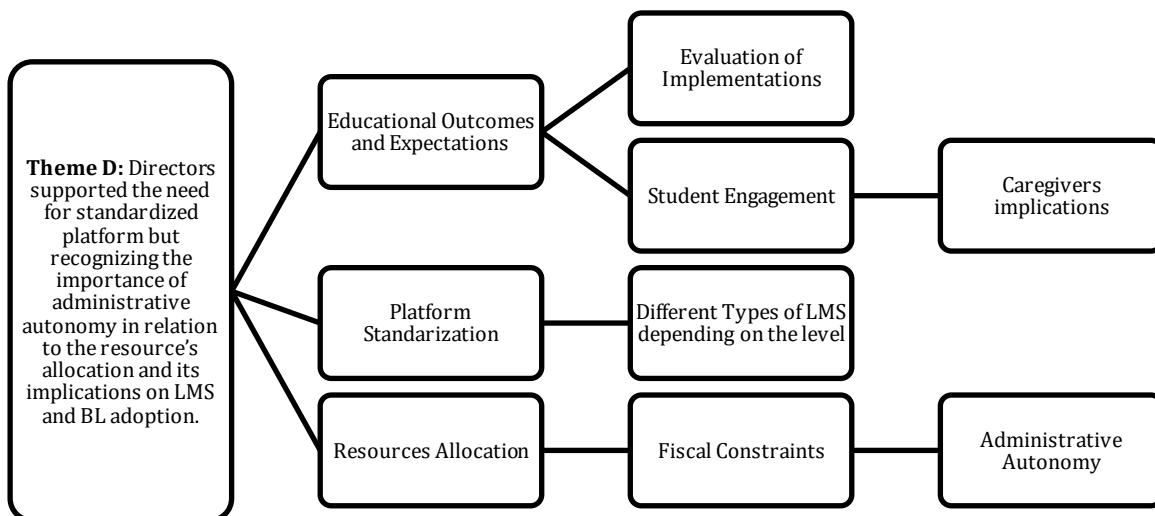
**Figure 8**

*Code Tree for Theme D*



Figure 8 shows the perspectives of school directors on the need for a standardized

platform while acknowledging the importance of maintaining administrative autonomy,

particularly in relation to resource allocation and its implications for the adoption of

LMSs and BL strategies. The code tree identifies Teacher Adaptation and Professional

Development as key areas, with Teacher Adaptation further divided into teachers'

commitment to LMS and BL strategy, and hybrid learning. The latter branches into

subcodes based on how director's viewed teachers' experience levels with technology

integration, may influence their level of acceptance to the BL strategy.

**Educational Outcomes and Expectations.** In examining the responses of school

directors from the provided interviews, the category of Educational Outcomes and

Expectations was the first that emerged. The category was characterized by a shared

vision for the role of a standardized LMS in enhancing the educational process. The

directors conveyed an anticipation for the LMS to extend the instructional reach beyond

traditional classroom settings, facilitating more effective communication with students

and caregivers and ensuring more consistent engagement with educational content,

especially during emergency times. They envisioned a system where the use of LMS

would result in increased instructional time and more thorough coverage of curricular

content, thus maximizing the potential for student learning and achievement within the

BL framework.

Four out of seven total participants discussed the category Educational Outcomes

and Expectations, where three of those were school directors. Some directors described

positive outcomes, and others were worried about how the BL influences the younger

grades. For example, Director 1 said "The expectation is that we will have a longer

contact time with the student. It is a tool to streamline and foster effective communication

with both the student and the parents and caregivers." Director 2 said "I had a great scope

of satisfaction from my students. And we saw the achievements and saw how we

worked." On the other hand, Director 2 said "Many students who worked with this

strategy during that time (COVID 19) were students entering kindergarten to first grade

and the results in academic achievement were very low." This response diverges from

that of the other 2 school directors which indicates a variant in the outcomes of this

category.

**Platform Standardization.** Based on the information from school directors'

interview, it is clear that school directors see both benefits and challenges in the

standardization of a single LMS for teaching, learning, and administration. They recognize the potential of a unified system to harmonize educational practices across schools, especially during emergency situations. For example, Director 2 said "I have encouraged the use of it [LMS] because of situations that have affected the school community from hurricanes, earthquakes, and pandemics." Yet, they also note the importance of flexibility to cater to the distinct needs of individual school communities. Director 3 mentioned "each community is going to decide what platform and what they are going to use for progress" which evidence a need of balance. Directors believe that while a standard LMS can provide a consistent and equitable educational experience, it should not come at the cost of stifling innovation or ignoring the unique cultural and socioeconomic contexts of each school. This indicates a preference for a balanced approach that values both standardization for equity and autonomy for customization.

