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LEARNING DURING COVID-19 IN HIGHER EDUCATION AROUND THE GLOBE:
SYSTEMATIC REVIEW AND META-ANALYSIS

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Oppiminen koronapandemian aikana korkeakouluissa ympäri maailmaa: systemaattinen kirjallisuuskatsaus ja meta-analyysi (Henrik Petäistö)

Pro gradu -tutkielma, 133 sivua, 7 liitesivua

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Tässä pro gradu -tutkielmassa tarkastellaan oppimisen merkitystä korkeakouluissa sekä opettajien että opiskelijoiden näkökulmasta maailmanlaajuisesti koronapandemian aikana. Systemaattisena kirjallisuuskatsauksena tämä tutkimus tarkastelee opettajien ja opiskelijoiden kokemuksia sekä monimenetelmä tutkimuksena että määrällisten vertaisarvioitujen tutkimusten (n=32) valossa. Meta-analyysinä tässä tutkielmassa on tarkoitus saada aikaan synteesi, jonka avulla haetaan vahvempaa näyttöä yksittäisten tutkimusten väittämiin johtopäätöksiin. Samalla tutkielman tarkoitus on tuoda esille ne ristiriidat, jotka esiintyvät eri tutkimusten tuloksissa.

Tutkielman teoreettisessa viitekehyksessä tarkastellaan oppimisen eri määritelmiä ja näkökulmia. Keskeisimmät oppimiseen liittyvät teoriat, joita käsitellään ovat behavioristinen, kognitiivinen ja tilannesidonnainen oppimisteoria. Näiden lisäksi aivojen toimintoja huomioiva oppiminen (*engl. brain-based learning*) otetaan tarkkailuun uudempaan näkökulmana pandemian tuottamien oppimiskokemusten valossa.

Teema-analyysin avulla tutkielmassa muodostettiin viisi pääteemaa, joita ovat: (1) muutokseen liittyvät asenteet ja tarjolla oleva tuki, (2) resilienssi ja selviytyminen muutosvaiheen alla, (3) tunneälän ja myötätunnon merkitys, (4) pedagogikka ja verkkokoulutus sekä (5) suorituskykyyn ja motivaatioon liittyvät tekijät.

Avainsanat: oppiminen, korkeakouluopetus, koronapandemia, selviytyminen, kirjallisuuskatsaus, meta-analyysi, muutosjohtaminen, organisaatiopsykologia

University of Oulu

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Learning during COVID-19 in universities around the globe: systematic review and meta-analysis (Henrik Petäistö)

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This Master's thesis explores the significance of learning from the perspectives of both teachers and students in higher education institutions worldwide during the COVID-19 pandemic. As a systematic literature review, this study examines the experiences of teachers and students in the light of both mixed-methods and quantitative peer-reviewed studies (n=32). As a meta-analysis, this thesis aims to provide a synthesis in seeking stronger evidence for the conclusions drawn from the claims of individual studies. At the same time, the aim of this thesis is to highlight any contradictions that may arise from the results of different studies.

The theoretical framework covers different definitions and perspectives of learning. The main learning theories that are discussed include the behaviorist, cognitive, and situated learning theories. In addition to these, brain-based learning will be considered as a more recent perspective that provides unique insights on learning experiences gained from the pandemic.

Using thematic analysis for the data, five main themes were formed and analyzed. The themes are: (1) attitudes toward adoption and support provided, (2) resilience in adapting and coping with the transition, (3) emotional intelligence and the role of compassion, (4) pedagogy and online education itself, and finally (5) performance and motivational factors.

Keywords: learning, higher education teaching, COVID-19 pandemic, coping, literature review, meta-analysis, change management, organizational psychology

CONTENTS

1	INTRODUCTION.....	6
1.1	Framing the Study.....	8
1.1.1	<i>Research Objectives and Questions</i>	9
1.1.2	<i>Principle Findings</i>	9
1.1.3	<i>Structure</i>	10
1.2	Meta-theories.....	11
1.3	Dimensions of Learning.....	26
1.3.1	<i>Attitudes and Support</i>	26
1.3.2	<i>Coping Capacity and Resilience</i>	29
1.3.3	<i>Emotions and Compassion</i>	30
1.3.4	<i>Pedagogy and Online Learning</i>	33
1.3.5	<i>Performance and Motivational Factors</i>	37
1.4	The COVID-19 Global Health Crisis and Learning.....	41
1.5	Crisis and Coping in Higher Education.....	44
1.5.1	<i>Coping in Higher Education</i>	44
2	METHODOLOGY.....	46
2.1	Scope of Review.....	46
2.2	Approach.....	46
2.3	Access to articles.....	54
2.3.1	<i>Data Reduction</i>	54
2.4	Population.....	56
3	RESULTS.....	57
3.1	Descriptive Characteristics of Articles.....	57
3.2	Themes and Thematic Relationships.....	61
3.2.1	<i>Thematic Relationships</i>	77
3.3	Meta-analysis.....	83
3.4	Synthesis.....	90
4	DISCUSSION.....	94
4.1	Learning in HEIs During the COVID-19 Pandemic.....	94
4.1.1	<i>Adapting to the New Normal by Learning to Learn</i>	94
4.1.2	<i>Self-efficacy and Self-regulation to Facilitate Learning</i>	96
4.2	Stress and Adapting to the Pandemic.....	99
4.2.1	<i>Alleviating Stress</i>	99
4.2.2	<i>Coping Strategies</i>	100
4.3	Role of Leadership.....	103

4.3.1	<i>Leadership's Role in Facilitating Performance in HE during COVID-19</i>	103
4.3.2	<i>COVID-19 Pandemic as an Opportunity to Reframe Educational Leadership</i>	106
4.4	Limitations of this Study	111
5	CONCLUSION	112
	REFERENCES	114
	Appendix 1	134
	Appendix 2	135
	Appendix 3	136
	Appendix 4	137
	Appendix 5	138

1 INTRODUCTION

In contemporary times, in many parts of our lives, ‘learning’ is a concept that is used to frame activity in various domains, such as organizational learning, web-based learning, and machine learning. Recent studies in education have claimed e-learning to be a cost-effective solution where gamification can be integrated to increase motivation, interaction, and decrease drop-out rates (Hassan et al., 2021) while others propose imitation learning or artificial intelligence can be used to process raw data or mimic human behavior (Hussein et al., 2018; LeCun et al., 2015). The COVID-19 pandemic has disrupted education on an unprecedented scale, providing an opportunity to examine the effects of online learning and explore the factors that contribute to the process of learning. While examining learning from the global north, it is important not to overlook that not all students have the appropriate connectivity, device, and digital skills required to find and use educational content dependent on technology. According to the UN, at least 463 million or nearly one-third of students around the world cannot access remote learning, mainly due to a lack of online learning policies or lack of equipment needed to connect from home (UNESCO Institute for Statistics Data, 2020). As stated by the director of UNESCO, Audrey Azoulay, “Never before have we witnessed educational disruption on such a large scale” (UNESCO, 2020). Despite being a harbinger of bad news, COVID-19 also served as a catalyst of change on many fronts, including the field of education.

This study attempts to dive deeper into the world of higher education and look at the impact COVID-19 has had on learning and our conception of what learning itself means. One of the initial questions motivating this study was understanding how did the shift to online learning during the COVID-19 pandemic impact higher education students and staff, and what were the implications this shift had on our understanding of learning? The recent COVID-19 pandemic presented an opportunity to revisit what learning means to us. Often the concept of learning is used without further investigation of what is meant by ‘learning’. While ‘learning’ may be referred to the process of receiving input and perceiving the information, the understanding of this concept seldom receives further explanation despite being used anywhere from tens to hundreds of times in numerous scientific articles. As many educational institutions had to switch to remote learning almost overnight, we soon discovered that there are further aspects to learning that can easily be taken for granted in a traditional classroom environment. In online courses, the high withdrawal rate and lower motivation rate have been reason for educators to revisit how they engage with their students.

Even though the COVID-19 pandemic in higher education has a relatively short history, there have been studies done on the impact the pandemic and the shift to online learning has had on students and staff (Bilgiç, 2021; Noori, 2021; Taufiq-Hail et al., 2021). Higher education institutions play a crucial role in developing students' skills and knowledge, and the pandemic has disrupted this learning process significantly. The shift to online learning has been a necessity to ensure students' and staffs' safety, but it has also raised concerns about the effectiveness and quality of education.

Despite trying to understand the impact that the pandemic and the shift to online learning has had on students and staff, often the concept of learning gets left undefined or, if defined, defined to a limited degree (Almusharraf & Khahro, 2020). While some cross-sectional studies have been done that compare the experiences between a select few countries (Cifuentes-Faura et al., 2021; Cranfield et al., 2021), they are limited in scope and fail to look at how higher education institutions have coped with the crisis on a global level. Having become a prevalent mode of education during the pandemic, online learning is likely to continue beyond the pandemic. Therefore, it is crucial to understand how effective online learning is and what factors contribute to its success or failure. Since the concept of emergency distance education (EDE) was adapted by institutions due to the unprecedented emergency created by the COVID-19 pandemic, few empirical studies have been conducted to date to establish the effectiveness of working remotely, including not only course delivery but also staff meetings and other administrative tasks related to educational management (Barnes, 2020). Additionally, investigating and understanding the impact of online learning on students and staff could inform future educational policies and practices, especially in emergency situations.

Thus, this study sets out to investigate the various articles written on the experiences of higher education students and staff throughout the globe during the COVID-19 pandemic. As a systematic review its purpose is to (1) depict a general picture of what has been studied thus far, (2) draw conclusions based on five different themes that seem to be common among those studies, and (3) consider where there might be reason for further research with respect to the learning impact of emergency education during the global health crisis. This study will use thematic analysis and meta-analysis as means to depict a general picture of what has been studied thus far while drawing conclusions based on the five themes. In addition, this study aspires to synthesize the studies to provide insight where there might be reason for further research. It is understandable that in a situation where studies are done in haste, some essential aspects may

go overlooked. Likewise, the conditions under which this study has been done have set limitations on the rigor and extensiveness of its approach.

As a second Master's thesis, one of the central purposes of this study was to also further practice and develop the research-related skills that influence the author's practice as a university teacher. This refinement of the teaching practice as a teacher-researcher is a cherished commitment to advance the pedagogical quality of teaching and hereby the quality of learning. Completing this study has provided an opportunity to engage in a process of learning and research that benefits from the reflection, consultation, and exchange of ideas, which would not have been possible without the cooperation and support of the individuals and forums involved in and made possible by the Education and Globalisation Master's Degree Programme at the University of Oulu.

1.1 Framing the Study

The on-going global health crisis closed university campuses forcing rapid improvisation and adoption of online teaching. Faculty were asked to transition, create, and implement online teaching due to university closures with no choice but to teach online. The situation required the faculty to adapt even if they did not feel properly prepared to do so, or formerly had little interest in online teaching.

This study will explore the experience gained so far of teaching online; both the opportunities and challenges that it has presented for higher education (HE). It will explore how pedagogies were adapted as the removal of face-to-face teaching relocated HE learning communities to new online spaces. Considering that the results indicate that factors such as the lack of direct interaction with learners and the sudden change of setting were among those that most strongly affected the participants' own learning process (Sepulveda-Escobar & Morrison, 2020), this study will look at the potential role compassion and self-regulation played in maintaining motivation. Finally, by doing a systematic review of prior research, this study will explore how these constructs of faculty online readiness from pre-COVID-19 pandemic time remain pertinent and perhaps fall short when the transition to online teaching is rapid and in response to a crisis. As significant differences in the perceptions of HE faculty regarding before and after

conducting classes through online teaching have already been found (Mittal et al., 2022; Rodrigues et al., 2021), this study attempts to explore how apparent these differences in perceptions and attitude toward learning are among students and staff alike.

1.1.1 Research Objectives and Questions

The aim of this study is to review quantitative and mixed methods research on learning in higher education during the COVID-19 pandemic. This study aims to include peer-reviewed quantitative and mixed methods articles published between 2020 and 2022. While the sample of articles for this study will be limited due to the recent occurrence of the COVID-19 pandemic, one of its central objectives is to understand how learning has advanced in higher education despite the on-going conditions of the pandemic. It investigates how five initial themes and their respective subthemes have advanced learning: (1) attitudes toward adoption and support provided, (2) resilience in adapting and coping with the transition, (3) emotional intelligence and the role of compassion, (4) pedagogy and online education itself, and finally (5) performance and motivational factors.

This study thus aims to address the following research questions:

1. What research has been done on learning in higher education during the COVID-19 pandemic from both a student's and teacher's perspective? (systematic review)
2. What themes are evident in the articles collected? (thematic analysis)
3. How have the studies that could be done during the COVID-19 pandemic advanced our understanding of the five initial themes? (meta-analysis)

1.1.2 Principle Findings

Value

Few studies on learning in higher education during the pandemic seem to have a coherent understanding of learning. Some seem to equate learning with grades (Septianasari & Wahyuni, 2021; Bawa, 2020) while others equate learning as an ability to adapt or change (Alasmari, 2021; Almusharraf & Khahro, 2020). This lack of coherence in a definite conception of learning

reflects the nature of research on learning in general. By exploring the various articles approaching this question of learning and success in higher education (HE), this study aims to provide added value by drawing a synthesis of how learning is understood and what has happened to advance these various aspects of learning globally during the pandemic. In doing so, this study also aspires to create a more coherent understanding of the concept of learning as HE continues to use online learning beyond the pandemic.

Learning itself can mean many different things to us. Through a thematic analysis, this study aims to reveal how learning has been understood from various viewpoints or themes, particularly in the context of the pandemic. In understanding the various themes that are apparent in the articles that are available, this study also aims to bring added value by investigating the various themes in more detail as they are applied and appear in the methods and results of a selection of articles where meta-analysis is possible. As a part of the systematic review, this study's meta-analysis attempts to provide additional value by (1) assessing the risk of bias throughout the articles included (Higgins et al., 2022) while (2) bringing light to how the effect sizes of the various aspects related to learning have been measured throughout the world by applying Cohen's d (1988). At the same time, by applying meta-analysis this study attempts to synthesize and summarize the findings on the process of learning among students and staff in higher education during the pandemic overall. By looking at the various factors and their effect on the learning process, we can also appreciate factors that we may take for granted (e.g., internet access or electricity). The value of a comparative perspective across higher education institutions globally is to help understand how learning in higher education is advanced on a more systemic level.

1.1.3 Structure

This study started with a plan to search and initially read the articles available on the topic of online learning in higher education during the COVID-19 pandemic. Upon reading the articles there was a need to consider whether they could be included in the thematic analysis. Considering the thematic analysis was on the various aspects of learning, it was essential to define this and understand the various facets with which learning may be depicted and studied in prior articles. Section 1.2 attempts to define the meta-theory behind our concept of learning that guides this initial search and more analytical reading of the selected articles. Section 1.3 proceeds with defining the dimensions of learning that were apparent in the articles: (1) attitudes

toward adoption and support provided, (2) resilience in adapting and coping with the transition, (3) emotional intelligence and the role of compassion, (4) pedagogy and online education itself, and finally (5) performance and motivational factors. Section 2 proceeds with discussing the methods behind this overall process, including the inclusion criteria and methods used for both the qualitative and quantitative analysis. Upon defining learning and selecting the articles that would be included in the thematic analysis, the articles were coded and analyzed for relationships. While paying attention to the coding frequency and relationships between the various codes, the articles were subsequently selected for further meta-analysis where the necessary data was available. Section 3 presents descriptive statistics related to the first research question and the results of the analysis and findings of the two last research questions. Finally, Section 4 discusses the implications of this study by trying to understand what our understanding of the prior research, its themes, and the results of the meta-analysis may suggest in terms of lessons learned from the learning that happened during the pandemic, coping strategies, and the role of leadership in managing change. Section 4 ends with a subsection on the limitations of this study. Section 5 concludes this study by summarizing the key findings and addressing the limitations of this study with a brief discussion of the implications for further research.

1.2 Meta-theories

To understand the COVID-19 pandemic and its impact on learning in higher education, it is necessary to first define the concepts with which we describe the phenomena and constructs being measured in the existing research. This will help identify and analyze relevant articles to gain insight into the experiences of students and staff while conducting the systematic review.

When trying to understand the world around us, we, as individuals and collectives, draw on different ontological and epistemological perspectives as ways of viewing the world (Kuhn, 1962). The term “ontology” can be defined as the study of what there is (Hofweber, 2021). When reality is understood as a truth out there, waiting to be discovered, we can appreciate how a creating a systematic approach to discovering what is “out there” assumes that there is something out there to discover. This approach is commonly referred to as realism. Scientific realism assumes that although the scientific method is imperfect, it can access representations of the world and is the best method for doing so (Madill et al., 2000). In seeking to understand how the developments involved with making the transition to emergency remote teaching have come

about, critical realism recognizes that a reality exists independent of a scientist's ideas but the experiences and understandings of reality (i.e., the empirical basis for discovering the truth) are mediated by language and culture (Braun & Clarke, 2022). In that sense this study's approach is to understand reality in a way that is as accurate as possible with the help of the data provided through the various articles included in this study. While doing so, it also recognizes that this study's understanding of reality is obscured by both subjectivity and the processes that produce knowledge (e.g., with the help of the risk of bias table in the meta-analysis; Higgins et al., 2022).

The term "epistemology" comes from the Greek words "episteme" and "logos". Episteme can be translated as "knowledge" or "understanding", while logos can be translated as "account", "argument" or "reason". Having taken on a critical realist ontology, this study recognizes that both quantitative and qualitative methods for producing knowledge and understanding are necessary. At the same time the critical realist perspective allows us to admit that all our avenues of knowledge are faulty and fallible. The classic philosopher Plato recognized this risk for fallibility already around 400 B.C. According to Plato, human behavior flows from three main sources: desire, emotion, and knowledge (Durant, 1933).

In Plato's view, when people are unguided by knowledge people are a multitude without order, like desires in disarray. Plato's epistemology was an attempt to understand what it was to know, and how knowledge is good for the knower. Aristotle later refined this into the art and method of correct thinking or logic; the *logy* of method of every science (Durant, 1933). Later Immanuel Kant brought together the idea of empiricism and reason by suggesting that rationalism and empiricism could be understood as components of an equilibrium: our knowledge is gained from empirical encounters and rational operations (Rohlf, 2020). In similar nature the aspiration of this study is to combine the experiences gained from various studies while analyzing what they have to share. Kant characterizes such synthesis as an act of putting different representations together and grasping what is manifold in them in one cognition (Pereboom, 2022). In attempting to implement a postpositivist epistemology this study strives to utilize meta-theories related to learning while doing a systematic review with the help of thematic analysis and meta-analysis to help create a synthesis of what can be understood about what the recent COVID-19 pandemic has meant for learning in higher education globally. This synthesis is apparent in the analysis of the thematic relationships, key findings, and key excerpts on how learning was defined (refer to Sections 3.2.1., 3.4., and Appendix 5, respectively).

By identifying recurring qualitative patterns and themes across the articles, this study attempts to better understand the key ideas and issues related to learning in higher education during the pandemic. Finally, the meta-analysis attempts to identify trends, patterns, and relationships among the findings to draw broader quantitative conclusions about the impact of the pandemic on learning in higher education. As described by Booth, Sutton, and Papaioannou (2016), the meta-analysis attempts to synthesize the findings by first extracting the data, then computing missing values, and finally translating it into common metrics (e.g., Cohen's *d*). If applicable, these steps would allow us to determine how the studies have generally advanced our understanding of the five initial themes and their meta-theories. If not, we can conclude that the studies have pointed us toward an obvious research gap that needs further attention beyond the COVID-19 pandemic.

To provide context for the articles included in this study, this section discusses the meta-theories related to learning that underpin our understanding of the constructs that are used to measure it. A meta-theory, in turn, provides 'a loose collection of logically related assumptions, concepts, or propositions that orient thinking and research' (Bogdan & Biklen, 1998). As suggested by Castelló et al. (2021) meta-theories can be represented on a continuum. A continuum allows a range of positions between two extremes. At one end of the continuum, we can situate positivism, or the idea that reality is directly observable and scientific knowledge is exclusively valid, and on the other end we can situate realism, or the idea that what is real is not dependent on observers to exist. The notion of *discovery* is central to the position of realism, as the underlying assumption is that the reality is waiting to be discovered. Although different meta-theories represent the underlying assumptions used in research, they often remain implicit (Atewologun et al., 2017).

As we set out to have a more global understanding of how learning was implemented and experienced during the pandemic, we also must not take for granted that we currently live in an era of human history where the generation of knowledge has become everyone's responsibility. With the advance of technology and communication, starting with the invention of the printing press in the 15th century and the first transmission of a telegraph in the 19th century, our access to knowledge has taken an exponential increase. Not only have digital electronics contributed to our ability to share knowledge, but they have also contributed to world economic growth. As economist Richard G. Anderson (2007) suggests, numerous studies have proven that technological innovations in the production of semiconductors have led to the increase of productivity. In fact, this phenomenon is sometimes referred to as Moore's law. When the silicon integrated

circuit was invented in 1960, only five years later Gordon Moore of Intel announced that the number of components placed on a chip had approximately doubled each year (Keyes, 2006).