**Category Resource Allocation.** The last category for SQ 2 is Resources allocation. All school directors were represented in this category. Directors underscored the critical nature of resource allocation, identifying it as a decisive factor in the success of LMS integration. They recognized the necessity for adequate technological infrastructure, including reliable internet access and suitable devices, to facilitate a smooth transition to and sustained use of the LMS along with continued support from Puerto Rico's Department of Education. Director 1 said "The main concern, and we are already experiencing it, is the continuity of the department aligned to this type of platform." The directors highlighted that without appropriate resources, the potential benefits of an LMS, such as enhancing teaching efficiency and student learning, might

not be fully realized. For example: Director 2 said "The first problem is the Internet. If we do not have a good system and a good technological service, I understand that we are not going to have 100% effectiveness in this type of learning management." Their concerns suggest that strategic planning and investment in resources are indispensable for the LMS to be an effective tool in the educational ecosystem.

Additionally, school directors discussed their perspectives on the implementation of an LMS across different educational levels. They argue that LMS and BL are most effective with high school students (grades 9-12) due to their higher readiness for such technologies. Conversely, they believe that elementary level students (kindergarten to 8th grade) require more face-to-face experiences and assistance of caregivers, suggesting that while LMS can be used at these levels, it should not be the norm. This indicates a differentiation in LMS applicability and effectiveness across student age groups, emphasizing a tailored approach to digital learning that considers the developmental needs and capabilities of students at various educational stages.

*Theme E*

Finally, Theme E emerged as a critical theme regarding the varying levels of acceptance among educators based on their experience. Theme E was that school directors voiced apprehensions that more seasoned educators might exhibit reluctance towards adopting a new LMS and integrating blended learning methodologies, suggesting potential challenges in transitioning from traditional teaching practices to innovative, technology-driven approaches. The category teacher adaptation showed a significant variant related to school directors' responses. School directors voiced concerns over the

apprehension that more seasoned educators might demonstrate towards embracing a new LMS and integrating BL methodologies into their teaching practices. This hesitancy is attributed to the potential challenges these educators face in transitioning from traditional, established methods of teaching to innovative, technology-driven approaches. The directors' insights suggest a nuanced understanding of the faculty dynamics and the need for strategies that cater to varying degrees of openness towards educational technology.

Theme E directly informs SQ2 by highlighting the importance of considering teacher adaptation in the successful implementation of a standardized LMS for BL. For example, Director 3's observation about the initial resistance from more experienced teachers underscores the need for targeted support and professional development tailored to address the concerns and resistance of this educator demographic. Director 1 said, "it was a little more complicated for veteran teachers to adapt, some of these veterans are still using it, others are not using it," thereby highlighting the variability in adaptation processes among teachers with differing levels of experience. Together, these perspectives underscore a complex landscape of factors influencing LMS and BL adoption in K–12 education, pointing to the need for a multifaceted approach that accommodates both the technological and human elements of educational innovation.

**Main Research Question**

The main research question was what are the perspectives of Puerto Rican teachers and school directors regarding the adoption of a standardized LMS to support BL in K–12 education? The question explored the perspectives of Puerto Rican teachers and school directors on the adoption LM) to support BL in K–12 education. The data

synthesized the views from both groups, revealing a consensus on the importance and potential benefits of integrating a standardized LMS to bring uniformity and efficiency to education. Key findings from both teachers and school directors indicate a unanimous recognition of the critical role played by professional development and teacher adaptation to technology in the context of adopting an LMS BL in K–12 Puerto Rican education. They underscore the importance of these elements not just as tools for effective technology use, but as essential underpinnings for educational resilience in times of crisis. This shared viewpoint reflects an understanding that the sustainability of education, particularly in unforeseen circumstances, hinges on educators' ability to engage with and leverage digital platforms.

Furthermore, there is a consensus on the delicate balance between BL strategies and traditional face-to-face learning. Educators from both sides are concerned about the potential overreliance on BL, especially for younger students, and the subsequent demands for caregivers. These concerns highlight a unified stance on the need to consider the holistic impact of BL on the educational ecosystem, emphasizing the social and developmental needs of younger learners as well as the support structures required at home.

While there was a general enthusiasm for its potential, variations in enthusiasm and perceived challenges emerged, including concerns over resource allocation, technological infrastructure, and the need for professional development, and teacher adaptation. These themes and codes, derived from the inductive coding process, were

instrumental in addressing the Main RQ and highlighted the crucial factors for the successful integration of the LMS in BL environments.

Even though participants generally coincide within the themes and categories, due to the role of the participants, interesting focuses appeared based on their roles. For example: teachers are more concerned with the practicalities of adapting to these systems, particularly with the legitimacy of results, and the continued support required to utilize them effectively. On the other hand, school directors are focused on broader educational outcomes and the expectations tied to the use of a standardized LMS along with the administrative concerns.

The codes and themes within the transcripts reveal a dichotomy in the concerns to LMS and BL adoption. Teachers frequently discuss the need for support in navigating new technologies, a shared commitment to strategies, and the challenges they face with hybrid learning. These concerns are from the hands-on perspective driven by direct classroom experience. School directors, on the other hand, speak to the strategic and administrative implications of standardizing an LMS, highlighting the need for administrative autonomy and resource allocation to support the technological infrastructure.

While there is an overlap in the acknowledgment of the importance of professional development and the potential benefits of a standardized platform, the nuances in their perspectives underscore the complexity of implementing such systems. Teachers emphasize the immediate impact on teaching and learning, whereas directors are concerned with the overarching impact on school operations and educational quality.

An example in the data can be seen in the themes where the resource allocation category aligned. Resources allocation had two codes, fiscal constraints and planning, and infrastructure and support, were school directors and teachers aligned with each one respectively.

Figure 9 is a Venn diagram with two overlapping circles comparing teachers and school directors' perspectives about the adoption of a standard LMS for BL. The left circle labeled "Teacher" includes perspectives such as continued support for navigating new technologies, practical use of BL and LMS, and concern for the legitimacy of results. The right circle labeled "School Directors," focuses on resource allocation, administrative autonomy, and educational outcomes. In the overlapping section, shared concerns include professional development, the benefits of LMS standardization, benefits of BL, and implications for caregivers regarding BL. This diagram suggests a common ground between teachers and school directors in professional development and technology integration while also highlighting their distinct areas of focus within the educational system.

**Figure 9**

*Venn Diagram of Teachers and School Directors' Perspectives Regarding the Adoption of a Standardized LMS for BL*



**Teacher**
- Continued support regarding the navigation of new technologies
- Practical use of BL and LMS
- Legitimacy of results

- Professional Development
- Benefits of LMS standardization and BL strategy
- Caregivers' implication regarding BL strategy

**School Directors**
- Resources allocation
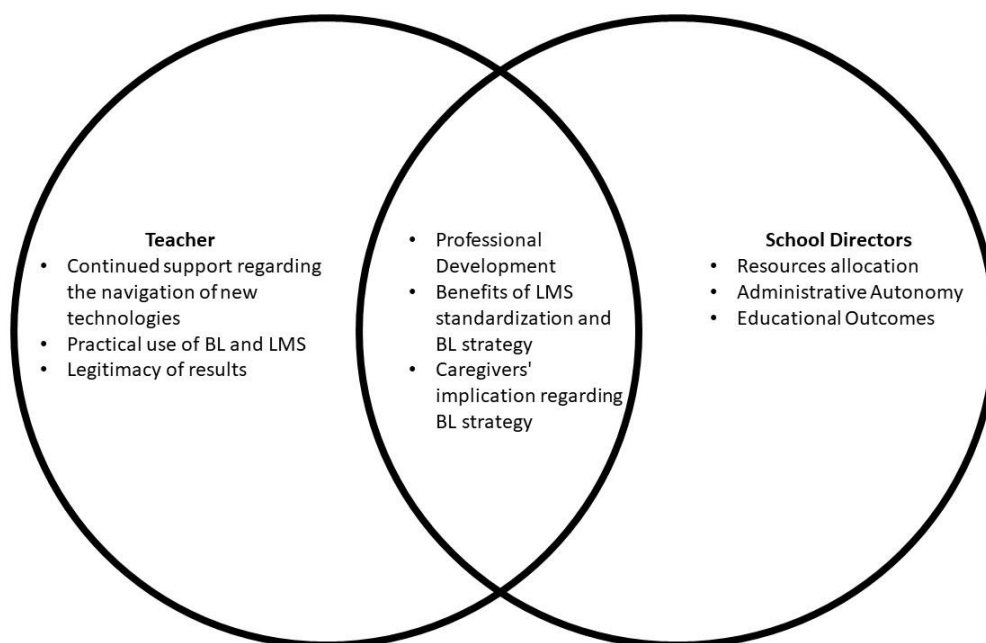- Administrative Autonomy
- Educational Outcomes

Figure 10 presents a quantitative analysis of how frequently the five categories were referenced across the documents studied. It shows that Platform Standardization and Professional Development were categories mentioned by all participants. This suggests a universal recognition of the importance of consistent platforms and the need for ongoing educator training. Resource Allocation was also a significant theme, with a 71.4% mention rate (five out of 7 participants), indicating its critical role in the successful implementation of LMS. Teacher Adaptation and Educational Outcomes were referenced by 5 out of the seven participants, revealing these areas as notable yet less uniformly

emphasized. This distribution of percentages provides insight into the varying degrees of focus on different aspects of LMS adoption among teachers and school directors.