Considering the rapid change of our world, the globalizing paradigm of human society, and the innate need of each citizen of this planet to live a meaningful life the potential significance of education cannot be overestimated. As advanced by the attendees at the United Nations Conference on Environment and Development in Rio de Janeiro (1993), “Education [...] should be recognized as a process by which human beings and societies can reach their fullest potential.” The UN statement (1993) continues: “[...] Both formal and non-formal education are indispensable to changing people’s attitudes so that they have the capacity to assess and address their sustainable development concerns.” This cherished commitment to genuine betterment can be described as a feature that educational science shares with futures studies: both are similar to the science of medicine in that they seek to produce effective practice for real-life improvements (Izadi, 2003).

As education sciences aspires to develop as a field of science, the COVID-19 pandemic allowed for a unique opportunity to review contemporary learning theory within a new situation. As Bredo (1997) acknowledges, contemporary learning theory faces several challenges. One of these challenges is the split of learning theory between behaviorist and cognitivist camps (Bower & Hilgard, 1981). At one extreme, behaviorists study bodily movement without the mind while on the other, cognitivists study the mind while paying little attention to its connection to the rest of the body. This polarization presents both theoretical and practical difficulties. Education which is based on such polarized views is likely to produce one-sided specialists who act in one-sided ways (Bredo, 1997). In fact, when looked at from the perspective of language learning, it did not take long during the pandemic to recognize the importance of having the video on during remote learning. Much of the importance of nonverbals and physical proximity had been overlooked. The danger in both extremes is that one is taught to behave without thinking while the other learns to think without practical application.

Too often we forget the social significance of learning. As Jerome Bruner (1985) explains, too often human learning has been depicted within the narrative of a lone organism pitted against nature – whether in the behaviorist’s model of an organism shaping up responses to fit the world of stimuli, or in the Piagetian model where a lone child struggles to strike some equilibrium between assimilating the world to his or her previous cognitive perceptions of the world. A theory of learning that focuses on the “lone organism” is likely to ignore all the sharing, the

mutual construction, and modulation that is at the essence of creating and adopting new knowledge, skills, and ways of applying these in practice. If one thinks of language use and reflective thinking as similarly social in character, then a narrowly individualistic approach to learning is likely to shortchange these processes (Bredo, 1997).

As a result of these considerations some have begun to question the whole concept of “learning” (Catania, 1992; Newman et al., 1989). To add to the complexity, others have developed a third approach to learning, of which current work on “situated learning” is an example (Brown et al., 1989; Clancey, 1993; Lave & Wenger, 1991). To better understand learning as a concept, this introduction will discuss these three approaches to learning – behaviorist, cognitivist, and situated.

At the turn of the 20th century, the dominant orientation in psychology was neither behaviorism nor cognitivism – it was functionalism (Bredo, 1997). Functional psychology developed in conjunction with pragmatism and the early advocates of pragmatism include names American philosophers like William James, John Dewey, and George Herbert Mead. William James suggested that an organism is organized to sense changes in the environment and act on them to bring about new, more beneficial states (Bredo, 1997). John Dewey was critical of the reflex view on which James had based their psychology; he argued that there never has been a pure sensation independent of the context of ongoing activity (Bredo, 1997). In other words, an organism helps cocreate its own stimulation and does not just react to events independent of its activity. This emphasized the importance of transactions rather than reactions. If both the organism and the environment are viewed as continually changing as in Dewey’s view, then learning new habits need not mean adapting to a fixed environment.

George Herbert Mead made sure to be more specific about the way in which reflective intelligence is learned through social interaction. If one considers a simple interaction between a zebra and a lion, we can appreciate Mead’s view in more detail. When a lion looks intently at a zebra, the zebra is likely to respond to the look as it would to a possible chase. It responds to this beginning, which signals that the rest of the chase is likely to begin. The lion is likely to learn how to respond to the zebra’s gestures in return – in fact, it is vital as a zebra’s kick is known to be capable of killing a lion. As Mead (1910/1970) put it, “there is a conversation of gesture, a field of palaver within the social conduct of animals.” For understanding learning this is important because it helps appreciate the creation of meaning (Bredo, 1997). For an event to have

a social meaning, it must then play a role in a joint activity by gesturing for what is to come in the interaction (Bredo, 1997).

Behaviorism grew out of the functionalists' emphasis on science and rejection of mental entities, as well as comparing the mental life of humans and animals (Bredo, 1997). Among the reasons for this shift for tough-minded empiricism was the desire to legitimize psychology as a science, as Bredo (1997) indicates. Watson (1913) defined psychology (as the behaviorist views it) as a purely objective experimental branch of natural science. Watson (1913) added that the theoretical goal of psychology is "the prediction and control of behavior"; introspection is not part of its methods. Watson defined learning as an adjustment adequate to "meet the situation". Learning was understood to be a function of behavior, not the mind; a process of "conditioning" (Bredo, 1997).

Frederick Skinner made three key changes to Watson's approach. First, Skinner retreated to a probabilistic rather than a deterministic approach to prediction (Bredo, 1997). Second, Skinner further defined what can be counted as a "stimulus" or a "response". Third, Skinner no longer predicted which stimulus an organism would respond to ahead of time, focusing more on how behavior changes because of consequences of past behavior. "Learning" for Skinner (1950) involves a change in response rate following reinforcement. In other words, an animal that "learns" is one that responds more rapidly in a manner likely to bring about reinforcement, just like a dog may when it is given a treat for behaving in a certain way. Consistent with this approach, behaviorists shifted the focus from the way in which an organism defines a situation to the way in which the environment has been defined by another (Bredo, 1997).

Applied behavior analysis (ABA) could thus be defined as the investigation of variables that influence the behavior of any living organism in the real world, with an intent to address socially important behavioral challenges. This infers that ABA is empirical, that is, an experimental, data-based, scientific approach, which draws upon observation and experience. For a further definition of ABA and its essential characteristics, please refer to Table 1.2.1.

Table 1.2.1. Essential Characteristics of Applied Behavior Analysis (Mayer et al., 2012)

Characteristic	Definition
Applied	Focuses on socially significant behaviors
Behavioral	Focuses on observable events (what people say and do)
Analytical	Demonstrates functional relationships
Technological	Defines procedures clearly and objectively
Conceptually systematic	References and relates procedures to basic principles of behavior analysis from which the procedures are derived; ties procedures directly to the principles of behavior analysis
Effective	Demonstrates socially significant behavior change
Generality	Extends behavior change across time, setting, or other behavior

Behavior analysts assess behavioral concerns and formulate the most promising solutions by designing methods to apply, monitor, analyze, revise if necessary, and communicate the effects of their interventions (Mayer et al., 2012).

To understand what then could further lead to effective behavioral change this study aims to define the construct of learning from an ABA perspective. This includes understanding the construct of learning from how it relates to three elements: (1) the interdependency among the antecedent conditions, (2) the behavior, and (3) the consequences of the behavior (Mayer et al., 2012). These three elements are part of what is called in ABA as the three-term contingency. Contingency here refers to the specified dependencies or relations between behavior and its antecedents and consequences (Mayer et al., 2012).

The environmental conditions in which a person behaves can also be called the context. The importance of the environment and its influence on behavioral change is of particular interest

under the transition from normal higher education teaching to the emergency online teaching that occurred in the first months of 2020. The behavior itself can be understood as a reaction to a stimulus, or a specific event or combination of events. For the purposes of this study the context of higher education serves as an arena where the COVID-19 pandemic served as a stimulus for changing behavior with respect to formal learning in various ways. Pre-post studies where an intervention was conducted prior to emergency remote teaching (face-to-face) and while in emergency remote teaching (learning and working online) did not account for all the possible confounding variables that this general situation can involve.

Related to changing behavior are the concepts of reward, or positive reinforcement, and punishment. Positive reinforcement is a stimulus, dependent or contingent on a response, resulting in the rate of that response increasing or maintaining (e.g., praising a student for coming to class early, leading to an increase in coming to class early in the future as well). Punishment can be understood in two ways: positive punishment and negative punishment (Hall et al., 2010). Positive punishment is an individual experience (generally unpleasant) where a stimulus contingent on a response, results in a decrease in the future probability of that response. In negative punishment an individual loses a stimulus (generally pleasant) contingent on a response (e.g., taking away a toy from a child for misbehaving). While one could say that this study has turned to an “older” understanding of learning, it attempts to do so by looking at the concept of learning with relation to various aspects, or themes, that have become evident in the articles written thus far on experiences from higher education students and teachers around the world during the COVID-19 pandemic. In doing so, it also integrates “newer” concepts, like those related to motivation process theory, a more constructivist perspective on how our thoughts and the meanings we associate with them also shape our behavior in interaction with the environment around us.

As stated earlier, this study attempts to understand how the various themes being discussed are being defined. To achieve this, it attempts to do a meta-analysis on multiple studies, assuming that there are some shared meanings upon which to make observations in the larger environment. This can be difficult with concepts like learning that are defined in various ways. This study attempts to understand the concept of learning, but it is important to acknowledge that the concept of learning advanced in this study has been limited by the scope of the articles read, the researcher’s prior concepts of learning, and any supplementary resources accessed during the process of completing this study. To get an overview of the concepts of learning discussed in this study make sure to refer to Table 1.2. For a further understanding of the various themes

related to the dimensions of learning make sure to refer to the summary of the themes (see Section 3.2., Table 3.2.1). The summary of key findings (see Section 3.4., Table 3.4.1) provides further insights on how these concepts were reflected in the key findings of the articles. The synthesis matrix provided in the appendices (see Appendix 5) also provides a further discussion of how learning is defined throughout some of the key articles in this study.

Comparing results among studies is a behavioristic analysis of the different variables and their effects on constructs like performance. However, such analysis would not be possible without a proficient understanding of the underlying concepts. Before the behaviorist conducts an external experiment with observable variables this naturally requires a simulated “internal” experiment within the mind to determine which variables will be observed and how – this can be called problem solving (Mayer et al., 2012).

Noam Chomsky (1959) criticized the work of Skinner by stating that the description of units of behavior requires interpretation in intentional terms. What counts as a stimulus or a response can be made rigorous under controlled laboratory conditions but extrapolating from these conditions to everyday situations is impossible (Bredo, 1997). As an alternative Chomsky suggested that learning is a form of implicit hypothesis testing that is constrained by innate structures (Bredo, 1997). Jerome Bruner (1966) also thought of the process of learning as like hypothesis testing. A learner uses some strategy to generate possible rules defining a concept and then tests these hypotheses against actual instances until one is found that survives the tests (Bredo, 1997). A learner would apply different strategies and thus we could observe which strategies affect the rate and accuracy of learning in different ways, clarifying which “inner” processes are of obvious importance to learning (Bredo, 1997). Herbert Simon helped formalize the models of problem solving and learning by simulating them more explicitly with a computer. Thus, his model was much like an inward version of the behaviorists’ external maze search (Simon, 1991).

As Bredo (1997) puts it “the cognitive revolution turned the behavioristic view back outside in”. Cognitivism, however, began facing increasing criticism in the 1970s. Computer models turned out to be limited to a definite set of conditions and were not sufficient in reflecting the real world. Philosophers like Hubert Dreyfus drew on Heidegger’s phenomenology while others drew on the dialectical view of Karl Marx (Bredo, 1997). This challenge has in part been reflected in the challenge confronted during the COVID-19 pandemic when considering how we see learning. Taking for granted, for example, the role that nonverbals have in pedagogical

interaction when trying to interact via video conferencing is just one example. The situated learning approach is one newer approach that has helped understand the social context in which learning happens.

The principal theme in the situated approach is the assertion that thinking and learning are fundamentally dependent on the situation (Brown, 1989). Using Heidegger's phenomenological critique of modern technicism, Dreyfus suggested that the problem with computer models is in the predetermined assumptions about what is relevant or important (Bredo, 1997). As a result, the functioning of these systems is limited with those contingencies and thus they are not generalizable across situations (Dreyfus, 1972/1979). Rather than being derived from rules, Dreyfus (1972/1979) argues that thinking has its origins in practical, embodied activity. Central to Dreyfus's argument is the idea that a machine can, at best, make a specific set of hypotheses and then find out if they have been confirmed or refuted by data whereas the human body can constantly modify its expectations in terms of a more flexible criterion. Dreyfus (1972/1976) points out how this defines embodied activity, as humans need not check for specific characteristics or a specific range or characteristics, but for whether, on the basis of our expectations, we are coping with the object. Dreyfus's analysis suggests that one needs to focus on activity and the varied situations that arise within it, as the background for thinking and learning.

Lev Vygotsky provided a more elaborated alternative to the computational approach. Vygotsky argued that higher mental functions develop through participation in social activities; hence, the social context of learning is critical (Bredo, 1997). Reminiscent of Mead's view, Vygotsky depicts learning as fundamentally social in origin. While Vygotsky did not define learning as specifically, he did define development as the internalization of the whole pattern of interaction in which a part is embedded. For example, learning could be understanding the meaning of a word while development would be being able to place and use, or embed, this word in a specific context. Given this view, learning is necessary for development as the application of a meaning would not be possible without the understanding of the meaning to be applied in the first place.

Building on the work of Vygotsky and Dreyfus, anthropologist Jean Lave took a more antimodernist approach to understanding learning. Lave approaches learning through the metaphor of apprenticeship (Bredo, 1997). As Lave and Wenger (1991) write, "It is the community, or at least those participating in the learning context, who 'learn' under this definition". In other words, social practice is the main driver, and learning is one of its features. Learning is about becoming a fully-fledged, contributing member of a community rather than simply performing

an isolated task (Bredo, 1997). When we understand learning in this more complex way, we begin to appreciate what all is part of learning in higher education – it is not just mastering the concepts that we use but also applying them in a certain context and becoming a member of the community. It is important to note that an exclusive focus on a given community can lose focus on the whole person (Bredo, 1997). Nonetheless, it is worth noting that belonging to a community has been an important element of higher education, one that many students have missed when restricted to learning from within the four walls of their homes during the pandemic. Students' sense of belongingness depicts their individual perceptions of acceptance and motivation theory maintains that performance and behavior can be improved if student experience belongingness in the larger social context (Voelkl, 1995, 1997).

Throughout the time of the COVID-19 pandemic one final learning theory that has been emerging and gaining popularity is brain-based learning (BBL). During the pandemic BBL has gained public interest with the help of video webloggers like Dr. Andrew D. Huberman, a neuroscientist from Stanford University who posts popular science videos on the YouTube website. Dr. Huberman has a background in neurobiology and more specifically ophthalmology. One of his original contributions during the COVID-19 pandemic was promoting the importance of looking outside the window to view the horizon in between remote sessions to help cope with the stress related to limiting our vision to a small screen for extended periods of time (Wapner 2020). Dr. Huberman's videos cover a range of topics including understanding how the brain works, mastering stress, and learning faster. His videos – as with BBL theory overall – advance public knowledge about brain function and its role in the process of learning, a new framework that has further potential to influence students' learning motivation when compared to conventional models. During the pandemic these questions became of particular interest because they served as ways to discuss how students could self-regulate and further motivate their learning while coping with the social isolation that resulted from the social distancing policies in many countries. Enhanced emotion regulation has been suggested to be the underlying reason for many of the beneficial effects of practicing mindfulness (Tang et al., 2015). From the teacher's perspective, understanding the strengths and weaknesses of learners and their individual differences from behavior, brain, and genetic aspects can help support, facilitate, and optimize individual learning and achievement (Tang et al., 2016).

It is worth noting here that applied behavioral analysis (ABA) and brain-based learning (BBL) are both approaches to understanding and ultimately, modifying behavior. Yet both ABA and BBL have different focuses and perspectives. While ABA is based on the principles of operant

conditioning, BBL is based on the idea that the brain is active and constantly adapting to new information and experiences. While ABA focuses on the conceptual analysis of behavior (Mayer et al., 2012), BBL focuses on the analysis of learning and how the nervous system plays a role in this process. One of the foundational principles of BBL is the natural ability and propensity of the brain to elicit patterns of meaning (Feinstein, 2014). ABA and BBL are not exclusive of each other; ABA focuses on helping individuals develop while BBL focuses on creating effective learning strategies based on understanding how the brain works. Both ABA and BBL are intended to improve learning and behavior.

Younger generations are now growing up in an age of diverse information and media. Inevitably, they often immerse in technologies and information for more hours per day (often referred to as “screen time”) than any generation ever before. Younger generations respond differently to the traditional learning and education model (e.g., textbook- and lecture-based learning and teaching) than previous generations. Therefore, it is crucial to develop a new technology-based learning environment and promote effective learning (Tang, 2017).

Despite the need to develop a new technology-based learning environment, some of the same principles continue to apply as before. This includes finding a balance between certain set routines and new adaptive processes that take the unique needs of the learners into consideration. As Leo van Lier (2007) explains that a structure, such as the structure of a curriculum, impedes the development of exploratory processes. On the other hand, it may also seem that processes without limits lead to chaos and disorder (van Lier, 2007). So, structure and process, when seen independent of one another, are detrimental to educational success; “it is only through the dynamic interaction of structures and processes that meaningful and effective pedagogy can come about,” van Lier (2007) writes. The dynamism and tension between the planned and the improvised are essential in the development of true action-based pedagogy (van Lier, 2007). In other words, there has to be enough predictability and security for learners not to feel lost and bewildered while there must also be enough room to innovate and move in novel directions for learners to develop autonomy and fuel their intrinsic motivation. According to van Lier’s action-based pedagogy (2007), the structure is just as important as the novelty. The planned can create a sense of security while improvisation is born from the need to adapt. This also supports the brain-based learning idea that learning is activated by new experiences that disrupt our sense of balance, triggering the deep brain centers that release norepinephrine and dopamine, two neurotransmitters that contribute to our sense of alertness and motivation.

If one were to pretend that learning is simply something that happens separate of the actual action, one would be deceiving themselves. To appreciate the fuller context of learning also within the context of the COVID-19 pandemic we must adapt a more holistic approach. The learning models outlined above have been summarized in Table 1.2.2.

Table 1.2.2. Learning Theories Summarized

Concepts of learning	Learning Theories			
	Behaviorism	Cognitive	Situated	Brain-based
Teacher's role	Preparer and sharer of knowledge	Arranger and relayer of knowledge	Provider, facilitator, and mediator of knowledge	Preparer, improviser, and mentor
Teaching defined as	Transmission of knowledge	Bringing about awareness of contradictions	Context-specific, authentic immersion in community	Process-based teaching where learning is verified, implementing various learning styles
Student's role	Passive receiver	Receiver, active experimenter	Participant, problem solver, critical thinker	Active agent, committed to learning and operating under stress while rewarding oneself for progress

To summarize, learning is embedded in action and advances as experience is gained. This embedded nature of learning is a two-edged sword; it also posed a particular occupational risk for teachers to burnout during the COVID-19 pandemic (Pyhältö et al., 2020). As a rigorous process, and a part of a greater development, learning can help build our capacity as individuals and communities to not only take on the very questions that we normally discuss in lecture halls but learn new ways of coping, interacting, and working and we take on the challenges of the 21st century. When measuring learning, the evaluation of emergency remote teaching (ERT) should include in the equation the context, input, and process elements in addition to the product, or learning outcomes (Hodges et al., 2020). Learning includes both factors in the environment and the individual. For new learning to happen, there has to be change on an individual level. As four catalysts for change Centra (1993) highlights four conditions:

1. individuals are more likely to acquire knowledge if they acknowledge a gap and feel the need for acquiring new knowledge,
2. individuals must value and appreciate the relevance of the learning opportunity and feel that what is gained from participating in a learning activity is worth the invested resources (i.e. time, money),
3. the teacher must know how to change and this is mediated by credible individuals,
4. and there must be an element of intrinsic and/or extrinsic motivation such as personal satisfaction or external rewards to facilitate change.

While change itself is a necessary part of learning, one higher-order aspect of learning that can go ignored with standardized tests that simply measure how well a student has responded to a question is the process of open inquiry. Learning can be seen as a process of continuous and renewed thinking that involves flexibility, judgement, and contemplation, as part of the changes that occur in the course of inquiry (Zion et al., 2004). Sadeh and Zion (2009) use “learning as a process” to compare students who have used open inquiry versus guided inquiry. Using a Dynamic Inquiry Performances (DIP) Index the learning process was evaluated in terms of changes that occurred in students during the inquiry, the processes involved in the learning, the understanding of procedures, and affective points of view (Sadeh & Zion, 2009). Affective aspects included emotions like curiosity, which are expressed in situations involving change and uncertainty. Such open inquiry was shown to contribute to students being less dependent on the teacher and “richer” in their ability to describe and explain the processes involved. The largest effect size in open inquiry versus guided inquiry was in the changes occurring during the inquiry with an eta squared effect size of 0.32 (Sadeh & Zion, 2009).