**Figure 10**

*Percent of Participants Referencing Categories*
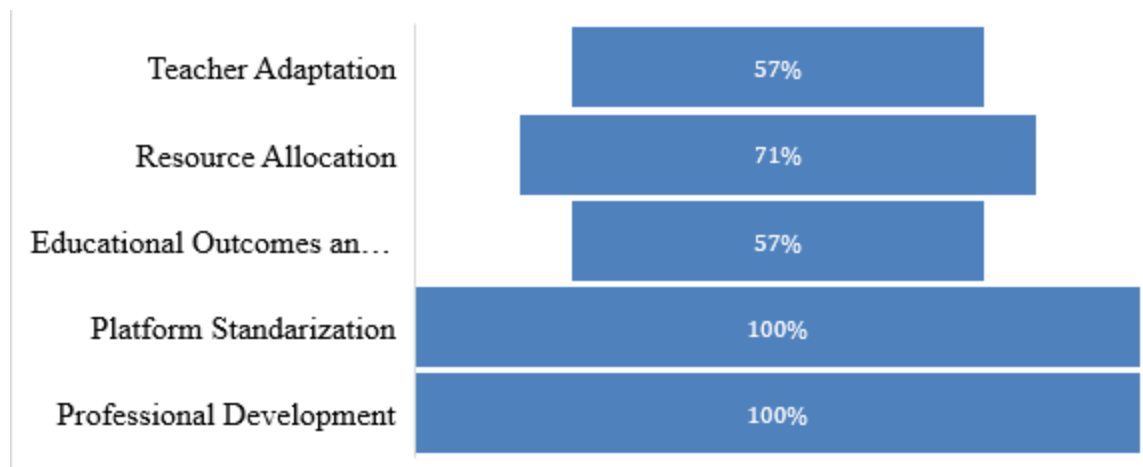


**Results in Context of the Conceptual Framework**

Upon analyzing the transcripts of interviews with school directors and teachers, it becomes evident how their experiences and insights resonate with the conceptual framework CBAM. This alignment offers a nuanced understanding of the adoption process and its implications for educational practice in the K–12 Puerto Rican scenario. Since the interviews included questions about initial perspectives on using LMS and BL during the COVID pandemic, the data revealed a pattern that aligns with the gradual and increasing stages of concern as outlined in Hall and Hord's (1987) CBAM. Based on the data gathered, it is evident that participants' concerns predominantly aligned with the task area of the SoC as outlined by in CBAM. This includes the Personal and Management stages, where both groups express concerns about understanding the LMS functionality,

its integration into existing systems, and managing the logistical aspects of implementation. None the less, there are noticeable differences and similarities in the SoC between teachers and school directors regarding the adoption of a standardized LMS for BL in K–12 education.

For teachers, the analysis revealed a significant emphasis on the management stage, indicating a strong focus on the logistics and operational aspects of integrating the LMS into their teaching practices. This suggests that teachers are primarily concerned with how the LMS will affect their day-to-day tasks and responsibilities. There's also a notable presence of the information stage, which highlighted a need for more knowledge about the LMS. Interestingly, the personal stage is mentioned fewer times, suggesting some consideration of how the LMS adoption impacts them personally, but this is much less pronounced compared to their concern for management aspects.

In contrast, school directors show a balanced concern for Information and Management stages. This indicates that directors, like teachers, are focused on understanding the LMS (information stage) and its logistical implementation (management stage). However, their concern regarding the information stage is more pronounced than that of teachers, suggesting directors are seeking a deeper understanding of the LMS's potential impact and features. In contrast with teachers, directors did mention the personal stage, specifically regarding the use of LMS by levels which reflect their own beliefs and the logistical challenges of LMS implementation. Also, data showed and emphasized the importance of fiscal autonomy and the adjustment needs of all stakeholders, which was not mentioned by teachers.

Furthermore, directors highlight the *Consequence* and *Collaboration* stages by evaluating the LMS's potential impact on educational outcomes and the essential role of collaborative efforts among educators to ensure successful adoption. Some directors advocate for the *Refocusing* stage, suggesting a need to adapt LMS implementation strategies to better suit their unique educational contexts.

This comparison highlights a shared focus on the practicalities of LMS integration (management) and a desire for more information (information) among both teachers and school directors. However, the slightly higher emphasis on Information among directors could reflect their broader responsibility for making informed decisions about LMS adoption at the school level. However, there is less evidence of directors and teachers reaching the impact stages of CBAM.

In addition to establishing participants' concern on implementation of BL on a standardized LMS, their levels of uses, was also considered. Teachers' experiences span across the levels of uses, from orientation to routine, indicating a progression from initial exposure due to the COVID 19 pandemic to full integration into their teaching practices afterwards. This journey reflects their movement through CBAM's stages, starting with exploring the innovation, gaining the necessary skills (preparation), adhering to prescribed guidelines (mechanical use), and eventually making personalized adjustments to embed the LMS into their instructional routines (routine use). However, teachers made less references to the nonuse, refinement, and renewal stages, which suggest that teachers are beyond initial exposure to the LMS but have not yet fully refined or transformed their teaching practices around it.

On the other hand, school directors show a slightly different pattern of engagement with the LMS. The Routine receives fewer mentions, which aligns with the teachers' responses and indicates a level of comfort with using the LMS as part of the school's educational tools. But the integration stage received more mentions with directors, suggesting a stronger focus or perhaps a more advanced understanding of integrating the LMS into the school's educational strategy. This could reflect directors' broader perspective on how the LMS can be utilized across different subjects and grade levels.

Both directors and teachers expressed personal and management concerns, underscore the importance of evaluating the LMS's impact on student learning, and highlighted the value of collaboration for professional development and peer support. This comprehensive view, through the lens of CBAM's stages of concern and levels of use, underscores the multifaceted challenges and considerations in adopting a standardized LMS for BL in the Puerto Rican K–12 scenario, pointing towards the critical need for tailored strategies that address both individual and systemic needs within the educational landscape.

**Discrepant Cases and Nonconforming Data**

Within the qualitative analysis, it is not uncommon to encounter data that diverge from predominant patterns, known as discrepant cases or nonconforming data. These instances are invaluable for a comprehensive understanding as they often challenge assumptions and reveal limitations or new directions for research. The data from the interviews revealed several discrepant cases that deviate from the primary trends

observed. While most participants may have expressed positive views about the adoption of an LMS, a small number may have shared reservations. These might stem from concerns over the digital divide, a lack of technical support, or the belief that technology could detract from the human element critical to teaching. Such perspectives provide a critical counterbalance to the overall narrative and raise important considerations about the equitable and effective integration of technology in education.

Within the cadre of teachers, a considerable number adapted to and valued the merits of hybrid learning. Nevertheless, a subset articulated a predilection for conventional, face-to-face pedagogy, questioning the efficacy of remote instructional methodologies. Teacher 2 raised concerns regarding the integrity of assessment outcomes in a remote setting, noting the challenges in verifying the authenticity of student work and test-taking practices. This highlights a broader issue: the difficulty in cultivating student engagement and participation within a virtual learning space, which some educators believe is more effectively addressed through direct, live interaction conducive to a dynamic educational experience.

Similarly, among school directors, while there was a general push towards the adoption of hybrid learning due to external crises like the pandemic, one director explicitly favored face-to-face learning, viewing it as the ideal method for delivering education. Additionally, Director 1 expressed concerns relating resources allocation stating "The main concern, and we are already experiencing it, is the continuity of the department aligned to this type of platform. It must be accompanied by a process that gives fiscal autonomy to the directors to address the need to purchase equipment in a

more agile manner." This director's stance was rooted in the belief that the nuances of direct teacher-student interactions are irreplaceable and critical for the learning process.

These discrepant cases highlight the diversity of opinions on hybrid learning within the educational community and underscore the importance of considering individual teacher and director experiences when forming policies on educational technology adoption.

## Summary

In Chapter 4 I reported the findings from interviews with Puerto Rican teachers and school directors regarding the adoption LMS for BL in K–12 education. The key study findings showed that teachers' perspectives range from enthusiasm to skepticism, underlining the necessity for comprehensive professional development and robust technological infrastructure. The findings underscore the importance of administrative support and the role of professional development in addressing concerns related to the integration of technology in education, particularly in maintaining the balance between technology use and preserving valuable face-to-face interactions. Key findings from the school directors showed that they recognize the potential benefits of a standardized LMS for enhancing educational delivery and administrative efficiency. Key findings from both teachers and school directors indicate a unanimous recognition of the critical role played by professional development and teacher adaptation to technology in the context of adopting an LMS BL in K–12 Puerto Rican education. However, they express concerns about the challenges of implementation, including the need for substantial training for educators, the necessity of upgrading technological infrastructure, and ensuring

consistent use across different levels of the educational system. Directors emphasize the importance of strategic planning, stakeholder engagement, and resource allocation to successfully integrate LMS into the school's educational framework. Combined concerns among teachers and school directors revealed the critical role of effective resource allocation and the importance of tailoring educational technology to meet specific institutional and student needs.

In Chapter 5 I will present a discussion of the broader implications of these findings. This includes considering the study's limitations, offering recommendations for future research, and reflecting on how the insights gained from Puerto Rican educators can inform educational policies and practices in the context of BL and technology integration in K–12 education.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this basic qualitative study was to explore teachers' and school directors' perspectives about standardizing an LMS for BL in K–12 Puerto Rican education. This study was prompted by the evolving demands of educational delivery, and the issues faced by students, teachers, and school directors during the COVID-19 pandemic, due to the lack of a standardized educational platform (LMS), leading to inconsistencies in delivering and accessing education. Drawing on semistructured interviews conducted with teachers and school directors, this study delved into the perspectives, including their expectations and reservations of the standardization of an LMS for BL.