As we confront our ever-changing and challenging world, learning will need to go beyond the building of knowledge capacity; learning will need to include the higher-order thinking skills like critical thinking, decision making, and problem solving (Barak et al., 2007). More research is needed to further understand this level of learning, and also advance strategies for achieving this goal. Brain-based learning (Yang, 2017) suggests that part of the answer is shifting the focus from solely considering how much knowledge has been accumulated to also considering how education advances our ability to think and act in a way that helps us solve life problems in a more wise and effective manner (see Figure 1.2.).

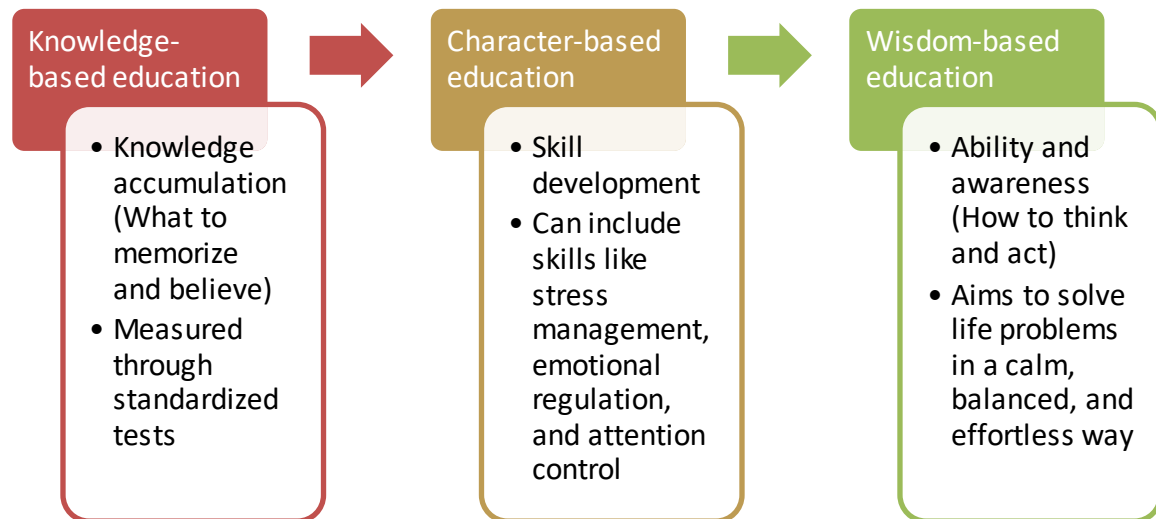


Figure 1.2. Brain-based Optimal Education (Yang 2017)

The emphasis on how to learn is closely related to the increasing emphasis on metacognition (Kolencik & Hillwig, 2011; Lang, 2012; Swartz & Perkins, 2017). The literature argues that giving students more control over the learning process overall helps them reach a deeper understanding of the material covered, becoming more engaged, and gain confidence. A growing literature also argues that the type of human capital needed in the modern economy includes this aspect of flexibility that is advanced by the emphasis on metacognition and “learning to learn” (Acemoglu et al., 2012; Hanushek & Woessmann, 2012; Flabbi & Gatti 2018).

1.3 Dimensions of Learning

This section attempts to define the dimensions of learning (also referred to in the context of the later thematic analysis as themes) related to student and staff learning experiences in higher education that appeared in the articles in this review: (1) attitudes toward adoption and support provided, (2) resilience in adapting and coping with the transition, (3) emotional intelligence and the role of compassion, (4) pedagogy and online education itself, and finally (5) performance and motivational factors.

1.3.1 Attitudes and Support

This section discusses the concepts of attitudes and support. Initially, the concept of attitude is defined and then the section proceeds to further define attitude within the context of two models: the bioecological model of development and the Technology Acceptance Model (TAM) (Davis, 1989). These two models can be applied to the online learning situation that university students and staff went through during the COVID-19 pandemic while further appreciating the role of support in advancing attitudes involved in the process of learning. Later in this section the concept of support is defined alongside the concept of accompaniment. These parallel concepts are considered with respect to measures that were used to curb the educational impact of the pandemic.

The definition of attitude has become more confined over the years, as attitude theory and measurement have influenced one another (Ostrom, 1989). For example, Allport's (1935) definition of attitude included the influence our "mental and neural state of readiness" has upon the individual's response "to all objects and situations with which it is related". Later, Krech and Crutchfield (1948) defined attitude as "an enduring organization of motivational, emotional, perceptual, and cognitive processes with respect to some aspect of the individual's world".

Bronfenbrenner and Ceci's (1994) bioecological model of development provides a way to understand the influences of an individual's background, personal attributes, peers, teachers, parents, the educational institution, community, and macrolevel factors like society and cultural through proximal processes described as "complex reciprocal interaction between an active, evolving biophysical human organism and the persons, objects, and symbols in the immediate

environment". There exists a shared understanding that if key actors involved in a student's upbringing – parents, teachers, and community members – operate in a vacuum or, worse, are in conflict, then healthy academic and psychosocial development cannot occur (Bempechat & Shernoff, 2012). With Bronfenbrenner's mesosystem as its starting point, Christenson, Reschly, and Wylie (2012) have proposed that community involvement represents a collaboration that is devoted to enhancing the student's development across the domains of the self, not limited to academic growth alone. At the core of this mesosystemic approach are key considerations related to the conditions upheld at the educational institution itself (Christenson & Sheridan, 2001). These include an approach to these key actors that communicates genuine respect and the different ways they become involved; an attitude that respects various perspectives and views their involvement as essential for student success; an atmosphere of support for interaction between the different actors; and finally, actions that can be adopted to strengthen the relationships among the key actors in this mesosystem, with the educational institution at its center (Bempechat & Shernoff, 2012).

To understand attitude within the context of online learning it helps to refer to the Technology Acceptance Model, a model referred to in several articles written on online learning in higher education during the COVID-19 pandemic. The Technology Acceptance Model (TAM) was originally proposed by Davis (1989) to explain how attitude and behavior can predict the adoption of technology. The model can be applied in attempts to comprehend the reasons for acceptance or rejection of an information system. In teaching, information technology (IT) plays a prominent role by providing new learning paces and transforming instructional activities. Studies have demonstrated the positive effect students' proficient command of IT has on learning performance (Castillo-Merino & Serradell-López, 2014).

Accompaniment is a construct that is used interchangeably with the construct of counselling in the field of education (Puerta Gil, 2016). Accompaniment can be defined as a humanizing action that acknowledges the students by encouraging them to learn through the desire for discovering, not through the idea of taking in information for what it is (Puerta Gil, 2016). The intention is to enrich the teaching-learning process by mediating or considering the needs of others and adjusting our own expression accordingly. An obvious component of accompaniment is that there is another person, or multiple people, with whom the accompaniment can be carried out. In addition, it requires the individuals involved to have willpower for collaboration while also having the necessary capacities for providing help. For accompaniment to be successful, it requires a logical progression towards some end-goal (i.e., the securing of learning outcomes

under the pandemic) yet this does not mean that one cannot stop to also reflect on the learning objectives and the methods by which they are being approached. Accompaniment can also be referred to as support. Under such new, stressful situations a need for such support networks – and the need to consider alternative means for approaching the earlier objectives can become a challenging task. In this sense the concept of accompaniment can differ slightly from the concept of support. While the word ‘support’ is much more commonly used and more specific than ‘accompaniment’, it can sometimes fail us when trying to appreciate what providing support can mean to its full extent. For example, reflecting on the significance of the scope of one’s objectives and considering alternative means to achieving can sometimes be the very ‘support’ that someone needs. This ability to adapt the objectives and the means by which they can be achieved arises from a wider understanding, or ability to apply compassion, which was vital for personal growth during the pandemic (Beltrán Morillas & Expósito, 2020).

Provided support is usually considered as part of what Bronfenbrenner (1977) called the meso-system (i.e. the institution where the teaching is implemented). This contrasts to the microsystem, or the immediate setting, where the interaction generally happens between the student and teacher. What was unique about the COVID-19 pandemic was that it presented scenarios where teachers may have found themselves providing support in the classroom. Likewise, some of the interaction that occurred between students may have revolved more around health-related concerns. At the same time support was provided by the exo-system (i.e., government and national strategies and policies) to help alleviate some of the economic burden endured during the pandemic, particularly by local businesses (Lee & Jung, 2021).

During the COVID-19 crisis, countries have implemented a range of measures to support students and staff in curbing the educational impact of the pandemic. At center stage was the concern that the continuity of the academic learning of students would be ensured (Gouëdard et al., 2020). Here, supporting students who lack autonomy can be particularly challenging in an online environment. In some countries one such challenge was having access to a quiet space to study (Gouëdard et al., 2020). Finding a quiet place to study was a particular challenge in OECD countries like Thailand, the Philippines, and Indonesia (Gouëdard et al., 2020). To guarantee continuity in learning, preserve equity, and curb the negative impact of the pandemic on education it helps to review past experiences with coping and try to find evidence on the effectiveness of various ways of dealing with the short time frames related to a sudden shift to emergency online teaching.

1.3.2 Coping Capacity and Resilience

This section defines the concepts of coping and resilience. Alongside the discussion of these concepts this section also introduces some coping mechanisms and ties them to the context of online learning in higher education during the COVID-19 pandemic.

Coping can be defined as the “cognitive and behavioral efforts to manage internal and/or external demands appraised to be taxing or beyond the resources of the individual” (Lazarus & Folkman, 1984). In addition, coping can also be defined by problem-focused (i.e. efforts to modify the stressor) versus emotion-focused coping (i.e., regulation of emotion in response to the stressor) (Garcia & Pintor, 2012). Coping reactions can be classified into families of coping, such as problem-solving, support seeking, or escape (Skinner et al., 2003). Another way to classify different coping modes that is prominent in the field of psychology is surrender, avoidant, and overcompensation (Young et al., 2003). Avoidant and escape would here be parallel constructs which refer to the tendency for us to try to escape unpleasant experiences by denying our needs or feelings, detaching emotionally from people, and rejecting help. Surrender is another coping mode where we tend to behave in a passive, subservient, approval-seeking, or self-deprecating way. While this is not the same as support seeking, there are some parallels. Overcompensation, on the other hand, can be understood as a coping mode that adapts the opposite of what a feeling might lead us to do. For example, instead of feeling vulnerable we may feel in control and powerful. In situations with significant uncertainty like the COVID-19 pandemic, the coping mode of overcompensation can lead us to behave in inordinately grandiose, aggressive, and competitive ways.

With respect to coping, resilience includes the aspect of being able to adapt to a stressful situation. Resilience can be defined as the ability to cope positively with adversity (Arnold & Boggs, 2011). The pandemic can be regarded as a major environmental disturbance, or adversity, for higher education. For many universities the extended emergency online teaching period was longer than in primary or secondary education institutions. As highlighted by Bento, Bottino, Cerchiaro Pereira, Forastieri de Almeida, & Gomes Rodrigues (2021), the challenge was to provide quality education while observing public health policies. Students from more socially vulnerable groups were often more affected by the pandemic in terms of emotional life and

personal circumstances (Aristovnic et al., 2020). Also, students who faced an educational transition period during COVID-19 (i.e., first-year university students) were likely to suffer more (Lavonen & Salmela-Aro, 2022). Resilience here can be understood as a broader ability to anticipate these very concerns, cope with them, and adapt in response (Bento et al., 2021). Folke (2006) conceptualizes resilience as a system's capacity to rearrange its structures and the emergence of new patterns of behavior. In systems of interaction among humans, this can require forming new problem-solving collaborative networks and producing new knowledge together (Berkes, 2017). This sort of learning-as-participation can also increase levels of trust along with developing an ability to solve increasingly more complicated and large-scale problems (Berkes, 2017).

While the pandemic is not an experience one would like to wish on anyone, sometimes a crisis can be an opportunity to advance about new ways of understanding and doing that are also of benefit in the long-term. Resilience is a concept that originated from the study of socio-ecological systems and refers to the ability to “bounce back” from unexpected events as suggested by Folke et al. (2005). Similarly, this idea of “bouncing back” from the pandemic can be applied to the context of higher education and overcoming the effects of the impact of the transition to emergency remote learning and all its subsequent consequences on students and staff. During the pandemic, system resilience could be seen in practices like communication processes that enabled the capacity to cope and adapt to the new environment. In the study by Bento et al. (2021) most participants reported engaging in informal emergent discussion groups in which experiences of the pandemic were shared. Such informal emergent discussion groups can also play an important role in adapting new support structures and innovative practices, playing a key role in advancing the resilience of higher education institutions overall.

1.3.3 Emotions and Compassion

This section defines the concepts of emotion and compassion. It also briefly discusses the relevance of these two concepts in the context of education and, more specifically, the context of online learning in higher education during the COVID-19 pandemic.

The classroom is a place full of *emotion*. Emotions can be defined as multifaceted phenomena involving sets of coordinated psychological processes, including affective, cognitive, physiological, motivational, and expressive components (Shuman & Scherer, 2014; Kleinginna & Kleinginna, 1981). Emotion is the very data that guides our actions and engagement. Starting with the *curiosity* to learn something new every day, leading to the feeling of being *tired* that reminds us to rest in between so that our brains can retain the new information received. Emotions are both experienced in the educational setting as well as instrumental for achievement and personal growth (Pekrun & Linnenbrink-Garcia, 2014). The importance of emotions in education extends to teachers, administrators, and other leaders (Pekrun & Linnenbrink-Garcia, 2014). Since the 1970s, there has been a dramatic increase in attention to emotion in many scientific disciplines but due to the strong focus of educational research on the cognitive outcomes of schooling, research on emotions was slow to emerge. Perhaps one of the reasons emotions have been ignored in research is because they have been deemed disruptive, implying that they should be suppressed (Shuman & Scherer, 2014). Another reason may be that emotions have been difficult to define (LeDoux, 2012). Current approaches to emotions see them as signals and advocate a more nuanced view. An evolutionary perspective suggests that emotions evolved because they have been adaptive; running away from an anxiety provoking situation, such as when facing an aggressive person, can be lifesaving and negative emotions can be thought to protect oneself (Shuman & Scherer, 2014).

As compared to intense emotions, moods have been considered as emotions of lower intensity, lacking a specific referent (Pekrun & Linnenbrink-Garcia, 2014). Some authors like Greenberger and Padesky (2016) do not make any distinction between the concepts of emotion and mood; these two constructs are deemed one and the same. Other authors have defined emotion and mood as categorically distinct constructs (Rosenberg, 1998). For the purposes of this study, we will be focusing on emotion as a construct that is compiled alongside moods under the more general construct of affect.

Two important dimensions describing emotions are valence and affect (see Shuman & Scherer, 2014). In terms of valence, positive states such as enjoyment and happiness can be differentiated from negative states such as anger, anxiety, or boredom (Pekrun & Linnenbrink-Garcia, 2014). In terms of activation, physiologically activating states can be distinguished from deactivating states, such as excitement versus relaxation (Pekrun & Linnenbrink-Garcia, 2014).

Compassion is defined in the Merriam-Webster dictionary as “the sympathetic consciousness of others’ distress together with a desire to alleviate it”. Gelles, Lord, Hoople, Chen, and Meija (2020) define compassion as simply recognizing the suffering of others and taking action to help. Strauss et al. (2016) propose that compassion comprises five interconnecting dimensions: (1) that suffering needs to be recognized as such; (2) that all people experience suffering in their lives; (3) having a willingness to feel and show empathy to another experiencing suffering; (4) being able to tolerate any disturbing feelings, such as upset or disgust, that arise when faced with another’s suffering; and (5) being motivated to engage in behaviors to relieve a another’s suffering. There has been some debate on how to define compassion versus terms like sympathy and empathy. The need to understanding the deference between these terms has largely arisen from the need to also address compassion fatigue. When an individual tends to help others, as is common in the fields of education and medicine, it is important to be able to have healthy boundaries while trying to understand others. Under a crisis like the COVID-19 pandemic the need for healthy boundaries is highlighted further. In this sense compassion can be thought of as a facet of justice, addressing one’s personal needs so that one can be available to help others in need. One classic example is the instruction to put one’s oxygen mask on first before helping others in the case of an accident on an airplane. Whether advancing development in the form of learning or psychotherapy, compassion plays an important role in laying the foundation bringing about effective change. For example, in the field of psychology common factors identified by Arkowitz (1992) for effective treatment for depression include:

1. A warm and positive relationship.
2. The application of procedures believed to be effective (e.g. support, encouragement, acceptance, opportunity for emotional expression)
3. A plausible explanation or symptoms, and a treatment rationale connecting the therapeutic procedures alleviating these symptoms.
4. Inducing positive expectations of the treatment.

In conceptualizing these common factors Rogers (1951) sought out to formulate empathy, positive regard, and congruence as the necessary and sufficient conditions of therapeutic change. As defined by Bohart, Elliot, Greenberg, and Watson (2002) empathy is “understanding the client’s frame of reference and way of experiencing the world”. A later meta-analysis by Elliot, Bohart, Watson, and Murphy (2018) revealed that the effects of empathy on the outcome of treatment yielded a weighted effect size of +0.58 standard deviations. This is a medium effect

and it surpasses the effect sizes from studies on working alliance, defined as the general collaboration between the patient and therapist (Martin et al., 2000; Horvath & Symonds, 1991). As defined by Martin et al. (2000) the collaborative nature of the patient-therapist relationship has generally included three themes: (a) the collaborative nature of the relationship, (b) the emotional bond between patient and therapist, and (c) the patient's and therapist's ability to agree on treatment goals and tasks. Hence, it could be concluded that empathy provides an important, initial “ground for intervention” (Bohart et al., 2002).

In the context of education, empathy or compassion can be understood as a facilitative ability to understand the student and provide the psychological safety necessary for learning to happen. From the teacher, this can include practicing acceptance, involvement, warmth or establishing rapport. Timothy Clark (2020) defines psychological safety as a condition in which a student (or staff member) feels “(1) included, (2) safe to learn, (3) safe to contribute, and (4) safe to challenge the status quo, all without fear of being embarrassed, marginalized, or punished in some way.” A person’s ability to learn requires staying focused, managing impulses, and avoiding distractions. According to Christensen (1991), a leader can maintain a culture of learning only if he or she minimizes vulnerability through a consistent pattern of positive emotional response. In other words, without emotional engagement we do not have intellectual engagement (Clark, 2020). Emotional engagement also allows for more mature forms of coping and vulnerability, as discussed in Section 1.3.2.

1.3.4 Pedagogy and Online Learning

This section defines the concepts of pedagogy and learning. Learning as a concept has already been extensively discussed in section 1.2 but this section aims to tie these two concepts more to the specific context of online learning in higher education during the COVID-19 pandemic.

The concept of pedagogy has an etymological background from the Greek language: *pais* ‘boy’, *agein* ‘lead’, *paidagogos* ‘the guide and upbringing of boys’. While nowadays pedagogy means more than just raising boys, the science of education has continued to develop in the light of the original aims of tact that Immanuel Kant (1803) described in his book *Über Pädagogik*. Kant (1803) writes how moral culture is based on maxims, or principles, and how the child should learn to act according to such maxims, the reasonableness of which they can apply for

themselves as a situation demands. Kant contrasts this to discipline, which he defines as forming “certain habits, moreover, the force of which becomes lessened in the course of years” (1803).

Pedagogy has been later understood more generally as the practice of teaching. In the COVID-19 context, the application of digital pedagogy has meant the meaningful integration of digital technologies into teaching practices that enhance the learning process (Vääätäjä & Frangou, 2021). The push toward the practice of teaching through digital means has also advanced new concepts like flipped learning, blended learning and the like. The pandemic has served as a catalyst for various pedagogical trends that will continue influencing the field of higher education beyond the pandemic.

Alongside online learning, some emerging trends within pedagogical practice include:

- **Making learning more accessible and flexible.** The classroom lecture is no longer the unique center of learning.
- **Sharing of power between the instructor and the student.** The changing instructional role, towards more support and negotiation over content and methods, and a focus on developing and supporting student autonomy. For students, this can mean an emphasis on students supporting each other through new social media, peer assessment, discussion groups, even online study groups but with guidance, support and feedback from the teacher or another expert.
- **Increased use of technology,** not only to deliver teaching, but also to support and assist students and to provide new forms of assessment.

As defined by Mayer, Sulzer-Azaroff, and Michele (2012), learning consists of altering response patterns, generally as a function of changes in environmental conditions. This definition of learning coincides with the general construct of behavior change. If we accept this as a definition of learning, we can then define teaching as promoting learning by any or a combination of various means (Mayer et al., 2012). As an example of teaching, consider how parents and teachers choose a suitable environment and provide the necessary assistance that enables the learner to succeed. Informal – or even unacknowledged – teaching occurs as well. Consider for example when the actions of parents, peers, or influential members of society serve as models for imitation. Here it is also important to distinguish between “teaching” and effective teaching. Teaching can be both effective and inefficient or even counterproductive.

From a behaviorist perspective we can understand the analysis of behavior as an attempt to first bring about awareness of the effect of our behavior and consequently apply this knowledge to better adapt to the environment with the purpose of our behavior in mind. Applied behavior analysis (ABA) transfers experimental investigations to the study and management of behavior in the real world. Here is where there is a distinction made between applied research and basic research. The purpose of applied research is to choose as a subject matter behavior that is important and immediately beneficial to individuals and/or society (Mayer et al., 2012).

Part of understanding how behavior is understanding how it is influenced on an organizational level. When the corona pandemic confronted higher education institutions (HEIs) throughout the world they had to reassess their organizational culture and mission, or fundamental purposes for existing. This discussion also included strategic planning of how the HEIs would adapt their plan for the period of the global health crisis. This greater framework helped set priorities or goals for the purposes of HEIs. Behavioral goals indicate the direction in which behaviors are to be changed (Mayer et al., 2012). Factors influencing goal selection include organizational purpose, legal mandates, real challenges, and specific goals.

To better understand what factors contribute to effective learning, we must further define the parameters or measurable behavioral quantities which can contribute to change. These include physical properties such as timing, frequency, intensity, and others. For the purposes of this study these parameters can be understood through four factors:

1. **Quality**, as in stimuli that can actually be counted on to function as reinforcers
2. **Quantity**, as in an optimal amount of stimuli to contribute to behavioral change
3. **Immediacy**, as in presenting the reinforcing stimulus right after the response
4. **Schedule**, as in presenting the stimuli precisely at a certain time

During the COVID-19 pandemic, learning happened largely with the help of computers. Using e-learning, or computers to enable learning, is no new phenomenon, however. Since the mid-1980s or so there has been a rapid evolution of Computer-Assisted Learning (CAL) and Computer-Assisted Instruction (CAI) into Course Management Systems (CMS) and Virtual Learning Environments (VLEs) (Andrews & Haythornthwaite, 2007). Alongside the COVID-19 pandemic, educational institutions around the world were forced to practice different forms of distance learning due to the social distancing policy in many countries. While distance learning is

distinct from online learning in the sense that distance learning can also be practiced without the internet, often the term distance learning is used to refer to learning that happens through content management systems like Moodle. Online learning, also known as web-based learning and sometimes more generically referred to as e-learning, can be defined as teaching in online environments. This could be hardly possible without the digital shift in technologies that has also led to the rapid progress of globalization, ever since the advent of some of the first digital communication technologies like the Morse code in 1844. Today, web-based Internet technologies allow for expanded options for the design of online learning (Breivik & Gee, 2006). Although we are not at the stage where broadband capabilities are equally available globally, the barriers to acquisition have been brought down significantly with the decreasing cost of producing microprocessors and their simultaneous increase in capability to process information.

While in Europe online learning has grown in popularity and is increasingly accepted as a comparable alternative, or complement, to face-to-face education, in Asia all distance learning has generally been regarded with suspicion and not held at the same level of credibility with campus education (Rennie & Mason, 2010). Blended learning, which combines on-campus and online education, is a more acceptable alternative in Asia (Dean et al., 2001). One aspect of learning that can be forgotten when learning is isolated from its context is the aspect of transfer (Bransford et al., 2000). Transfer here refers to an ability to extend what has been learned in one context to new contexts. Being isolated during the COVID-19 pandemic presented a unique pedagogical challenge for ensuring that the learning was transferable from the confines of the home to the real world that existed outside.

During the pandemic brain-based learning theory was supplemented by further considerations like cognitive ergonomics and the importance of social interaction in advancing performance and motivational factors (Gumasing & Castro, 2023). One example is understanding the difference between face-to-face interaction and video conferencing through polyvagal theory (Porges, 2003). In spontaneous face-to-face interactions, our nervous system detects these cues intuitively and rapidly without involving conscious awareness (Porges, 2020). The disembodiment of a social interaction in video conferences does not provide the nervous system with the required reciprocity to enable and optimize co-regulation and connectedness (Porges, 2020). This posed a particular challenge during the COVID-19 pandemic because there was limited distinction between the 'real' and 'virtual' worlds as students and staff operated remotely. One way to establish the necessary trust that helped also advance a safe learning environment during

the pandemic was to practice cues of psychological safety and connectedness through spontaneous reciprocal co-regulatory facial expressions and vocal intonations (Porges, 2020). According to Clark (2020), this can be advanced in the most advanced level of psychological safety by protecting each person's right to speak openly about any topic, provided they do so in a respectful manner. Reciprocal co-regulatory facial expression and vocal intonations can serve as a form of validation or acceptance, while not necessarily agreeing with the other person. Accepting these differences that may arise in an online learning environment is critical for it to thrive to its full potential. These differences allow for an ever more diverse collection of raw material that then leads to innovation (Dyer et al., 2011).

1.3.5 Performance and Motivational Factors

This section defines the concepts of performance and motivation. It also ties them to the context of online learning in higher education under the COVID-19 pandemic.

Within the fields of education and psychology the concept of performance is often associated with the concepts of learning outcomes and self-efficacy (Gonzalez et al., 2020; Schunk & Greene, 2017). Performance can also be understood from the more general perspective of human resource management. Torrington et al. (2005) refer to facilitating performance like conducting a symphony orchestra. A symphony orchestra requires members with expertise, playing different instruments, to work to an identical score under the leadership of the conductor. There is little room for individual flair. The jazz quartet is more flexible with many individual riffs. Those working in logistics or in a hospital can have a rather tight schedule, arranged by someone else whereas those working in an advertising agency can have a looser rein to encourage creativity. Teaching and education are probably somewhere in between these two. Performance can include the satisfaction of achievement and results, effective coordination and production, good quality and service. When it comes to understanding the concept of performance, numerous authors seem to agree that it is important to differentiate between an action and an outcome (Campbell, 1990; Kanfer, 1990; Roe, 1999). Imagine a sales employee in a telecommunication business who shows only mediocre performance in the direct interaction with customers but nevertheless achieves high sales figures. Similarly, a student may choose to focus on the tasks that "matter" and achieve a high result despite a mediocre performance. As Sonnentag and Frese (2002) point out, only actions relevant to organizational goals constitute performance and for

this reason one needs a criterion for evaluating how an individual's performance meets organizational goals. Performance itself can be understood as a multi-dimensional concept that includes task performance and contextual performance.

Task performance is more prescribed and varied between different tasks while contextual performance is relatively similar across tasks and determined more by the performer themselves. Task performance is related to ability whereas contextual performance is related to personality and motivation (Sonnentag & Frese, 2002). When it comes to adapting to emergency online teaching contextual performance can play an important role in ensuring the smooth functioning of the higher education institution while also planning ahead with possible proactive behaviors which aim at changing and improving work procedures and organizational processes. Moreover, these processes underlying performance change over time; during the early phases it relies on 'controlled processing', availability of knowledge, and optimal allocation of limited resources, whereas later it relies on more automatic processing, procedural knowledge, and psychomotor abilities (Ackerman, 1988; Kanfer & Ackerman, 1989).

As with any organization, it is important to motivate the members in advancing the collective objectives. In the short run a lack of motivation may lead to reduced effort and lack of commitment (Hall et al., 2010). When students are observed closely, fear of not meeting the course assessment requirements may force their effort even though they are not motivated. This kind of negative motivation was understandably more difficult to maintain during remote learning. In fact, one concern that some teachers had was how to get student to keep their cameras on so that teachers could see how engaged they were during the actual lessons. In the long-term, a lack of motivation potentially meant high levels of absenteeism, a particular concern with first-year students. A lack of motivation can also contribute to unnecessary disputes and falling productivity among students, just as it does in the modern workplace. In this sense, it can be argued that motivated students will be productive and perform better.

Motivation is generally defined by the Oxford English Dictionary as a reason or reasons for acting or behaving in a particular way. In understanding these reasons there generally are two main schools of thought – content theories, as in theories that explain specific factors that motivate people, and process theories, as in theories that strive to understand the cognitive thought processes that influence behavior. One of the major issues where theories on motivation diverge is on the question of whether the factors contributing to human motivation are within or beyond human control (Dembo & Eaton, 1997). Content theories include the theory a hierarchy of needs

by Abraham Maslow (1943) whereas process theories include the equity theory of John Stacy Adams (1963). With these two approaches we can appreciate the importance of addressing student and teacher needs when considering what motivates their behavior, while also considering how the interaction between what is given and received also present a relationship that may or may not contribute to further motivation. While content theories can be used to advocate a more behaviorist view of a passive learner influenced by needs and drives (Dembo & Eaton, 1997), process theories can be used to advocate a more cognitive view of learning, viewing learners as more active, rational beings that have an ability to reason about their current situation and adapt their behavior (Weiner, 1991). Understandably an online environment can be limited in affordances, or opportunities for learning, but at the same time the online environment can present new affordances that are not feasible in the same way in the physical classroom (e.g. inviting guest speakers from further away).

The word motivation comes from the Latin verb *movere* meaning ‘to move’. According to Dörnyei and Ushioda, (2011), what eventually moves a person, to expend effort and persist in action – such questions lie at the heart of motivation theory and research. While we may understand what motivation is intuitively, understanding the concept itself has provoked considerable debate. In the 1960s, philosopher Richard Peters (1960) challenged the value of the concept of motivation. Peters argued that the concept of motivation implies a push or pull notion, whereas learners make decisions to do this rather than that. This pushing or pulling notion can imply a false assumption of a static being. Even the American Psychological Association was considering to replace the term ‘motivation’ in their main psychological database, Psychological Abstracts, because, as a concept, there were too many underlying meanings behind the term and therefore it was not useful.

With respect to the difficulty of defining phenomenon, a helpful analogy to draw here is the well-known fable of an elephant and blind men. Each touches a different part of the elephant, ending up with very different mental representations of the animal. One feels the tusk, the other the tail, the other the ear, one the leg, and final another the trunk. Only once they share their insights are they able to come to a consensus on what the animal might be. Therefore, it is important to recognize that as a researcher, my selective focus is limited – and will always be – from the whole picture. With that said, this thesis attempts to reach out to what has already been discussed regarding these themes, to reach a more holistic understanding of the underlying phenomena which are described by the words we use.

Part of this discussion may benefit from defining what motivation is not. Motivation generally concerns the direction and magnitude of human behavior, as pointed out by Dörnyei and Ushioda (2011). Thus, we could deduct that motivation is not a general lack of direction, magnitude, or meaning. In fact, when it came to understanding what motivated nurses and doctors during the COVID-19 pandemic, meaning and procedural justice were two significant variables that contributed as protective factors in preventing burnout and disengagement (Correia & Almeida, 2020).

Some scholars use the terms engagement and motivation interchangeably (e.g., Martin, 2007; National Research Council & Institute of Medicine, 2004) while others have proposed that motivation is a part of the metaconstruct of engagement (Fredricks et al., 2004), while others suggest that engagement and motivation are two distinct, yet related, constructs.

This study is particularly interested in motivational orientations that support learning and achievement. Achievement motivation consists of a constellation of beliefs that influence patterns of achievement, including expectations and standards for performance, value placed on learning and self-perceptions of ability (Deci & Ryan, 1985; Dweck, 2006; Nicholls, 1989; Weiner, 2005).

As for teacher motivation with online learning, one motivator that has been reported to be significant factor has been having a more flexible work schedule (Shea, 2007). This in turn presents the challenge of being able to manage one's use of time and to self-regulate one's own conception of how much work is enough. Not only does this require a good sense of time management but also a sense of our capacity to perform. Interoception, or the collection of senses perceiving the internal state of the body, a facet of emotional intelligence is vital here. Other studies suggest that faculty motivation also played an important role in influencing the acceptance and continuation of teaching online (Chapman, 2011; Ko & Rossen, 2003). Understandably, without faculty motivation, it would have been hard to see the implementation of significant online learning happening in higher education during the COVID-19 pandemic.

1.4 The COVID-19 Global Health Crisis and Learning

While the COVID-19 global health crisis was not the first epidemic to affect educational systems, it has certainly been one of the more prominent events in recent history. Past epidemics of a wide scale have been the Black Plague (1331-1353) and Spanish flu (1918-1920). As with the COVID-19 pandemic, students and teachers vacated educational premises shortly after the outbreak of both of these epidemics. The loss of student enrollment and teachers led to the decline in the quality of education between 1350 and 1380 (Courtenay, 1980). Nonetheless, the technology available then did not allow for online learning as it does today.

Technological advances were only further accelerated with the onset of the COVID-19 pandemic. These technological advances have generated unprecedented innovations, greatly affecting the quantity and speed of knowledge production and transfer (Schugurensky, 2013). This emergent situation also created situations where teachers began using the new platforms like Zoom, without much prior training or experience of how to implement these technologies (Yan, 2020). After studying online teaching in the wake of Hurricane Katrina, Lorenzo (2008) found that higher education is often slow to adopt new tools and innovations, when there is a will to do so even during crisis. Regardless of whether faculty had taught online before, Johnson et al. (2020) found that faculty was able to quickly adopt online teaching approaches and make necessary pedagogical adjustments. In this sense, the COVID-19 served as both a disruption and an opportunity to learn new skills.

Despite advances in technology, teachers still had some difficulties reaching out to students. This was also the case alongside the SARS epidemic in Hong Kong when 1,302 schools were closed (Fox, 2004). Fox (2004) discovered that teachers who went through the SARS epidemic encountered difficulties staying in touch with students who reported feelings of isolation and disconnectedness. According to the study by Barbu, Popescu, and Moicaunu (2022), in addition to dealing with feelings of isolation during the COVID-19 pandemic, teachers had a challenge in retaining the attention of younger students. This has important implications on learning because attention has implications on what someone is currently processing in their working memory (Gage & Berliner, 1998) and thus having the potential to learn.

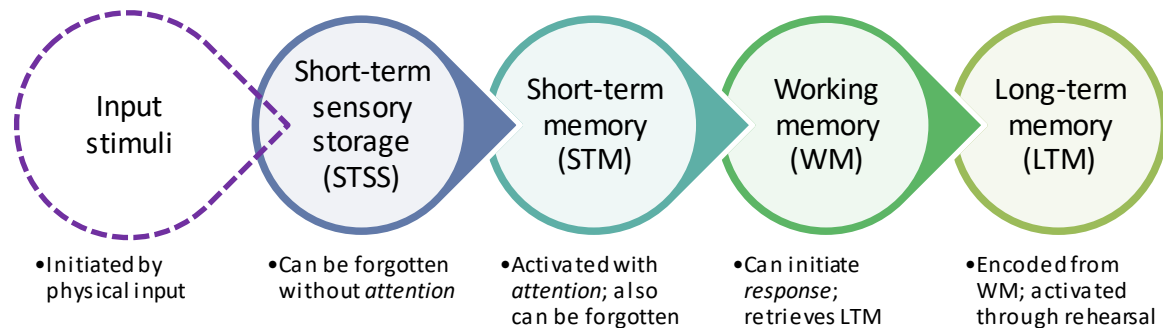


Figure 1.4. Information-Processing Model of Memory (Gage & Berliner, 1998)

According to the information-processing model of memory, when a student interacts in an online learning environment, the information provided by an input stimulus (e.g., a sound, an image, etc.) in the environment is stored briefly (less than half a second) in their short-term sensory storage (STSS). Attention determines whether this information is engaged with by the short-term memory. As defined by Tang et al. (2015), attention can be divided into three sub-components: (1) alertness (readiness for an impending stimulus), (2) orientation (selection of specific information from multiple stimuli received by the STSS), and (3) conflict monitoring (monitoring and resolution of conflict between computations of different neural areas). Attention span is thus an important determinant of whether a student engages with the information afterward or orients their attention toward something else. Cranfield, Tick, Venter, Blignaut, and Renaud (2021) indicate that what is deemed appropriate in length for a lecture or seminar video can also be a question of cultural preference. According to the article by Okwuduba, Zulnaidi, Abd Rauf, and Nwosu (2022), perceived social context (teacher, peer, and parent support) can also play a critical role in motivating student engagement in online learning. The capacity of the short-term memory (STM) to process information is limited to seven (+/- two) chunks of information (Gage & Berliner, 1998). Working memory (WM) can then lead to eliciting an actual response, involving the retrieval of information from the long-term memory

(LTM). The information-processing model of memory presents why attention is so important in advancing learning. The activation set in motion by attending to the information that eventually is processed cognitively and encoded in the LTM (Bransford et al., 2000). Attempts to switch the attention away from the teacher and more towards the learner and the learning process were characterized by the phenomenon of flipped learning, which gained further popularity among teachers during the COVID-19 pandemic (Dalbani et al., 2022). According to Gage and Berliner (1998), attention-arousing stimuli can also include:

- **novelty** (e.g., the teacher does something new and unexpected)
- **complexity** (the teacher follows a yes/no questions with a more advanced question)
- **ambiguity** (the students try to fill in the missing information through deduction)
- **incongruity** (the students notice that something is out of place)

The new remote learning now allows for a new level of agility which institutions of higher education and their teachers will be able to apply coping with challenges that are beyond the traditional classroom (Buitendijk et al., 2020). This shift is an outcome of the COVID-19 pandemic and will likely meaning more use of blended learning and online delivery in the future (Biju et al., 2022). Obviously, the health of teachers and students is significantly affected when faced by public health emergencies. These unique challenges have highlighted the attention and due diligence required by both pedagogical practices that advance learning and the periphery factors that make student engagement possible in the online learning environment in the first place (Gautam & Gautam, 2021).

1.5 Crisis and Coping in Higher Education

One concerning trend that got brought to the forefront during the COVID-19 pandemic was that student mental health has recently been worsening (Ahmadi et al., 2021; He & Wei, 2021). During the 2020–2021 school year, more than 60% of college students met the criteria for at least one mental health problem, according to the Healthy Minds Study, which collects data from 373 campuses in the United States (Lipson et al., 2022). Even before the pandemic, schools were facing a demand for care that far outpaced capacity, and it has become clear that the traditional counseling center model is ill-equipped to solve the problem (Abrams, 2022).

1.5.1 Coping in Higher Education

As with the rest of society, the work environment, has been characterized by unprecedented change over the past 50 years. The 1960s brought on growing technologies, followed by the work conflicts of the 1970s between workers and employers, while the 1980s reflected a decade of mergers and acquisitions, privatization, and re-engineering of work processes (Cohen et al., 2012). According to Cooper, Dewe, and O’Driscoll (2001), the exponential growth of technology further complicated the work environment, meaning that workers had to cope with information overload and increased expectations of productivity. As a workplace and an educational institution these factors are reflected in higher education institutions as well.

Crisis in Organizational Life

Crisis is a prominent condition of organizational life today (Roitman, 2014), and this is particularly true for higher education institutions. The reason for this is in the very complexity of the structure of higher education, due to the involvement of multiple stakeholders (Caliskan & Zhu, 2019). As Nobel laureate Ilya Romanovich Prigogine is often attributed for stating, “Entropy [or chaos] is the price of structure” (1984). In coping with the chaos involved with learning something new, it is important to be able to acknowledge and accept this incompleteness that is inherent to systems dealing with crisis and change.

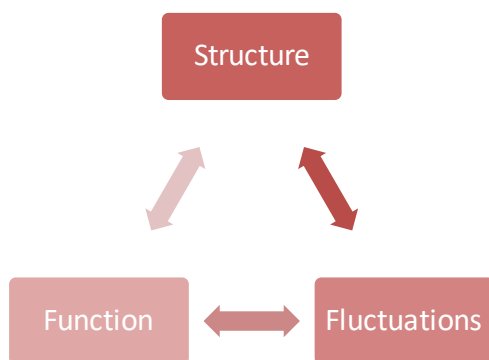


Figure 1.5.1 Fluctuations and Their Interplay with Structure

To understand how the laws of thermodynamics can also have implications on how higher education institutions (HEIs) and other organizations coped with the crisis please refer to Figure 1.5.1. The fluctuations, or changes, in the environment influence the function of the structure (e.g., the purpose of higher education institutions). Meanwhile these fluctuations also have an effect on the structure. The COVID-19 pandemic brought about significant fluctuations to HEIs across the globe and as a result these institutions had to adapt their structures and functions to ensure the continuation of learning. Both university teachers and students faced technical glitches initially, leading to the slowdown of learning (Mittal et al., 2022). Many teachers who found themselves conducting online classes suddenly needed to adapt, design, and prepare course content that had been originally intended for face-to-face teaching. This all happened within a period of only a few weeks, thereby also raising the demand for support from the technical specialists (Mittal et al., 2022). While the pandemic was a particularly challenging time, it was also an opportunity for change and growth within educational institutions (i.e., to adopt new structures to address the new need for support). For this change to be comprehensible, manageable, and meaningful, it required that both staff and students were able to successfully cope with the initial shock of the lockdown and the changes that followed.