The first key findings from the school directors showed that they recognized the potential benefits of a standardized LMS for enhancing educational delivery and administrative efficiency. This acknowledgment by school leaders underscores the importance of integrating digital tools into the educational framework to improve both teaching and administrative operations. The enthusiasm for standardized LMSs stemmed from their potential to streamline curriculum delivery, facilitate communication, and enable more effective tracking of student progress and teacher performance. However, this recognition also sets the stage for addressing the subsequent challenges of implementation, emphasizing the need for careful planning and support to realize these benefits fully.

The second key finding from school directors emphasized the importance of strategic planning, stakeholder engagement, and resource allocation to successfully

integrate LMS into the school's educational framework. This perspective points to the necessity of a holistic approach to LMS integration, one that goes beyond mere technological adoption. Strategic planning involves identifying clear goals for what the LMS should achieve within the educational context, while stakeholder engagement ensures that all voices, including teachers, students, and parents, are considered in the process. Effective resource allocation is crucial for supporting these efforts, ensuring that both technological and human resources are directed towards areas where they can have the greatest impact. This comprehensive approach is seen as key to overcoming the barriers to LMS integration and maximizing its benefits for all members of the school community.

The third key finding corresponds to teachers and school directors alike. Both teachers and school directors indicate a unanimous recognition of the critical role played by professional development and teacher adaptation to technology in the context of adopting an LMS in K–12 Puerto Rican education. This consensus highlights a shared understanding that the success of LMS integration is heavily dependent on educators' ability to effectively use the technology. It suggests that beyond the selection of an LMS, significant attention must be devoted to preparing teachers through professional development opportunities that enhance their technological proficiency and pedagogical skills. This focus on professional development is seen as essential for ensuring that the adoption of LMS technology leads to meaningful improvements in educational outcomes.

The fourth key finding relates to the concerns that both teachers and school directors had about the challenges of implementation, including the need for substantial

training for educators, the necessity of upgrading technological infrastructure, and ensuring consistent use across different levels of the educational system. These concerns reflect a realistic assessment of the hurdles that schools face in integrating technology into their educational practices. The need for comprehensive training underscores the gap between the current capabilities of educators and the demands of proficiently navigating an LMS. Similarly, the requirement for improved infrastructure highlights the physical and technical limitations that may hinder effective LMS deployment. Addressing these challenges is critical for creating an equitable and effective digital learning environment that can support diverse educational needs.

The last finding relates to concerns among teachers and school directors about the critical role of effective resource allocation and the importance of tailoring educational technology to meet specific institutional and student needs. This finding highlights a shared understanding that the successful implementation of an LMS requires thoughtful consideration of the unique context of each school and its students. Effective resource allocation is not just about providing the necessary hardware and software, but also about ensuring that these tools are aligned with the educational goals and needs of the school community. Tailoring the approach to LMS adoption means considering factors such as the school's existing technological infrastructure, the digital literacy of teachers and students, and the specific educational challenges that the LMS is intended to address. By focusing on these considerations, schools can enhance the likelihood of a successful LMS integration that truly benefits teaching and learning.

These findings reveal a nuanced landscape of perceptions, underlining the critical role of LMS in supporting BL, yet also highlighting significant concerns regarding implementation challenges, training needs, fiscal limitations, resources allocation, and the potential impact on caregivers related to the use of BL. The study unveiled a spectrum of perspectives that ranged from enthusiasm to skepticism among teachers and school directors towards the standardization of an LMS for BL. Key findings underscored the unanimous recognition of the critical role of professional development and teacher adaptation to technology. These aspects are vital for the effective integration and utilization of LMS in the educational process. Both groups acknowledged the potential benefits of a standardized LMS in enhancing educational delivery and administrative efficiency.

However, concerns were raised about the challenges of implementing such a system, including the need for substantial continuous training for educators, the necessity of upgrading technological infrastructure, and ensuring consistent use across different educational levels. The importance of strategic planning, stakeholder engagement, caregivers' implications, and effective resource allocation was emphasized as essential for the successful integration of LMS into schools' educational frameworks.

Furthermore, the study highlighted a shared understanding of the delicate balance required between leveraging technology for BL and preserving the invaluable face-to-face interactions that are foundational to effective teaching and learning. The findings also pointed to the need for tailoring educational technology to meet specific institutional

and student needs, usually depending on the level, suggesting a flexible, nuanced approach to the adoption and implementation of LMS for BL.

Building on the insights gleaned from the study, Chapter 5 will serve as a comprehensive culmination of the study. In this chapter, I will delve into the interpretation of the findings, drawing connections between the perspectives of teachers and school directors and the broader implications for educational technology implementation. I will critically examine the limitations of the study, acknowledging the constraints that may affect the generalizability and applicability of the findings. Furthermore, I will outline in Chapter 5 recommendations for future research, identifying areas where additional inquiry could further illuminate the complexities of integrating LMS into diverse educational settings. The practical implications of this study will also be described, offering insights for educators, policymakers, and stakeholders on optimizing the use of LMS to enhance learning outcomes. Finally, the conclusion will encapsulate the study's contributions to the field of educational technology, reflecting on the potential of LMS to transform teaching and learning practices in Puerto Rico's K–12 education system. This transition sets the stage for a thorough analysis and reflection on the study's significance, its impact on educational practice, and its role in shaping future research directions.