This ability to adopt a sudden change into a significant learning opportunity, despite the ongoing challenges presented by a health crisis, depicts one aspect of learning and resilience which this study will explore further in the sections to come. In trying to understand this opportunity, this study also attempts to advance our understanding of how learning can be seen as not only a process that involves accumulating knowledge but also a process that helps us build an ability to solve life problems in a calm and balanced way despite the seemingly chaotic circumstances (see Section 1.2, Figure 1.2; Tang, 2017).

2 METHODOLOGY

This section describes the methodology of this study, including a discussion of the review's scope, approach, accessing of articles, and the populations included.

2.1 Scope of Review

The scope of this study included peer reviewed articles from the years 2020-2022 on learning in global higher education institutions during the COVID-19 pandemic. These articles were further restricted to articles that were written in English and had either a mixed methods or quantitative approach. From the initial search of 21,603 articles found through the University of Oulu's OULA-FINNA database, 17,615 (about 80%) were peer reviewed. With this initial search query, the first six articles were found. As a threshold, finding at least 20 peer-reviewed quantitative and mixed methods articles with similar research questions was the aim and this meant the scope of the study would require some expanding. For better conducting this search, an information specialist from the University of Oulu Library was consulted. The second search focused on quantitative studies on the coping experiences of teachers, and this yielded 13,900 peer reviewed articles through Google Scholar. While the initial focus was on the coping experiences of teachers, this was later expanded to also include the learning experiences of students as well, as it was clear that there were less articles on teachers' learning than on students' learning. Dissertations and master's thesis studies were excluded from the scope of this review.

2.2 Approach

Selection and Access

The selection of articles for this study was done by assessing research quality through a review of relevance and acceptability. For the first part of this study where thematic analysis was applied the initial criteria for inclusion were that the article considering aspects related to learning in higher education during the COVID-19 pandemic and that it was peer reviewed. While my initial focus was also set on looking specifically at the experience of teachers, I soon realized that there were rather limited number of articles available. For this reason, the research question was expanded to include the question of learning during the pandemic both from the perspective of the teacher and the student (see Search Process, Appendix 1). In terms of acceptability, a number of quality-related criteria were reviewed. These included the credibility of the author(s),

the intentions of the research, how current the research was, how much evidence was provided for statements and finally, ease of use. For the second part of this study, the meta-analysis, it was necessary that the articles included in the final analysis had a mention of the means and standard deviations involved as Cohen's *d* (1988) was used to compare the effect size. Without a mean and standard deviation of both a control group and the intervention group being tested, the effect size is not possible to calculate while accounting for confounding variables.

Research Design

This study adapted a mixed methods design. The aim of this study was to conduct a systematic literature review of both quantitative and mixed methods studies. In doing so, it also aimed to address both qualitative and quantitative considerations. The thematic analysis, which is the first part of the study, aimed to better understand qualities and relationships behind the concepts being used in the studies themselves while the meta-analysis, which is the second part of the study, aimed to integrate the findings of the quantitative studies that met the final acceptance criteria, i.e. provided the necessary parameters for measuring the effect size.

This study was conducted with the idea of performing a systematic review of relevant articles that were accessible since the beginning of the global health care crisis in 2020 and the autumn of 2022. The idea of reviewing existing research studies was for the purpose of informing practice related to higher education (HE) online teaching for the future. Having taught through the pandemic, both in secondary and post-secondary education, the author's experience as a language teacher has influenced the motive for instigating this meta study. At the same time, the shared experiences of other teacher-students from abroad, studying in the Education and Globalisation program informed a particular interest in looking into the experiences of HE staff and students alike on a global scale.

Research synthesis is an empirical process. As with any empirical research, our observations of prior research have an influence on how this process proceeds. When it comes to synthesizing quantitative studies, statistical considerations also influence how the research project proceeds.

As principles guiding the process of doing a systematic review, this study aspired to apply three core principles that are expected from systematic reviews: (1) *replicable*, (2) *exclusive*, and (3) *aggregative* (Cooper & Hedges, 1994).

Replicable studies are studies that can be reproduced. For that reason, part of doing this study has also been producing a record of the protocol while proceeding through the research project.

The aim here was also to be aware of the preformed opinions that may influence the relevance and validity of the articles in a review (Cooper & Hedges, 1994). The articles that were included in the study were found via databases like the University of Oulu's OULA-FINNA and Google Scholar and selected using the search query *covid teacher coping "quantitative research" "higher education" OR universities*. Later this search query was expanded to include students. The search query is described further in Section 3 (see Table 3.1.1.). After a sufficient number of articles were selected, they were initially skimmed for themes and sorted according to themes and according to whether the studies were on teachers or students or both. Articles were further scrutinized and reviewed with the help of a source review, including the following questions:

1. **Credibility:** Is there an author? What are his/her credentials? What makes this author an expert?
2. **Purpose:** Is the goal of the source to inform? Governmental? Educational institution?
3. **Currency:** When was the source published or created? Is there a revision date? A copyright date? Are the methods and tools used according to best practice?
4. **Accuracy:** Is the information based on fact or opinion? Does the author provide evidence for their statements? Are sources provided? Is data missing?
5. **Ease of use:** Is the source well-organized? Can everything necessary be found? Does the source offer anything unique?

If the author(s) did not seem to have sufficient background in the topic of their article, they were contacted for further details on their academic background and motivations for conducting the study. While some authors did not respond to this query, most authors did reply within a period of a few weeks. During the initial thematic analysis, some of the articles that were found with the initial searches were removed from this study since they did not fulfil some of the criteria listed above or did not answer to the research questions of this study. Please refer to Table 2.2. for further details on the inclusion criteria.

Table. 2.2. Inclusion Criteria According to the PICOS Review Protocol (CRD, 2009)

Inclusion criteria	
Participants	Teachers and students of higher education who engaged in emergency remote teaching during the COVID-19 pandemic.
Phenomena of interest	Teachers' and students' experiences of learning
Context	Online learning, which was characterized by the COVID-19 pandemic experienced worldwide by higher education institutions
Types of studies	Peer-reviewed quantitative and mixed methods studies published during the years 2020-2022

Once the themes were identified, each article was coded for themes in NVivo. This process initially required an average of 1-2 hours per article. Once a sufficient amount of data was collected on the themes, autocoding was done through NVivo to help speed up the process. After autocoding, the articles' codes were checked for quality and autocoded codes were removed, if they did not address the themes sufficiently.

The second principle that informs systematic reviews is *exclusivity*. If systematic reviews are to inform future practice, they should synthesize the best research available (Slavin, 1986). As a precondition for being included in the study, the article had reflected the original search criteria and to be peer reviewed.

The third key principle, *aggregation*, depicts what synthesis is at its core. By aggregating, or adding together, data from separate studies to increase the effective sample size, this study aims to produce an overall effect size. When doing this Denyer and Tranfield (2009) point out that it is important to identify whether or not the results from studies are consistent with one another (i.e. homogeneous) or inconsistent (i.e. heterogenous).

Content analysis refers to a wide range of tools and approaches unified, by three common goals of (1) *quantification*, (2) *standardization*, and (3) *systematization* (Franzosi, 2009). For these

ends, Krippendorff (1980) provides a list of possible methods: from word counts of the most elementary syntactical analysis, to referential analysis, prepositional analysis, and thematic analysis.

One of the most common approaches to do content analysis is thematic analysis. Here a coding scheme is based on categories designed to capture the dominant themes present in a text. The coding scheme design reveals both the richness and the fundamental limitations of this technique. This consideration brings us back to the consideration of language and how language is understood (and used) in so many different ways. A 'car' in China is not necessarily understood in the same way as a 'car' in Finland, let alone among locals. We might have a generic idea that has similarities, but we are bound to have slightly different perspectives of what an 'ideal' car should look like.

Absorbed in its drive to quantify and to deal with large amounts of data, content analysis has generally been limited in its capacity to appreciate the subtleties of language. Thematic analysis moves beyond counting explicit words or phrases by identifying and describing both implicit and explicit ideas within the data, that is, themes (Guest et al., 2012). While appreciating the subtleties of language may not be as great a concern with thematic analysis as it is in content analysis in general, reliability is of greater concern because more interpretation goes into defining the data items and applying the codes to the texts (Guest et al., 2012). In the interest of maintaining reliability, strategies for improving the coding practices are important (Guest et al., 2012). One of the strategies applied in this study was clumping different codes under subthemes and through these subthemes, trying to find relationships, or synthesize, the themes apparent in the different articles. Themes were initially clustered with the help of NVivo's cluster analysis tool, which analyzes for similarity based on the words and coding.

The formulation of the research synthesis problem has implications for the statistical methods that may be used for the interpretation of results (Cooper & Hedges, 1994). Cohen's *d* (1988) being the central statistic for measuring effect, the articles were reviewed for sample size, standard deviation, and the means of the independent and control group.

As a mixed-methods study, this research also aspires to conduct research synthesis from a quantitative perspective. Meta-analysis was the research tool that was used for synthesizing the current knowledge that arose from the available articles with the idea that the results would "reveal" or even prove the cumulation of knowledge by "cleaning up and making sense of the scientific literature (Schulze, 2004; Schmidt, 1992). In trying to identify patterns from

the quantitative data this study sought to consider whether the settings for a particular intervention (e.g. learning online) more similar or different. At the same time by practicing synthesis, this study sought to compare the concepts by different studies and whether they were actually being used to refer to the same phenomenon.

Research Procedures

In the random effects, or unconditional, model, the study sample is presumed to be literally a sample from a hypothetical collection of studies (Cooper & Hedges, 1994). The studies in this sample differ from those in the universe as much as might be expected when drawing a sample from a population. This model is called unconditional because it does not condition the characteristics of studies that might be related to the effect size parameter. This statistic is often used in meta-analysis. It is calculated by taking the difference between the control and experimental groups' means and dividing that difference by the standard deviation of the control group's scores. It was understandable that many of the quantitative studies lacked controls because they were studies done amidst an unusual situation that the researcher(s) could not predict prior to the conducting of their survey. To make up for the lack of a control to compare to, particular attention was paid to the articles that were included in the final part of the meta-analysis. While some pre-post studies were included, it is important to note that these studies do not have a control group and thus confounding variables have not been accounted for. This practice of including an independent group to calculate effect size is based on the *independent groups design* approach, in which the data can be measured for variation between two groups but the effect size calculated does not account for confounding variables (Cumming, 2012).

Kind of Data

The kind of data analyzed in this study was both qualitative and quantitative. The data was extracted using the random effects model from a sample of the universe of studies that were published during the COVID-19 pandemic on learning in higher education. The studies included for the data extraction were both experimental and quasi-experimental.

Alongside the thematic analysis data extracts were compiled under subthemes and then thematic relationships were analyzed through cluster analysis with the help of NVivo's cluster

analysis tool. While the thematic analysis was primarily qualitative, the cluster analysis produced also quantitative values for word similarity based on Pearson's correlation coefficient and coding similarity based on Jaccard's coefficient. Pearson's correlation coefficient r ($-1 =$ least similar, $1 =$ most similar) helped in this case provide a metric for understanding the similarity of the bivariate correlation between two words while Jaccard's similarity coefficient J ($0 =$ least similar, $1 =$ most similar) helped provide a metric for understanding the similarity and diversity of the two themes investigated for their thematic relationship.

In dealing with secondary data, this study applied the risk of bias instrument to synthesize the internal validity of the articles included (Booth et al., 2016; Higgins et al., 2022). One central risk in putting together a meta-analysis was whether the articles included all the necessary outcome data for measuring the effect size (Cohen's d).

The qualitative data included the actual texts of the articles included in the study while the quantitative data included the results of the articles included. The quantitative data was largely continuous ordinal data, as in values for various variables that aimed to measure the various dimensions of learning on a continuous scale like the Likert scale. Based on this scale then a mean and a standard deviation was also collected. What often missed from the quantitative data were these values for a control group or the same sample prior to COVID-19, prior to transitioning to remote learning. Some of the articles also included effect sizes themselves (Estrella, 2022; Long et al., 2022), and results from more advanced analyses like the heterotrait-monotrait ratio (HMR) analysis and partial least squares (PLS) regression (Lee & Jung, 2021; Mo et al., 2021; Taufiq-Hail et al., 2021).

As research that implements the random effects model, the studies selected differ from one another in study characteristics and effect size parameter. According to Cooper and Hedges (1994), there are two sources of variability into the observed effect sizes in the universe of studies: (1) one due to variation in effect size parameters and (2) one due to variation in the actual observed study effect sizes.

With the limited number of studies and the unique situation present, we must recognize a risk for omitted variable bias. In other words, there may have been other confounding variables contributing to or hindered the learning that occurred during the pandemic that were not accounted for in the studies themselves.

Collection Procedures

The preliminary collection procedures included:

- (1) formulating the research problem (see questions in Section 1.1.1.);
- (2) developing and validating the review protocol;
- (3) searching the literature (primarily through Google Scholar and OULA-FINNA);
- (4) screening for inclusion (reviewing relevance to teachers and HE);
- (5) assessing quality (separate worksheet with quality criteria);
- (6) extracting data; (data reduction, thematic analysis; statistical data)
- (7) analyzing and synthesizing data; and
- (8) reporting the findings.

By following these preliminary collection procedures, this study systematically proceeded through these steps, albeit at times without the rigor initially intended. At times it was necessary to return to subsequent steps to review and revise the procedures as the research proceeded.

2.3 Access to articles

Articles were initially accessed using Oula-Finna, Google Scholar, and ERIC online databases. The initial search query used in Oula-Finna was pandemic response higher education teachers. This brought 17,615 peer reviewed results, out of which 18 new articles were initially added, six of which were quantitative and one of which was mixed methods. Some of these articles were later removed due to insufficient quality. The second search query used in Google Scholar was covid teacher coping "quantitative research" "higher education" OR universities. Eventually this second search query was broadened to include students (teacher OR student). This brought 13,900 peer reviewed results, out of which an additional 20 articles were added. Later on, a few more articles were included through searches with other online databases like ERIC.

2.3.1 Data Reduction

Review of Data for Meta-analysis

To make up for the lack of a control to compare to, particular attention was paid to the articles that were to be included in the meta-analysis where effect sizes were to be compared. Considering Cohen's d (1988) was used, the quantitative or mixed methods study needed to state the means and standard deviations observed from the data collected for the study.

In the end, three (3) articles were selected for the final meta-analysis. One of the weaknesses that many of the articles had as a result of the short time period in which the studies were conducted was that their scientific rigor suffered. Some of the quantitative studies did not report what scale was being used to measure some of the constructs and as a result these were dropped (e.g., Bilgiç, 2021; Noori, 2021; Lee & Jung, 2021). Other articles were simply removed because the study looked at such a limited number that the sample was not deemed representative of the population (e.g., Bingimlas, 2021; Vergara-Rodríguez et al., 2022). Many of the articles lacked a control due to the fact that they had no data to compare to from prior to the COVID-19 pandemic.

Of the three articles that were selected for the final meta-analysis only two were articles where some sort of effect size was already measured. The first article was from Bahrain on teachers' experiences of the effect of self-efficacy and feelings on teachers' task performance (Taufiq-

Hail et al., 2021). In the first article from Bahrain this could be done by converting f -squared to Cohen's d . The second article was by Long, Sinclair, Fraser, Larson, and Harrell (2022) from the United States on students' experiences of the online learning effect on the students' learning environment. This second article had was a pre-post study and the Cohen's d effect size was calculated in the article itself (Long et al., 2022).

2.4 Population

In the articles used in this study came from 46 different countries throughout all five continents of the world (excluding Oceania and Antarctica).

Since the articles were on both teachers and students, they covered a vast range of faculties and student bodies throughout the world. The collection of articles represented 46 countries and a total of 3,990 university staff and 26,629 students, about twice the current student body of the University of Oulu (<https://www oulu fi/en/university>). Of the total number students and teachers in each country, however, the studies represented a limited section of the total population. Of the identifiable countries, the average student population was about 4.5 million whereas the average teacher population was about 250,000 (see Appendix 2). If we calculate that 46 countries were covered in the studies, an average study represented only 0.1% of a country's teachers in higher education institutions while representing only 0.03%. To put things in perspective, if these proportions were reflected as a sample size within the population of the University of Oulu this would be the equivalent of surveying about 4 teachers or 7 students. It is good to be mindful that as studying looking primarily at online learning that happened during the pandemic, the experiences of these students and teachers were reflected in the accessibility to stable internet, something that can be easily taken for granted in a country like Finland, where 92% percent of the population are internet users in 2020 according to the World Bank (see Table 2.2.). Compare this to the 18% of the population who are internet users in Afghanistan, for example (World Bank). In some countries the percentage of internet users increased significantly during the pandemic (e.g., compare India in 2020 to India in 2019, 29%) (World Bank). However, increases in the percentage of internet users should not be attributed to the pandemic alone, as these trends began prior to the onset of the shift to online learning and remote work.

Table 2.4.1. Countries and Percentage of Internet Users

Country	Internet users (%)	Year	Source
Afghanistan	18.4%	2020	World Bank
Finland	92%	2020	World Bank
India	43%	2020	World Bank
South Korea	96.5%	2020	World Bank
United States	90.9%	2020	World Bank

3 RESULTS

This section will discuss the resulting analysis of the 32 articles included in the study by addressing where the articles were found, describing the characteristics of the articles (publication year, country, and sample size), themes and thematic relationships, meta-analysis, and finally, synthesizing the articles.

3.1 Descriptive Characteristics of Articles

The articles compiled for this study were initially searched through Google Scholar and OULA-FINNA, the University of Oulu Library's database.

The units mentioned in the articles included the participants, their experience, education, and task performance. Alongside these units, the constructs of feelings and motivation were measured.

Table 3.1.1 Search Queries and Databases Used for Accessing Articles Included in Study

Search Database (incl. publication indexes)	Search query	Peer reviewed results	Mixed-methods and quantitative articles in this study
OULA-FINNA (incl. ProQuest, PubMed, Springer)	pandemic response higher education teachers	17,615	6
Google Scholar (incl. PubMed, Springer, DOAJ)	covid teacher coping "quantitative research" "higher education" OR universities	13,900	14
Google Scholar (incl. ProQuest, PubMed, Springer, DOAJ)	covid teacher OR students coping "quantitative research" "higher education" OR universities	17,500	6
Other sources (incl. ERIC, EBSCO, Elsevier, SCOPUS, Taylor & Francis, Wiley)	-	-	6

Through OULA-FINNA the articles were primarily accessible through ProQuest and PubMed, although many articles were also accessible through open access databases like DOAJ as well (see Table 3.1.2.). Six (6) out of the 32 articles were uniquely accessible through only one database.

Table 3.1.2. Distribution of Articles on HE Learning under COVID-19 by Publication Index

Publication index	Classification	n	%
DOAJ	open access	2	6%
EBSCO	multidisciplinary	1	3%
Elsevier	social sciences and humanities	2	6%
ERIC	education	3	9%
ERIH PLUS	humanities	1	3%
Google Scholar	multidisciplinary	2	6%
MDPI	open access	1	3%
ProQuest	multidisciplinary	9	28%
PsycInfo	psychology	0	0%
PubMed	biomedical	6	19%
SCOPUS	high-level, multidisciplinary	1	3%
Springer	multidisciplinary	2	6%
Taylor & Francis	multidisciplinary	1	3%
Wiley	multidisciplinary	1	3%
Total		32	100%

Most of the articles (50%) in this study were published in the year 2022 (see Table 3.1.3.). The distribution across countries was rather evenly distributed with an average of 2.14 articles published on students and/or faculty in each country between the years 2020 and 2022.

Table 3.1.3. Distribution of Articles by Publication Year and Country

Countries	Publication Year				Total	%
	2019	2020	2021	2022		
Afghanistan			1		1	3%
Bahrain			1		1	3%
Canada		1			1	3%
China		1	1		2	6%
Ecuador				1	1	3%
Finland			1		1	3%
France			1		1	3%
Germany			1		1	3%
Greece				1	1	3%
Hungary			1		1	3%
India		1		2	3	10%
Indonesia			1		1	3%
Israel			1		1	3%
Lithuania			1		1	3%
Malaysia				1	1	3%
Nepal			1		1	3%
Nigeria				1	1	3%
Romania			2	1	3	10%
Serbia			1		1	3%
South Africa			1		1	3%
South Arabia		1	1		2	6%
South Korea			1		1	3%
Spain				1	1	3%
Sweden			1		1	3%
Turkey			1		1	3%
United Arab Emirates				1	1	3%
United States		1	1		2	6%
Wales (UK)			1		1	3%
Total	0	6	18	7	31	100%

The distribution of studies by sample groups was primarily sample groups of 100-1999 for students (50% of the studies) and 50-400 for teachers (28% of the studies) (see Table 3.1.4.). Since most of the studies were done on students the percentages reflect this reality. There were, however, some studies that covered both students and teachers (see Section 3.4., Table 3.4.1).