## Interpretation of Findings

The teachers and school directors' perspective about the adoption of a standardized LMS for BL within K–12 education in Puerto Rico has yielded insights that significantly extend the discipline's knowledge base. In comparing these findings with

peer-reviewed literature, it is apparent that the perspectives of teachers and school directors not only resonate with existing research on technology integration in education, but also offer new dimensions to understanding the practical and philosophical challenges of such endeavors. I interpret the findings by explaining how the data gathered and analyzed align with the study's conceptual framework (CBAM). This section specifically focuses on stages of concern and the levels of use. Following that, I present an analysis of how this study's findings resonate with current research on similar topics.

**Interpretation Related to the Concerns-Based Adoption Model**

The study's findings align with the conceptual framework of CBAM, providing a nuanced view of teachers and school directors, concerns, acceptance, and levels of use towards technology adoption in the Puerto Rican educational settings. CBAM's stages of concern offer a framework through which the gradual acceptance and integration of LMS in the Puerto Rican educational context can be better understood. Teachers and school directors exhibited varying stages of concern, from informational needs to the management of LMS integration, reflecting CBAM's spectrum of user engagement from initial awareness to concern about impact. While there was also variation on levels of use among participants, none of the participants were using the LMS for BL at the Integration and Renewal levels. This may indicate a potential gap in the training or support provided to the participants, limiting their ability to fully integrate and renew their instructional practices through the use of an LMS for BL. Furthermore, this limitation in utilization levels may also be attributed to teachers being required to use Microsoft Teams as an LMS, a platform which, despite its merits, does not encompass the comprehensive suite

of specifications inherent to dedicated LMSs. This discrepancy in platform capabilities could further constrain the teachers' ability to engage in more advanced integration and renewal practices within the context of BL. This alignment suggests that successful LMS implementation must address these concerns through tailored fiscal support and professional development, echoing the literature's emphasis on the need for comprehensive training and stakeholder engagement in technology adoption processes (Francom et al., 2021; Ross, 2020; Shin & Park, 2023).

The interpretation of findings through the lens of CBAM not only validates the model's applicability in analyzing technology adoption in education, but also enhances the understanding of the specific concerns and stages of acceptance among educators in Puerto Rico. This study contributes to the body of knowledge by highlighting the importance of contextually informed strategies for LMS integration, the pivotal role of professional development, and the nuanced concerns of educators navigating the shift towards BL environments.

**Interpretation and Recent Research**

This study enters a dynamic and evolving conversation on the integration of technology in K–12 education, a focus sharpened by recent shifts towards digital learning environments. As contemporary research increasingly underscores the necessity of technological fluency in educational settings, my research aligns with these findings by examining the practical implementation and operational challenges faced by educators. Through a methodical approach, this study not only echoes the urgency for integration

identified by recent scholarship, but also contributes new insights into the pragmatic aspects of technology adoption in schools.

Furthermore, the emphasis on professional development, resource allocation, and caregivers' implications echoes findings from peer-reviewed studies, which highlight the critical role of ongoing training and resources in facilitating technology adoption in schools (Francom, 2020; Shamir-Inbal & Blau, 2021; Tuma, 2021). Additionally, my study has unearthed a dual facet of educators' concerns: While they are deeply invested in the day-to-day practicalities of deploying technological strategies within the classroom, they also show a significant awareness of technology's ripple effect on caregivers' postschool hours. This key finding finds support in the literature, as evidenced by the independent studies conducted by Fehl-Seward (2022), Izci et al. (2022), and Vinson and Caukin (2021). Each of these studies contributes to a nuanced understanding of the implications associated with the implementation of BL strategies in education. It reveals a broader perspective where educators acknowledge the integral role of technology in shaping the learning ecosystem, extending beyond the school environment to influence interactions and support mechanisms at home, which also resonates with recent research (Lindeman et al., 2020). Finally, this research extends the conversation by situating these needs within the specific sociocultural and infrastructural context of Puerto Rico, thereby contributing to a more global understanding of educational technology integration challenges and strategies.

**Limitations of the Study**

One notable limitation of this study was the relatively small number of participants involved. By engaging with a limited cohort, the breadth of perspectives and experiences was inherently constrained, potentially impacting the generalizability of the findings. The depth and richness of qualitative insights gathered are, to an extent, reflective of the specific sample chosen. Consequently, the study's capacity to encapsulate a wide-ranging understanding of educators' concerns and practices related to technology integration is limited by the number of voices included.