Table 3.1.4. Distribution of Studies by Sample Groups

Sample Groups	Range	n	%
Students	10-99	3	9%
	100-499	9	28%
	500-1999	7	22%
	2000-4999	3	6%
	5000-9999	0	0%
	10000-20000	1	3%
Teachers	10-49	1	1%
	50-99	2	6%
	100-199	1	3%
	200-399	6	19%
	400-599	0	0%
	600-1000	2	6%
Total		32	100%

Note. Larger >10% sample ranges are highlighted in boldface.

3.2 Themes and Thematic Relationships

The ten themes included in the coding for the thematic analysis were from the five original dimensions of learning, defined in Section 1.3. For a summary of the ten themes and how they are referred to in the literature, review Table 3.2.1.

Table 3.2.1. Summary of the Themes in the Articles on HE Learning Under COVID-19

Theme	Summary
Attitude	an enduring organization of motivational, emotional, perceptual, and cognitive processes with respect to some aspect of the individual's world (Krech & Cruchfield, 1948); also referred to as instructor's attitude (IAT), perceptions, perspective, effort expectancy, and technology acceptance (Mittal et al., 2022; Bingimlas, 2021; Mo et al., 2021; Zagkos et al., 2022)
Support	learning support is generally referred to as social resources recognized to be accessible and used by students in their learning environment (Okwuduba et al., 2022); also referred to as accompaniment
Coping	the "cognitive and behavioral efforts to manage internal and/or external demands appraised to be taxing or beyond the resources of the individual" (Lazarus & Folkman, 1984); also referred to as ease of coping (EoC) (Biju et al., 2022)
Resilience	the ability to cope positively with adversity (Arnold & Boggs, 2011); also referred to as readiness (Palival & Singh, 2021)
Compassion	recognizing the suffering of others and taking action to help (Gelles et al., 2020); also referred to as empathy (Vergara-Rodríguez et al., 2022)
Emotion	multifaceted phenomena involving sets of coordinated psychological processes, including affective, cognitive, physiological, motivational, and expressive components (Shuman & Scherer, 2014; Kleinginna & Kleinginna, 1981)
Learning	an engagement to support and boost meaningful interaction between students, teachers, and resources (Dogbey et al. 2017); altering response patterns, generally as a function of changes in environmental conditions (Mayer et al., 2012)
Pedagogy	the meaningful integration of digital technologies into teaching practices that enhance the learning process (Vääätäjä & Frangou, 2021)
Motivation	the thrust that strengthens people to engage in a given task (Okwuduba et al., 2022); also referred to as engagement

Theme	Summary
Performance	achievement, accomplishment, the outcome of an action, behavior, the task done or the use of a method, instrument or abstract concept (Taufiq-Hail et al., 2021); also referred to as academic achievement (Okwuduba et al., 2022)

Based on the thematic analysis, the most popular theme covered by the articles was pedagogy (n=24) whereas the least covered theme was compassion (n=5). Similar terms like empathy were considered when considering how many articles covered theme of compassion. On average a theme was covered by 14 articles, indicating that different articles generally focused on different themes while some themes like pedagogy and emotion seemed to be covered rather universally.

Table 3.2.2. Distribution of Articles on HE Learning Under COVID-19 by Themes

Theme	n	%
Attitude	10	31%
Support	11	34%
Coping	12	38%
Resilience	19	59%
Compassion	5	16%
Emotion	19	59%
Learning	14	44%
Pedagogy	24	75%
Motivation	12	38%
Performance	13	41%
Total	32	100%

For the purposes of thematic analysis, the coded excerpts of the articles were further analyzed into subthemes to help identify thematic relationships that appeared within the themes themselves. The subthemes for each theme are listed in Tables 3.2.3., 3.2.4., 3.2.5., 3.2.6., 3.2.7., 3.2.8., 3.2.9., 3.2.10., 3.2.11., and 3.2.12.

Table 3.2.3. Data Extracts for Subthemes of Attitude

Subthemes of Attitude				
Subtheme 1:	Subtheme 2:	Subtheme 3:	Subtheme 4:	Subtheme 5:
Teachers' approach to change, OL	Teachers' resistance to change	Transition to OL and its effects	Optimism as a catalyst for adapting	Views on CRTS and its needs
teacher's conception of teaching important factor in pedagogical change (Dorfsman & Horenczyk, 2022)	teacher resistance to change due to lack of knowledge, poor support, and difficulty visualizing benefits (Dorfsman & Horenczyk, 2022)	ERT is born out of crisis, and it may create motivational factors that circumvent negatives of online learning (Bawa, 2020)	forced readiness brought about optimistic sentiments from the participants, willingness to adapt (Dorfsman & Horenczyk, 2022)	due to the pandemic learners felt more responsible (Bawa, 2020)
change to teaching practice not possible without change to teacher's approach to teaching (Dorfsman & Horenczyk, 2022)	cautious teachers show few indicators of openness to change with more signs of resistance (Dorfsman & Horenczyk, 2022)	disruption of HE sector has seen a shift of technological and technical advancement (Biju et al., 2022)	faculty became more optimistic, utilized more diversified resources over time, with more online experience (Lee & Jung, 2021)	experienced teachers see CRTS as a learning opportunity (Dorfsman & Horenczyk, 2022)
dissatisfaction with low student cohesiveness due to missed classmates, difficulty to work in groups (Long et al., 2022)	change in beliefs about online teaching was lower with groups with less than 10 students than 10 or more (Lee & Jung, 2021)	rapid transition referred to as collectively shared experience, contributing to solidarity (Cutri et al., 2020)	resilience can be stimulated through optimism, well-being, and creativity (Rodrigues et al., 2021)	cautious teachers see CRTS as an emergency that is temporary (Dorfsman & Horenczyk, 2022)
positive attitude of teachers towards teaching increased the students' perceived ease of use of online learning (Mo et al., 2021)		forced experience of online teaching has influenced attitude to use of OL, willingness to modify teaching (Dorfsman & Horenczyk, 2022)		for difficult subjects, students prefer face-to-face (Bawa, 2020)
		attitudinal responses correlate with feeling of crisis effect on practices in future; willingness to participate (Lee & Jung, 2021)		enthusiasts are interested in change but lack the skills for implementation of genuine change (Dorfsman & Horenczyk, 2022)
		unavoidable context of COVID-19 forced many educators to change behavior without changing beliefs (Lee & Jung, 2021)		faculty need to reorganize priorities, giving prominence to collective rather than individual objectives (Rodrigues et al., 2021)

Note. ERT = emergency remote teaching; OL = distance learning; CRTS = corona-related teaching situation

Table 3.2.4. Data Extracts for Subthemes of Support

Subthemes of Support			
Subtheme 1: Students' needs for support	Subtheme 2: Teachers' needs for support	Subtheme 3: Support with adaptation of information and communication technology	Subtheme 4: Institutional support and its role in administering commitment to change
participants' satisfaction might be due to instructor support, among other delivery, engagement factors (Alasmari, 2021)	teachers reported emotional support and compassion, resulting from virtual interaction among students (Alasmari, 2021)	schools' computer labs provided remote hardware for handling resource-intensive software (Boton, 2020)	institutions should spend resources on strategizing effective ways to deploy and administer ERT (Bawa, 2020)
students wanted to discuss emotional, personal, and family issues more openly with professors (Bawa, 2020)	experience teachers do not consider institutional support essential (Dorfsman & Horenczyk, 2022)	insufficient technical support obstacle to teachers' incorporation of ICT (Dorfsman & Horenczyk, 2022)	institutional support crucial for profound change (Dorfsman & Horenczyk, 2022)
universities should support the motivational deficiencies of students (Bilgiç, 2021)	enthusiastic teachers more aware of social acceptance of change and necessity of institutional support (Dorfsman & Horenczyk, 2022)	frequent communication, technology infrastructure and support key to adaptation of online tools (Lee & Jung, 2021)	fidelity of institutional support part of the meso-system (Lee & Jung, 2021)
important to understand need for adequate study spaces to those students who do not have them at home (Cranfield et al., 2021)	faculty motivated to teach online when institutional support exists and is of sufficient quality (Lee & Jung, 2021)	ICT center needed to support technology acceptance and improve fidelity of instructional support (Lee & Jung, 2021)	redirect funding earmarked for non-essential travel to cover student and faculty wellbeing and support (Rodrigues et al., 2021)
both teachers and students provide social support to students engaging in online learning (Mo et al., 2021)	teaching in the COVID-19 context included resilience and institutional and technological support (Rodrigues et al., 2021)	instant feedback provided by teachers deemed important during distance education; assistance and material provided during transition (Bilgiç, 2021)	organize meetings that focus on care and support in addition to "business-focused" meetings (Rodrigues et al., 2021)
teachers should show students compassion, help cope with anxieties, encourage, and give support (Stevanović et al., 2021)			

Note. ICT = information and communications technology; ERT = emergency remote teaching

Table 3.2.5. Data Extracts for Subthemes of Coping

Subthemes of Coping		
Subtheme 1: Coping strategies	Subtheme 2: Coping mechanisms	Subtheme 3: Challenges with coping
coping can be both religious and secular (Ahmadi et al., 2021)	pandemic has forced HEIs to modify delivery systems (Alasmari, 2021)	challenges include assessing learners' academic integrity, cyberbullying, inaccessibility, technical issues (Almusharraf & Khahro, 2020)
emergency distance education methods can be effective in crisis (Alasmari, 2021)	social distancing was extended to requiring both teacher and learner to work from home (Alasmari, 2021)	adequate attention not given to how faculty coped with difficulties to preserve educational process (Taufiq-Hail et al., 2021)
awareness and other approaches help cope with behavioral, cognitive, and emotional difficulties (Almusharraf & Khahro, 2020)	to cope with pandemic many HEIs have resorted to ERT (Bawa, 2020)	
intracrisis learning can motivate to cope, creating flow states, self-compassion, mindfulness (Bawa, 2020)	crisis experience helps deal with pressure and engage in sensemaking (Bawa, 2020)	
talking about the pandemic in communication channels creates sense of camaraderie and rapport (Bawa, 2020)	mass and personalized communication help ensure higher instructor presence (Bawa, 2020)	
institution's policies and strategies to help faculty cope with crisis are influential in facilitating change (Lee & Jung, 2021)	seeking empathy and commiserating was way to resolve stress in areas beyond teacher's expertise (Cutri et al., 2020)	
institutional crisis response can include strategic coping through planning and promoting innovation (Lee & Jung, 2021)	teachers should show students compassion, help cope with anxieties, encourage, and give support (Stevanović et al., 2021)	
	many regulations and procedures imposed to cope with drastic increase of COVID-19 (Taufiq-Hail et al., 2021)	

Note. HEI = higher education institution; ERT = emergency remote teaching

Table 3.2.6. Data Extracts for Subthemes of Resilience

Subthemes of Resilience				
Subtheme 1:	Subtheme 2:	Subtheme 3:	Subtheme 4:	Subtheme 5:
Resilience necessary and helpful for coping, continuation	Educational resilience, a new opportunity for growth	Preparedness, capacity for resilience	Factors contributing to resilience	Limiting factors for developing resilience
crisis experience helps deal with pressure and engage in sensemaking (Bawa, 2020)	switch from face-to-face to fully online required fundamental change to teaching and assessment (Cranfield et al., 2021)	faculty began delivering classes online without adequate preparation (Biju et al., 2022)	empathy necessary factor for faculty online readiness (Cutri et al., 2020)	accessibility problems due to network issues, lack of technology to continue online (Biju et al., 2022)
move to remote created challenges that students were able to deal with through resilience, skills (Bawa, 2020)	teaching in COVID-19 context includes resilience and institutional/technological support (Rodrigues et al., 2021)	teachers should enhance skills to use technology for delivering content, communicating and support (Bilgiç, 2021)	construct of optimism might be considered part of productive faculty online readiness (Cutri et al., 2020)	limited resources and learners with limited access led to adverse ability to engage in online environment (Gautam & Gautam, 2021)
resilience necessary for combatting COVID-19 and reactions of anxiety, stress, pessimism (Rodrigues et al., 2021)	educational resilience is students' capacity to deal with and progress in face of adversity (Rodrigues et al., 2021)	most students (and some teachers) were new to online teaching platforms (Estrella, 2022)	confidence in ability to use technology, allows teacher focus on how to transfer teaching practices (Dorfsman & Horenczyk, 2022)	unstable or lack of internet, power supply, facilities, resources, preparation were major barriers to learning (Noori, 2021)
resilience has central role in retaining mental health despite exposure to serious events (Rodrigues et al., 2021)	teachers familiar with digital literacy see emergency remote teaching as a learning opportunity (Dorfsman & Horenczyk, 2022)	individual factors influenced instructional change (Lee & Jung, 2021)	course-level instructional design and media factors affect faculty adoption of online education (Lee & Jung, 2021)	
resilience important for coping with isolation, fear and frustration, stress, and anxiety	regardless of prior experience, faculty able to quickly adopt teaching and adjust assessment (Lee & Jung, 2021)	institutional resilience is capacity to continue teaching and learning after disturbing event (Rodrigues et al., 2021)	integration of technology has potential to facilitate flexible, learner-centered teaching (Paliwal & Singh, 2021)	
since learning succeeds online it may not be necessary to rush back to face-to-face teaching (Bawa, 2020)	disruption opportunity to redefine excellence, to present new practices (Rodrigues et al., 2021)	pandemic should be catalyst for learning how to transform HEIs' missions to transmit value of resilience (Rodrigues et al., 2021)	HEIs that acquire digital resources and system of rotational mixed teaching will gain resilience (Rodrigues et al., 2021)	

Note. HEI = higher education institution

Table 3.2.7. Data Extracts for Subthemes of Compassion

Subthemes of Compassion		
Subtheme 1: Need for compassion	Subtheme 2: Compassion as a prerequisite for learning, coping	Subtheme 3: Factors contributing to compassion
students wanted to discuss emotional, personal, and family issues more openly with professors (Bawa, 2020)	ease and level of communication between professors and students driving factor for success (Bawa, 2020)	teachers reported emotional support and compassion, resulting from virtual interaction among students (Alasmari, 2021)
new models of ERT application should be investigated for converting uncertainty to understanding (Bawa, 2020)	seeking empathy and commiserating was way to resolve stress in areas beyond teacher's expertise (Cutri et al., 2020)	intracrisis learning can motivate to cope, creating flow states, self-compassion, mindfulness (Bawa, 2020)
empathy necessary for faculty online readiness (Cutri et al., 2020)	teachers need to practice compassion and provide support toward first-year students who are developing motivation and coping with anxieties (Stevanović et al., 2021)	sense of vulnerability foundation for having empathy for students, beneficial for learning to teach online (Cutri et al., 2020)
		students whose technological expertise surpassed that of their teachers raised empathy toward students (Cutri et al., 2020)
		use of a variety of collaboration and communication technologies helped students and their teachers build emotional connections and compassion to support each other during the pandemic (Logemann et al., 2022)

Note. ERT = emergency remote teaching

Table 3.2.8. Data Extracts for Subthemes of Emotion

Subthemes of Emotion						
Subtheme 1: Trends during COVID-19	Subtheme 2: ICT and emotion	Subtheme 3: Causes, effects of positive emotions	Subtheme 4: Effects of negative emotions	Subtheme 5: Causes of negative emotions	Subtheme 6: Emotion and gender	Subtheme 7: Coping with difficult emotions
during pandemic, negative emotions and sensitivity to risks increased while positive emotions decreased (Ahmadi et al., 2021)	teachers reported emotional support and compassion, resulting from virtual interaction among students (Ahmadi et al., 2021)	participants satisfied with school arrangement and faculty preparation due to unified vision (Almusharraf & Khahro, 2020)	teachers encountered difficulties reaching students with reported feelings of isolation, disconnectedness (Dorfsman & Horenczyk, 2022)	teachers concerned over “excessive time” required for preparing online classes, covering sufficient material (Dorfsman & Horenczyk, 2022)	males had higher level of confidence with usage of technology compared to females (Lee & Jung, 2021)	awareness and other approaches help cope with behavioral, cognitive, and emotional difficulties (Almusharraf & Khahro, 2020)
studies of faculty experiences reveal confusion, anxiety, and struggles in early stages of transition (Lee & Jung, 2021)	when students kept cameras off during online meetings teachers felt anguish, failure, and personal offense (Dorfsman & Horenczyk, 2022)	positive reactions to change predicted willingness to change (Dorfsman & Horenczyk, 2022)	negative reactions to change predicted hesitation among teachers (Dorfsman & Horenczyk, 2022)	negative emotions generated by lack of peer interaction, feeling of endangered language development (Maican & Cocoradă, 2021)	gender gap in confidence with technology becoming less evident with increased prevalence of technology (Lee & Jung, 2021)	resilience necessary for combatting COVID-19 and reactions of anxiety, stress, pessimism (Rodrigues et al., 2021)
COVID-19 had both positive and negative impact on student learning (Noori, 2021)	when students turned on cameras during online meetings teachers felt this as a sign of success (Dorfsman & Horenczyk, 2022)	being in a positive emotional state allows students to learn better, neutralize effects of negative emotions (Maican & Cocoradă, 2021)	negative emotions like shyness, shame reported for students’ low proficiency, concern regarding progress (Maican & Cocoradă, 2021)	negative consequences of pandemic for students included stress, fear of failure, boredom, depression (Stevanović et al., 2021)	higher psychological distress reported among women than men during pandemic, as in normal times (Maican & Cocoradă, 2021)	COVID-19 had significant impact, creating negative feelings and challenges for all (Rodrigues et al., 2021)
	confidence in ability to use technology, allows teacher focus on how to transfer teaching practices (Dorfsman & Horenczyk, 2022)	retrospective enjoyment has protective role to stressors triggered by online FL learning (Maican & Cocoradă, 2021)	negative influence on grades from negative emotions, low-performing students stressed and ashamed (Maican & Cocoradă, 2021)	negative feelings experienced by faculty included fear of infection, loneliness, boredom, financial concerns (Taufiq-Hail et al., 2021)	during Ebola crisis in 2014 gender was not a predictor of psychological distress (Maican & Cocoradă, 2021)	importance of resilience highlighted by other infectious diseases, social isolation, fear, and frustration (Rodrigues et al., 2021)

Subthemes of Emotion						
Subtheme 1: Trends during COVID-19	Subtheme 2: ICT and emotion	Subtheme 3: Causes, effects of positive emotions	Subtheme 4: Effects of negative emotions	Subtheme 5: Causes of negative emotions	Subtheme 6: Emotion and gender	Subtheme 7: Coping with difficult emotions
	teachers who already used digital tools before CRTS felt prepared for change (Dorfsman & Horenczyk, 2022)	past studies show positive emotions decrease effects of negative emotional arousal, facilitate adaptation (Maican & Cocoradă, 2021)	negative emotions like frustration can be conducive to positive, behavioral correction, situation-appropriate action (Maican & Cocoradă, 2021)		negative emotions cannot be differentiated by gender; gender not a predictor of psychological distress (Maican & Cocoradă, 2021)	social isolation, fear, and frustration predict psychological problems, transformed to stress and anxiety
		the more positive the emotions, the better the performance achieved, overcoming of difficulties (Taufiq-Hail et al., 2021)	student stress during COVID-19 pandemic negatively impacted learning (Noori, 2021)			absence of resilience has effect where anxiety, depression and stress range from moderate to serious (Rodrigues et al., 2021)
			negative feelings can damage judgement and problem-solving strategies in the event of adversity (Taufiq-Hail et al., 2021)			pandemic clarified that more attention must be given to emotions and life experiences of students (Rodrigues et al., 2021)
						sport (physical exercise) an important factor for mental well-being and positivity, sustaining performance and motivation (Taufiq-Hail et al., 2021)