Likewise, the geographical concentration of participants from the north and northwest regions of Puerto Rico introduced an additional limitation. This distribution presents a challenge in capturing the diverse socioeconomic contexts that characterize the island's educational landscape. Factors such as socioeconomic status and regional educational resources significantly influence the adoption and impact of technology in educational settings. Therefore, the study's findings may not fully represent the varied experiences and challenges faced by stakeholders across the broader spectrum of Puerto Rico's school districts. Although the study is marked by certain constraints, its findings maintain their relevance to the broader context of technological implementations in K–12 education.

**Recommendations**

Building upon the findings of this research, it is recommended that future studies expand the participant pool to include a wider demographic and geographic representation across Puerto Rico. This approach would allow for a more comprehensive

understanding of the challenges and successes of technology integration in various educational settings, which could capture the nuanced differences that socioeconomic factors may present. Additionally, it would be beneficial to establish partnerships with educational stakeholders in other regions to explore the distinct ways in which technology affects educators and caregivers, thus enriching the digital literacy discourse with diverse, inclusive perspectives.

For future research, it would be valuable to investigate the long-term impact of technology integration strategies on student outcomes and caregiver engagement. Longitudinal studies could provide insight into the sustained effects of technology integration in K–12 and its implications for student retention and teachers' satisfaction. Furthermore, exploratory research into the professional development of educators, focusing on enhancing the use of LMS and BL strategy, could offer strategies to mitigate the concerns revealed in this study. Such research would not only contribute to the academic field, but also offer practical solutions that could be implemented by policymakers and educational leaders to support a more effective and equitable integration of technology in K–12 education.

## Implications

This study provides significant implications for educational stakeholders. The alignment of the study's findings to CBAM offers a structured understanding of the varying stages of concern and levels of use toward technology adoption, emphasizing the importance of addressing informational needs, management of LMS integration, and the impact on teaching and learning practices. For school directors, the study underlines the

critical role of leadership in navigating the transition to a standardized LMS. It suggests that directors must prioritize fiscal support and professional development to address the concerns identified through the CBAM framework. This involves creating opportunities for teachers to engage with the LMS in meaningful ways, thereby ensuring that technology integration supports educational goals such as BL initiatives without overwhelming educators with additional burdens.

Teachers, on the other hand, stand at the forefront of implementing these technological tools and learning strategies in their classrooms. The study's findings highlight the need for continuous training and resources to build technological fluency, enabling teachers to integrate LMS and BL strategies effectively. It also points to the necessity of developing a supportive ecosystem that acknowledges the complexities of technology adoption in the classroom, including its implications for student engagement and the extension of learning beyond school hours (caregivers).

Policymakers are urged to consider these findings in the broader context of educational reform and technology integration policies. The study advocates for policies that provide robust support for professional development, fiscal autonomy, resource allocation, and infrastructural improvements. Moreover, it emphasizes the importance of involving educators in the policymaking process, ensuring that their concerns and insights inform the development of technology integration strategies are practical, sustainable, and aligned with educational objectives. By providing insights into the concerns and stages of acceptance among educators, the study contributes to the field of

educational technology by advocating for contextually informed, educator-centered strategies for LMS integration.

The transition to a standardized LMS across the public K–12 system in Puerto Rico represents a significant shift in educational practices. This study contributes to positive social change by offering a comprehensive analysis of the challenges and opportunities associated with such a transition. It underscores the potential of technology to enhance educational outcomes, while also acknowledging the critical need for a thoughtful approach to implementation.

## Conclusion

This study analyzed the landscapes of technology integration in education, specifically examining the perspectives of teachers and school directors about the adoption of a standardized LMS for BL in Puerto Rico's K–12 schools. Central to this study was CBAM, which illuminated the multifaceted concerns and levels of use among teachers and school directors. The study's findings underscore a pivotal message; the successful integration of LMS in educational settings hinges not merely on the technology itself but significantly on addressing the human concerns (Barrane et al., 2020). In this case, ranging from informational needs to the management of implementation and its impact on educational outcomes.

The essence of this research lies in its clear demonstration that for technology to enrich education truly, it must be accompanied by robust support systems, professional development for teachers, and strategic leadership from directors (Crompton et al., 2021; Ross, 2020; Shaheen, 2022). The nuanced perspectives from Puerto Rico's educational

stakeholders reveal a path forward that balances the promise of technology with the realities of its implementation. As this study concludes, it presents a compelling call to action: the integration of technology in education encompasses both humans and technology. The future of educational technology adoption is contingent upon the capacity to listen to, understand, and address the concerns of frontline educational professionals (Al-Ohali et al., 2020). This study contributes not just to the academic discourse but serves as a call to action for policymakers, educators, and leaders to forge a collaborative path toward a future where technology genuinely serves to enhance learning for all.

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