Note. CRTS = corona-related teaching situation; FL = foreign language

Table 3.2.9. Data Extracts for Subthemes of Learning

Subthemes of Learning			
Subtheme 1: Benefits, effects of online learning versus face-to-face teaching	Subtheme 2: Factors that advance learning	Subtheme 3: Difficulties in online learning	Subtheme 4: Evaluation, assessment of learning
students in face-to-face courses learn better due to felt presence of instructor and direct instruction (Bawa, 2020)	OL environment improves writing skills, self-assurance, and power in composing texts (Almusharraf & Khahro, 2020)	deficiency of face-to-face interaction deemed the greatest obstacle to advancing OL (Bilgiç, 2021)	students are an important stakeholder to evaluate a learning environment based on their experiences (Bilgiç, 2021)
responsibility helped create structure in learning process, deal with procrastination (Bawa, 2020)	switch from face-to-face to online necessitated a fundamental change to teaching and assessment (Cranfield et al., 2021)	overload of homework deemed the second greatest obstacle to advancing OL (Bilgiç, 2021)	Kirkpatrick model proposes four levels of learning evaluation including reaction (level 1), learning (level 2), behaviors (level 3) and results (level 4) (Bilgiç, 2021)
blended learning enhances teaching and learning process for more responsiveness and adaptability (Paliwal & Singh, 2021)	online learning advanced independent learning skills (Cranfield et al., 2021)	inadequate infrastructure and support reduce the effectiveness of OL and disrupts learning, which ultimately results in less achievement of learning outcomes (Alasmari, 2021)	university students are significantly more motivated during blended learning, but the difference in their achievements to traditional learning is not statistically significant (Stevanović et al., 2021)
online learning advanced digital literacy (Cranfield et al., 2021)	potential of ICTs to promote more student-centered practices that favor activity, creativity, and teamwork (Cranfield et al., 2021)	more difficult for the teachers to see the differences between students and, therefore, they are not able to anticipate the individual needs of students to the appropriate extent (Stevanović et al., 2021)	
distance learning is very suitable for time management, reduction of costs and for the students who are prevented from attending lessons by employment, health, etc. (Stevanović et al., 2021)	text-based asynchronous discussion advances temporal and spatial flexibility, higher cognitive function (Paliwal & Singh, 2021)		

Subthemes of Learning			
Subtheme 1: Benefits, effects of online learning versus face-to-face teaching	Subtheme 2: Factors that advance learning	Subtheme 3: Difficulties in online learning	Subtheme 4: Evaluation, assessment of learning
benefits of OL perceived by students: (a) being able to work according to own schedule in relaxed environment; (b) being able to re-watch the lecture if needed; (c) feeling free to ask question and interact with teachers and, (d) saving travel time (Stevanović et al., 2021)	students deemed asynchronous content (e.g. videos, PDFs, presentations, etc.) as most effective component contributing to students' learning during ERT (Bilgiç, 2021)		
	motivation impacts what, how, and when of learning (Stevanović et al., 2021)		

Note. OL = online learning; ICT = information and communication technology

Table 3.2.10. Data Extracts for Subthemes of Pedagogy

Subthemes of Pedagogy			
Subtheme 1: COVID-19-specific considerations	Subtheme 2: Special challenges	Subtheme 3: Pedagogical demands	Subtheme 4: Different modes of learning
revamp of delivery, engagement, and assessment due to lockdown (Alasmari, 2021)	keeping students engaged in a virtual environment challenging for teachers (Biju et al., 2022)	rapid increase in online teaching requires skills and competence from teachers for student outcomes (Biju et al., 2022)	students prefer blended learning rather than fully online or face-to-face (Almusharraf & Khahro, 2020)
satisfaction with school arrangements and faculty preparation during rapid shift (Almusharraf & Khahro, 2020)	teacher resistance to change include lack of knowledge, poor support, and difficulty visualizing benefits (Dorfsman & Horenczyk, 2022)	need for pedagogical strategies to address students who experience isolation (Biju et al., 2022)	blended learning has opportunities and challenges and is experienced on individual level (Biju et al., 2022)
keeping materials and assignments as close to the original helps mitigate disruption in ERT (Bawa, 2020)	students' perceptions of learning environments deteriorated due to pandemic (Long et al., 2022)	student voice important in evaluating learning environments due to excessive time spent (Bilgiç, 2021)	semi-inverted classroom approach can be particularly effective (Boton, 2020)
COVID-19 has exposed effort still required to meet the needs of learners (Boton, 2020)	many inequalities among students and teachers in ability to participate in remote teaching (Rodrigues et al., 2021)	continuity of teaching online requires new skills from staff for which training is not necessarily required (Butnaru et al., 2021)	forced switch to online learning allows for flexibility due to accessibility (Butnaru et al., 2021)
change in technology use higher in female faculty members than male faculty members (Lee & Jung, 2021)		teacher's conception of teaching important factor in pedagogical change (Dorfsman & Horenczyk, 2022)	younger students prefer face-to-face, suggesting blended learning better later (Cranfield et al., 2021)
individual factors had most influence over course factors, leading to instructional change (Lee & Jung, 2021)		change to teaching practice not possible without change to teacher's approach to teaching (Dorfsman & Horenczyk, 2022)	transmission to transformation pedagogy shift includes change from lowest to higher cognitive activities (Dorfsman & Horenczyk, 2022)
teaching strategies for reducing anxiety include increased communication, providing less stressful environment, getting to know students, and encouragement (Stevanovic et al., 2021)		confidence in ability to use technology, allows teacher focus on how to transfer teaching practices (Dorfsman & Horenczyk, 2022)	soft discipline teachers favor student-focused approach while hard disciplines favor teacher-focused (Dorfsman & Horenczyk, 2022)

Subthemes of Pedagogy			
Subtheme 1: COVID-19-specific considerations	Subtheme 2: Special challenges	Subtheme 3: Pedagogical demands	Subtheme 4: Different modes of learning
		changing in teaching behavior and technology adoption urgently required (Lee & Jung, 2021)	faculty accept blended and online options but face-to-face more effective and preferred (Lee & Jung, 2021)
		instructors could pay particular attention to encouraging students to be friendly and supportive (Long et al., 2022)	flipped classroom among hard disciplines has shown potential for improved retention (Tang et al., 2020)
		content should be priority over technology to benefit from blended learning (Paliwal & Singh, 2021)	blended learning effective in supporting traditional forms of teaching (Tang et al., 2020)
		online teaching requires more time from teachers than classroom teaching (Paliwal & Singh, 2021)	flipped classroom has improved student outcomes with rather large effect (Tang et al., 2020)
		need for online software and tools for course design, time management and effective communication (Paliwal & Singh, 2021)	

Note. ERT = emergency remote teaching

Table 3.2.11. Data Extracts for Subthemes of Motivation

Subthemes of Motivation				
Subtheme 1:	Subtheme 2:	Subtheme 3:	Subtheme 4:	Subtheme 5:
Prerequisites for, learning influenced by motivation	Contributing factors to motivation	Detrimental factors to motivation	Motivation as student engagement	Contributing factors motivating adoption and use of OL
approaches to cope with online learning include managing motivation (Almusharraf & Khahro, 2020)	high satisfaction can be due to multiple instructor-led factors (Almusharraf & Khahro, 2020)	excessively long sessions detrimental to focus and motivation (Boton, 2020)	unique challenges lead students to engage and concentrate more (Bawa, 2020)	performance expectancy, social influence, and hedonic motivation significant factors in influencing behavioral intention to adopt OL (Mittal et al., 2022)
motivation influenced by online teaching strategies (Almusharraf & Khahro, 2020)	intracrisis learning can motivate to cope (Bawa, 2020)		extrinsic and intrinsic motivation impact students' engagement (Biju et al., 2022)	
learning opportunities may vary between countries due to students' motivation (Bingimlas, 2021)	crisis experience prompts learners to commit to completion (Bawa, 2020)		students in low power distance countries engage more in online sessions (Cranfield et al., 2021)	
faculty motivation influences acceptance and continuation of teaching online (Lee & Jung, 2021)	confidence is relevant to challenge generated motivation and engagement (Bawa, 2020)		balance of social and family engagement impacts student engagement	
	ease and level of communication between teachers and students is motivating factor (Bawa, 2020)		online study groups can provide students additional support and opportunities to engage more deeply with content (Alasmari, 2021)	
	listening to students' issues contributed to their motivation (Bawa, 2020)			
	ERT can create new motivation that circumvents negatives associated with OL (Bawa, 2020)			

Subthemes of Motivation				
Subtheme 1: Prerequisites for, learning influenced by motivation	Subtheme 2: Contributing factors to motivation	Subtheme 3: Detrimental factors to motivation	Subtheme 4: Motivation as student engagement	Subtheme 5: Contributing factors motivating adoption and use of OL
	forced online teaching led to cognitive dissonance and motivated new beliefs (Lee & Jung, 2021)			

Note. ERT = emergency remote teaching; OL = online learning

Table 3.2.12. Data Extracts for Subthemes of Performance

Subthemes of Performance			
Subtheme 1: COVID-19 impact on performance	Subtheme 2: Face-to-face vs. ERT impact on student performance	Subtheme 3: Factors advancing performance	Subtheme 4: Obstacles to performance
COVID-19 had destructive, negative impact on learning achievement, performance (Almusharraf & Khahro, 2020)	students in face-to-face courses perform better due to felt presence of instructor and direct instruction (Bawa, 2020)	formative online assessment aided learners' performance in final assessment (Almusharraf & Khahro, 2020)	mental problems among leading obstacles to the academic success of students (Bilgiç, 2021)
COVID-19 developed students' learning approaches, efficiency, and learning achievement (Almusharraf & Khahro, 2020)	no evidence that ERT led to lower grades (Bawa, 2020)	flexibility and choice between synchronous and asynchronous options may defeat negative performance (Bawa, 2020)	
change of behavior towards negative wellbeing impacted performance of teachers (Taufiq-Hail et al., 2021)	fourth-year students put in significantly less effort during distance learning than the younger students (Stevanović et al., 2021)	ease and level of communication between teachers and students is success factor (Bawa, 2020)	
		higher academic performance associated with more effort (Stevanović et al., 2021)	

Note. ERT = emergency remote teaching

3.2.1 Thematic Relationships

In answering the question of what themes are evident in the 32 articles included in this study, this thematic analysis attempted to not only identify the various themes but also the relationships between them.

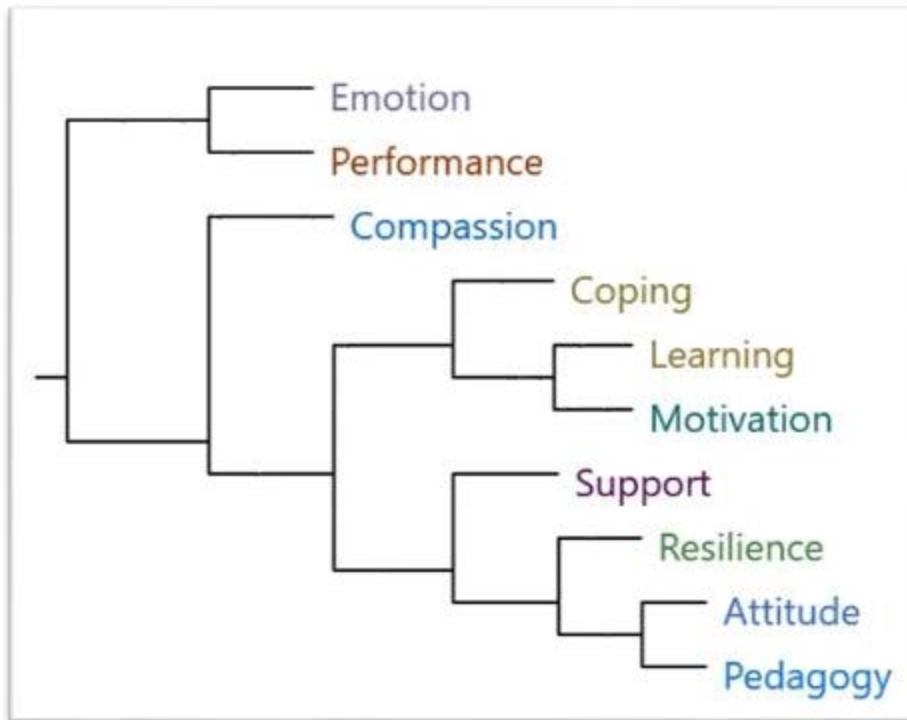


Figure 3.2.1. NVivo's Cluster Analysis with Themes Clustered by Word Similarity

Initially cluster analysis by word similarity done with NVivo provided some insights on the thematic relationships. The cluster analysis was done using the Pearson correlation coefficient, measuring for the similarity of words within the coded themes (see Appendix 2 for the summarized values for word similarity). NVivo's cluster analysis by coding similarity also provided insights on the relationships between themes. This cluster analysis was done using Jaccard's coefficient, measuring for coding similarity among the themes (see Appendix 3 for the summarized values for coding similarity). It is important to remember that the correlation or similarity index produced here only indicated that there is a relationship in the frequency of words or coding between two themes as they appeared in the articles, not a causal relationship between

any two themes and the actual phenomena being studied by the articles included in the thematic analysis.

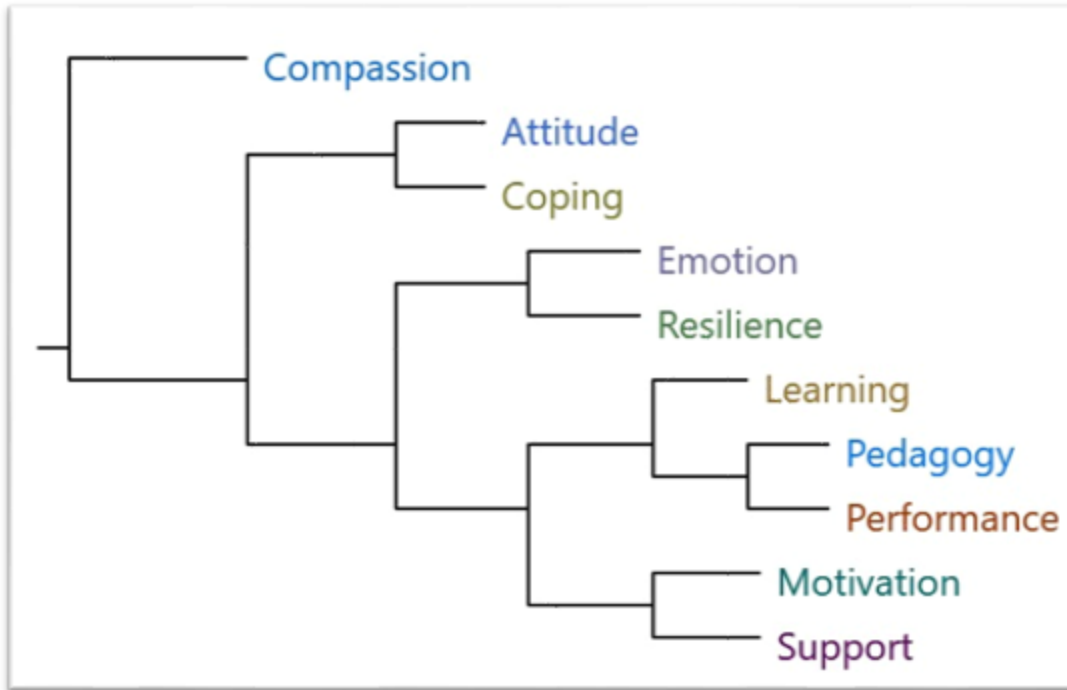


Figure 3.2.2. NVivo’s Cluster Analysis with Themes Clustered by Coding Similarity

As a result of the thematic analysis the themes were ultimately manually lumped into clusters based on the subtheme extracts. These thematic relationships are briefly discussed in subsections 2.2.1., 2.2.2., 2.2.3., 2.2.4., and 2.2.5.

2.2.1. Thematic relationship A: Emotion and compassion

In NVivo’s report on items clustered by word similarity the theme compassion was clustered next to emotion and performance and above the themes coping and support. Both the themes of emotion and compassion were commonly coded in two of the articles (Alasmari, 2021; Dorfsman & Horenczyk, 2022). Between the coding of the themes of emotion and compassion Jaccard’s similarity coefficient for coding was 0.1. The coding for the themes of emotion compared to performance and resilience had a significantly higher Jaccard’s coefficient (0.5), suggesting that the coding for emotion was similar by a significant margin (+0.4) to the coding on performance and resilience when compared to compassion. This likely due to the limited coverage of compassion in the articles included in this study.

In the subtheme extracts it was apparent that both positive and negative emotions were apparent during online learning that happened alongside the pandemic (Ahmadi et al., 2021; Almusharraf & Khahro, 2020; Noori, 2021). This provided an opportunity for teachers to practice compassion in understanding the emotions experienced by students. In contrast, in the study by Ahmadi, Cetrez, Akhavan, and Zandi (2021) teachers reported emotional support and compassion, resulting from virtual interaction among students. Positive emotions were generally associated with positive task performance (Taufiq-Hail et al., 2021) which also has important implications on which emotions teachers may want to focus on resonating when encouraging learning in the classroom (Maican & Cocoradă, 2021).

2.2.2. Thematic relationship B: Attitude and resilience

In NVivo's report on items clustered by word similarity the theme resilience was clustered along with pedagogy and attitude. In fact, in terms of word similarity, the themes of pedagogy and attitude had the highest Pearson's correlation coefficient (0.8). This suggests that the wording was the most similar among the coded excerpts on attitude and pedagogy. This likely due to the fact that terms like teacher and emergency remote teaching (ERT) were common in data excerpts of both themes (see Tables 3.2.3. and 3.2.10.). The themes of attitude and resilience were commonly coded in 11 of the 32 articles (Almusharraf & Khahro, 2020; Bawa, 2020; Biju et al., 2022; Cutri et al., 2020; Dorfsman & Horenczyk, 2022; Lee & Jung, 2021; Long et al., 2022; Noori, 2021; Rodrigues et al., 2021; Tang et al., 2020; Taufiq-Hail et al., 2021). Between the coding of the themes of attitude and resilience Jaccard's similarity coefficient was 0.55. The Jaccard's coefficient for resilience and performance was slightly higher (0.6).

In the subtheme extracts an optimistic attitude was a clear contributor to resilience (Mo et al., 2021; Rodrigues et al., 2021). When teachers were more optimistic, they were also able to see how they could utilize more diversified resources over time as their experience with online learning increased (Lee & Jung, 2021). For teachers, having an optimistic attitude was not sufficient, however, as compassion was a necessary factor for ensuring faculty online readiness (Cutri et al., 2020). Being able to maintain a positive approach while being able to understand the unique challenges of students, and accept help in return, seemed to be common contributors to the faculty's ability to cope successfully with the ongoing emergency remote teaching situation.

2.2.3. Thematic relationship C: Coping and support

In NVivo's report on items clustered by word similarity the theme coping was clustered with learning and motivation. In fact, in terms of word similarity, the themes of coping and learning a rather high Pearson's correlation coefficient (0.57).

Both the themes of coping and support were commonly coded in eight of the 32 articles (Alas-mari, 2021; Almusharraf & Khahro, 2020; Bawa, 2020; Dorfsman & Horenczyk, 2022; Lee & Jung, 2021; Long et al., 2022; Rodrigues et al., 2021; Taufiq-Hail et al., 2021). Between the coding of the themes of coping and support Jaccard's similarity coefficient was 0.47. The Jaccard's coefficient for coping and attitudes was slightly higher (0.64).

In the subtheme extracts it was apparent that communication was an important preliminary step to ensure that the necessary support could be provided where teachers or students were in need of help (Bawa, 2020). While the needs of students were a clear focus in the articles, the need to further understand how teachers coped during the pandemic was recognized (Taufiq-Hail et al., 2021). According to Rodrigues, Silva, and Franco (2021) institutional support was one common contributor to ensuring successful teacher coping, including meetings where staff was able to discuss care and support issues, in addition to "business-focused" meetings.

2.2.4. Thematic relationship D: Learning and performance

In NVivo's report on items clustered by word similarity the theme performance was clustered next to emotion. In fact, in terms of word similarity, the themes of performance and emotion a rather high Pearson's correlation coefficient (0.55).

Both the themes of learning and performance were commonly coded in 14 of the 32 articles (Almusharraf & Khahro, 2020; Barbu et al., 2022; Bawa, 2020; Bilgiç, 2021; Boton, 2020; Cranfield et al., 2021; Dorfsman & Horenczyk, 2022; Gautam & Gautam, 2021; Long et al., 2022; Maican & Cocoradă, 2021; Mo et al., 2021; Noori, 2021; Rodrigues et al., 2021; Stevanović et al., 2021). Between the coding of the themes of learning and performance Jaccard's similarity coefficient was 0.61. The Jaccard's coefficient for performance and pedagogy was

among the highest (0.69). This high result on coding similarity is likely due to the shared articles between these themes and high number of references to pedagogical considerations (e.g., e-learning systems and materials) which also were followed with considerations on performance (Almusharraf & Khahro, 2020; Bawa, 2020; Bilgiç, 2021; Stevanović et al., 2021).

In the subtheme extracts the potential of online learning to promote more student-centered practices that favor activity, creativity, and teamwork was recognized (Cranfield et al., 2021). To ensure successful learning, however, it was important to ensure that there was adequate infrastructure and support. As mentioned by Alasmari (2021), inadequate infrastructure and support reduces the effectiveness of online learning and disrupts learning, which ultimately results in less achievement of learning outcomes. Pedagogy had significant implications on performance. For example, flexibility and choice between synchronous and asynchronous options may help defeat negative performance (Bawa, 2020).

2.2.5. Thematic relationship E: Pedagogy and motivation

In NVivo's report on items clustered by word similarity the theme pedagogy was clustered alongside resilience under the themes of attitude, emotion, and support. In fact, in terms of word similarity, the themes of pedagogy and resilience a rather high Pearson's correlation coefficient (0.75). All three themes of attitude, emotion, and support can be seen to play a role in advancing motivation. As Schunk and Usher (2012) have pointed out motivation is one of the most important factors in determining our decisions related to the learning process. Motivation impacts the students' decisions of what how and when they will learn (Schunk & Usher, 2012). The themes of pedagogy and motivation were commonly coded in 12 of the 32 articles (Alasmari, 2021; Almusharraf & Khahro, 2020; Bawa, 2020; Biju et al., 2022; Bingimlas, 2021; Boton, 2020; Cranfield et al., 2021; Dorfsman & Horenczyk, 2022; Lee & Jung, 2021; Long et al., 2022; Rodrigues et al., 2021; Stevanović et al., 2021). Between the coding of the themes of pedagogy and motivation Jaccard's similarity coefficient was 0.48. Interestingly the Jaccard's coefficient between motivation and support was slightly higher (0.53).

The subtheme extracts indicated that teachers' pedagogy had not only a significant influence on student performance but also their motivation. Part of having a successful pedagogy was finding effective ways to ensure students received the necessary support. Online study groups were one example of additional support and opportunities for students to engage more deeply

with course content (Alasmari, 2021). An important pandemic-specific consideration that teachers needed to account for was including teaching strategies for reducing anxiety. As pointed out by Stevanović, Božić, and Radović (2021), these included increased communication, providing less stressful environment, getting to know students, and general encouragement.

3.3 Meta-analysis

One of the central aims of this meta-analysis was to integrate, summarize, and organize a set of reported statistical findings of the articles that investigated the same research question using the same methods of measurement (Booth et al., 2016). One of the challenges that became apparent during the course of the review of this study was that the quantitative and mixed methods articles included in this study were lacking in internal validity. Another challenge was finding studies looking at the same dimension of learning (i.e., with the same research question). Many of the quantitative articles lacked a control group, understandably so because they had been conducted only after the emergency remote teaching had been implemented and having a control group in the classroom had ethical implications with respect to the COVID-19 pandemic. This challenge to internal validity has also been reflected in meta-analyses on the pandemic done in other fields (Jefferson et al., 2023).

At best, pre-post studies were found, where there was a record of learning that happened prior to the pandemic and learning that happened during the period of emergency remote teaching. As pre-post studies, however, confounding variables were not accounted for and for this reason it is not possible to conclude that the effect on the dependent variables was due to the reported independent variables alone. Another challenge for conducting a meta-analysis with an estimate of an effect size for the pandemic's impact on learning in higher education was between-study heterogeneity simply in terms of what aspects of learning were being measured and how. Thus, as a meta-analysis this study was limited to describing in a systematic way the findings of the articles included in the study without comparing the actual statistics to provide further evidence of the effectiveness of the studies conducted in the articles themselves.

As a systematic review, this study attempted to also consider the applicability and external validity of the articles included in the meta-analysis. Since the effect size could not be measured for a majority of the articles, it was not possible to compile a funnel plot to check for publication bias. However, what could be compiled was a risk of bias summary, which appraised the internal validity of the articles' results included in a systematic review. Bias here refers to factors that can systematically affect the observations and conclusions of the study and cause them to be different from the truth (Higgins et al., 2022).

The five risk of bias factors considered in Table 3.3.1. include (1) whether article's sample was chosen randomly, (2) whether the appropriate analysis was used to measure the intended intervention, (3) whether there was missing outcome data, (4) whether the outcome was measured

appropriately (e.g., whether confounding variables were accounted for), and finally, (5) whether the trial was analyzed and reported in accordance to the pre-specified plan, as determined alongside the article's initial research questions.

Table 3.3.1 Risk of bias summary

Risk of bias due to	Randomization	Deviations from intended intervention	Missing data	Outcome measurement	Selection of reported result
Ahmadi et al. 2022	+	+	?	-	+
Alasmari 2021	?	+	-	-	-
Almusharraf & Khahro 2020	-	+	+	-	+
Barbu et al. 2022	-	+	-	-	+
Bawa 2020	?	+	+	+/-	-
Biju et al. 2022	-	+	?	-	+
Bilgiç 2021	?	+	+	-	+
Bingimlas 2021	-	+	+	-	+
Boton 2020	-	+	-	-	?
Butnaru et al. 2021	+	+	+	-	+
Cranfield et al. 2021	?	+	?	-	-
Cutri et al. 2020	-	+	?	-	-
Dorfsman & Horenczyk 2021	?	-	?	-	+
Estrella 2022	-	+	+	+/-	+
Gautam & Gautam 2021	?	?	?	-	?
He & Wei 2021	-	+	-	-	+
Lee & Jung 2021	?	+	+	-	+
Logemann et al. 2022	-	+	+	-	+
Long et al. 2022	?	+	+	+/-	+
Maican & Cocoradă 2021	-	+	+	-	+
Mittal et al. 2021	-	+	+	+/-	+
Mo et al. 2021	-	?	?	-	?
Noori 2021	-	+	-	-	+
Okwuduba et al. 2022	-	+	+	-	+
Paliwal & Singh 2020	+	+	+	-	+

Risk of bias due to	Randomization	Deviations from intended intervention	Missing data	Outcome measurement	Selection of reported result
Rodrigues et al. 2021	-	?	+	-	-
Septianasari & Wuhyuni 2021	-	+	+	-	-
Stevanovic et al. 2021	?	+	?	-	?
Tang et al. 2020	-	+	-	-	-
Taufiq-Hail et al. 2021	-	+	+	+	+
Vergara-Rodriguez et al. 2022	-	+	?	-	?
Zagkos et al. 2022	?	+	?	-	+

Note. A plus (+) under Missing data indicates that key data was missing and/or not reported. A plus/minus (+/-) under Outcome measurement indicates that the article was a pre-post study with effect sizes that did not account for confounding variables.

The study by Taufiq-Hail, Sarea, and Hawaldar (2021) suggested that self-efficacy had a strong effect (+1.1 standard deviations) on the task performance of teachers in Bahrain (See Table 3.3.2). As noted in Table 3.3.1, Taufiq-Hail et al. (2021) did not randomize their sample, one factor contributing to a risk of bias. Self-efficacy as a construct is a key personal factor in social cognitive theory related to performance (Schunk & Mullen, 2012). Academic self-efficacy can be defined as the perceived confidence in one's ability to execute actions for attaining academic goals and it had an effect on choice of tasks, effort, persistence, and achievement (Schunk & Mullen, 2012). In turn, self-efficacy can be influenced by the outcomes of behaviors and inputs from the environment (Schunk & Mullen, 2012). People may also assess self-efficacy when they receive persuasive information or encouragement from others (e.g., "I know you can do this"; Bandura, 1997).

Important as it is, self-efficacy cannot be the only predictor of task performance because no amount of it will produce a competent performance when the actual skills are lacking (Schunk & Pajares, 2009). Nonetheless, self-efficacy is understandably a significant contributor to performance because individuals typically select tasks and activities that they deem they are

competent in (Schunk & Mullen 2014). Self-efficacy is also likely to affect how much cognitive and physical effort people expend on an activity, how long they persist when they encounter obstacles, and their levels of learning and achievement (Schunk & Mullen 2014). As a critical component of self-efficacy and self-regulation, motivation can further define the goals one wishes to achieve. As highlighted alongside Bilgiç (2021) and Mittal, Manti, Tandon, and Dwivedi (2022), the role of implicit motives for achievement or affiliation (read: satisfaction) alongside with the encouragement towards particular goals (read: facilitative leadership) seem to suggest that intrinsic motivation proved to be more effective than extrinsic motivation. In terms of learning, individuals are more likely to learn how to adapt to new things when they are interested for personal reasons. Willpower, or the motivation to persist at something even when one is tired, bored, or stressed, was understandably important with respect to performance during the pandemic as we were more isolated from the professional communities that provided us with support.

Another significant finding from Taufiq-Hail et al. (2021) is that negative feelings also seemed to have a medium effect (+0.55 standard deviations) on task performance. This may be a surprising finding for many, as positive feelings only had a small effect (+0.32 standard deviations) on task performance. Understandably the burden and responsibilities on teacher increased with respect to family members, colleagues, and students as the pandemic escalated and there was a need to gain new skills in a short time (Taufiq-Hail et al., 2021). While negative emotions are expected to produce task-irrelevant thinking, emotions like anxiety, shame, and anger can induce motivation to avoid failure and facilitate the use of analytical strategies to solve problems and overcome difficulties (Pekrun & Perry, 2014). By contrast some negative emotions like hopelessness and boredom can, nonetheless, distract attention, undermine task-related motivation, reduce the effortful use of strategies, and promote shallow information processing (Pekrun & Perry, 2014).

Table 3.3.2. Effects of Self-efficacy, Negative Feelings, and Positive Feelings Towards *Task Performance* among Teachers (n=83) in Bahrain (Taufiq-Hail et al., 2021)

Construct	Effect size (Cohen's d)
Self-efficacy	+1.1*
Negative feelings	+0.55*
Positive feelings	+0.32**

Note. P-values for all reported effect sizes were statistically significant at * <0.01 , and ** <0.1

Another study which looked at the effects of the switch to remote learning on students' perceptions of the learning environment was conducted by Long, Sinclair, Fraser, Larson, and Harrell (2022). As noted in Table 3.3.1, it is unclear whether Long et al. (2022) randomized their sample. The study incorporated the What is Happening In this Class? (WIHIC) questionnaire to assess student cohesiveness, teacher support, involvement, task orientation, and equity both before and after switching to remote learning. This was one of the pre-post studies and while the effect size from switching to remote learning was reported within the study, listed in Table 3.3.3, it is important to note that due to the fact that there was not a control group simultaneously in the classroom, the study does not account for the possibility of confounding variables.

Table 3.3.3. Effects of Remote Learning on Student Perceptions (n=230) of the Learning Environment in the United States (Long et al., 2022)

Construct	Effect size (Cohen's d)
Social cohesiveness	-0.56
Teacher support	-0.20
Involvement	-0.23
Task orientation	-0.23
Equity	-0.28

Note. P-values for all reported effect sizes were statistically significant at <0.001

Another pre-post study conducted by Mittal, Manti, Tandon, and Dwivedi (2022) suggested that facilitation by leadership had a significant relationship (a standard estimate of +0.294) to teachers' behavioral intentions towards adapting to online learning in Northern India. According to the study, project teamwork (a standard estimate of +0.179), social influence (a standard estimate of +0.244), effort expectancy (a standard estimate of +0.142), and performance expectancy (a standard estimate of +0.131). As noted in Table 3.3.1, Mittal et al. (2022) did not randomize their sample. This was another one of the pre-post studies and while the standard estimates from the factors recorded after switching to remote work were reported within the study, it is important to note that due to the fact that there was not a control group simultaneously working at the university, the study does not account for the possibility of confounding variables. Looking at this from the applied behavioral analysis perspective, the aim to assess behavioral concerns and formulate the most promising solutions by designing methods to apply, monitor, analyze, revise if necessary, and communicate the effects of their interventions is left unfulfilled due to the fact that the confounding variables have not been accounted for (Mayer et al., 2012). With that said, the idea that general facilitation or encouragement may have a role in affecting motivation and general attitudes seems to support the path-goal theory. The path-goal theory emphasizes the relationship between the leader's style and the characteristics of the subordinates and the work setting. The underlying assumption of path-goal theory is derived from expectancy theory, which suggest that workers will be motivated if they believe they are capable of performing their work and their efforts will be worth it (Northouse, 2001).

A few articles reported an effect size as R-squared (R^2) but this is more of a measure for regression and thus it has not been converted to Cohen's d for the purposes of this meta-analysis (Almusharraf & Khahro, 2020; Maican & Cocoradă, 2021; Mo et al., 2021; Paliwal & Singh, 2021). Two other articles included in this study reported effect sizes (Bawa, 2020; Estrella, 2022). However, the results from these studies were not statistically significant ($p > 0.5$) and for this reason have not been reported in further detail in this meta-analysis. The reported effect sizes in both of these studies were small (under 0.10 standard deviations) (Bawa, 2020; Estrella, 2022).

As there were not multiple studies with effect sizes for common variables where confounding variables were accounted for, no estimates of effect sizes could be measured for the purposes of this meta-analysis.

3.4 Synthesis

This section summarizes, compares, and synthesizes the key findings from the 32 articles reviewed in this study. Table 3.4.1 provides a summary of the key findings.

Table 3.4.1 Summary of the Key Findings from Articles on Learning in HE during COVID-19

Author(s)	Method	Key findings
Ahmadi et al. 2022	QUAN	This study reveals insights on how HE teachers (n=277) managed the challenges caused by the pandemic. It also alludes to some possible cultural factors in coping with crisis. Coping methods related to nature were the most used in Sweden.
Alasmari 2021	QUAN	This study suggests that HE students (n=4,623) and teachers (n=916) perceived infrastructural support efficiency as critical for ensuring OL.
Almusharraf & Khahro 2020	QUAN	This study suggests that HE students (n=283) were satisfied with teachers who clearly communicated new assessment criteria, course delivery practices, and with general support during ERT.
Barbu et al. 2022	MIX	This study highlighted the discrepancy between the perspectives of HE students (n=844) and teachers (n=126) with respect to what was most effective for learning during the pandemic.
Bawa 2020	QUAN	This study suggests that ERT did not have a negative impact on HE students' (n=~200) grades.
Biju et al. 2022	QUAN	This study suggests a causal effect between ease of coping and the difficulty level experienced by HE teachers (n=600) in the challenges while working from home, ease of student engagement, and work experience. Formal training was not associated with ease of coping.
Bilgiç 2021	QUAN	This study suggests that the highest satisfaction among students (n=3,540) at a university in Turkey during ERT was with the LMS and ICT tools while the lowest satisfaction was with assessment methods. It also suggests that teacher feedback and student-teacher interaction advanced learning.
Bingimlas 2021	QUAN	This study suggests that HE students (n=97) had a positive perspective of the application of ERT. It further suggests that there were no differences in perspective between the genders.
Boton 2020	MIX	This case study suggests that HE students (n=43) had mixed perceptions on whether ERT worked well. It also suggests that OL sessions should be short (<2 hrs) to ensure optimal student motivation.
Butnaru et al. 2021	QUAN	This study suggests that the educational level of HE students (n=784) did not necessarily influence their attitudes toward OL.
Cranfield et al. 2021	QUAN	This study revealed differences in the home learning environments, followed by engagement of HE students (n=559) from South Africa, Wales, and Hungary during the pandemic.

Author(s)	Method	Key findings
Cutri et al. 2020	MIX	This study developed a scale (FROCT) for measuring pandemic constructs of faculty online readiness. It reported that beginner and intermediate HE teachers (n=30) obtained a higher score for readiness for the CRTS. It also reported that students' technological expertise evoked empathy in teachers.
Dorfsman & Horenczyk 2021	MIX	This study suggests that HE teachers (n=241) coping with the CRTS could be divided into three profiles: enthusiasts, experienced, and cautious. Two factors were found to influence their adapting to the situation: digital literacy and whether they had a student-centered focus.
Estrella 2022	QUAN	This pre-post study attempted to identify student performance differences between face-to-face (n=188) and ERT (n=196). The results were not statistically significant ($p < .05$).
Gautam & Gautam 2021	MIX	This study suggests that three core factors contributed to the effectiveness of online learning among students (n=158) during the pandemic. These three factors were (1) infrastructure, (2) technical support and (3) proactive faculty and student attitudes.
He & Wei 2021	MIX	This study highlighted the experiences of HE students (n=280) and teachers (n=90) in China when implementing ERT.
Lee & Jung 2021	QUAN	This study suggests that in HE crisis-driven changes may be taken on by teachers (n=201) differently than pre-planned, voluntary change, and that factors influencing crisis-driven changes are different from those influencing voluntary changes.
Logemann et al. 2022	MIX	This study revealed how innovative use of a variety of collaboration and communication technologies helped students and their teachers (n=440) build emotional connections and compassion to support each other during the pandemic, advancing inclusion and resilience.
Long et al. 2022	MIX	This pre-post study suggests that HE students (n=230) perceived a decline in student cohesiveness, teacher support, involvement, task orientation and equity due to the switch to ERT.
Maican & Corodă 2021	MIX	This study revealed that among HE students (n=207) coping behaviors and positive and negative emotions coexisted during the pandemic. It suggested that providing online resources/interaction had the greatest influence on stressors and coping behaviors, followed by practicing retrospective enjoyment.
Mittal et al. 2021	QUAN	This pre-post study provided insights into factors influencing the adoption of online teaching at the outbreak of COVID-19. The three most significant factors advancing adoption of the DLE among HE teachers (n=222) were facilitative leadership, motivation, and social influence.
Mo et al. 2021	QUAN	This study suggests that HE students' (n=552) continuance with OL was influenced by whether the LMS was navigable, the LMS fit the course design, the teacher's attitude, and family support.
Noori 2021	MIX	This study showed that not all HE students (n=592) experienced constant access to online learning during the pandemic. Obstacles included poor internet connection and lack of technical facilities. It

Author(s)	Method	Key findings
		also suggested that the corona-related teaching situation had negatively affected students' learning.
Okwuduba et al. 2022	QUAN	This study suggests that learning support was a positive predictor of HE students' (n=216) academic achievement during the pandemic.
Paliwal & Singh 2020	QUAN	This study suggests that the course design, communication, and time management competencies possessed by HE teachers in India (n=296) were not adequate for online education.
Rodrigues et al. 2021	MIX	This study contributed with a perspective of teachers, researchers, and students (n=254) on barriers and opportunities experienced during the pandemic. It pointed to a need for more training in OL.
Septianasari & Wuhyuni 2021	QUAN	This study suggests that most HE students (n=56) at a university in Indonesia (N=356) had moderate to positive learning engagement, motivation, and self-efficacy. It also suggests that lack of internet access to internet was the main reason for failing to reach learning outcomes.
Stevanovic et al. 2021	MIX	This study suggests that HE students (n=832) were significantly less motivated by ERT during their first year than the older students.
Tang et al. 2020	QUAN	This study suggests that HE students (n=11,088) were dissatisfied with online learning during the pandemic. It further suggests that flipped learning was shown to have a positive effect on students' learning.
Taufiq-Hail et al. 2021	QUAN	This study offered insights into the significant and negative effect of negative feelings on performance of HE teachers (n=83). Self-efficacy emerged as the most significant factor positively affecting task performance (+1.1 standard deviations) during COVID-19.
Vergara-Rodriguez et al. 2022	QUAN	This study suggests that HE teachers' (n=908) pandemic stress negatively influenced their self-confidence as well as their perception of digital competence and their adaptation to DLEs to a lesser extent.
Zagkos et al. 2022	QUAN	This study suggests that HE students' (n=807) perception of the effect of ERT on pedagogy was largely negative, partly due to lack of digital equipment and underdeveloped infrastructure.

Note. CRTS = corona-related teaching situation; DLE = digital learning environment; ERT = emergency remote teaching; HE = higher education; LMS = learning management system; MIX = mixed methods; OL = online learning; QUAN = quantitative

Based on the key findings from the articles, very little can be claimed about the overall lessons learned from the transition from face-to-face teaching to emergency remote teaching and its effects on learning. Approximately a third (37.5%) of the studies cover teachers's experiences

while a vast majority (23 out of 32 studies) address students' experiences. Mixed reports suggest both that students in higher education were both satisfied and dissatisfied with the corona-related teaching situation (Bingimlas, 2021; Boton, 2021; Tang et al., 2020). The key findings from several studies suggested that further training for teachers in online learning was necessary (Barbu et al., 2022; Paliwal & Singh, 2020; Rodrigues et al., 2021). For teachers, facilitative leadership and self-efficacy seemed to be key factors for adapting new technologies and advancing general performance (Mittal et al., 2021; Taufiq-Hail et al., 2021). For students, teachers' proactive attitude, clear communication, LMS usability, immediate feedback, and support, enabled by access to internet and the necessary facilities, seemed to advance online learning based on a number of studies (Alasmari, 2021; Almusharraf & Khahro, 2020; Bilgiç, 2021; Gautam & Gautam, 2021; Mo et al., 2021). A further synthesis of some of the key concepts related to learning and teaching strategies can be found in Appendix 5.

4 DISCUSSION

This section discusses how learning, stress, and leadership were three common considerations that were highlighted in the light of the findings from the systematic review, thematic analysis and meta-analysis conducted alongside this study.

4.1 Learning in HEIs During the COVID-19 Pandemic

This section discusses learning in higher education institutions during the COVID-19 pandemic in the light of the findings from this study. First section 4.1.1. discusses how the pandemic brought both students' and teachers' attention to the importance of paying attention to aspects involved in the process of learning and then section 4.1.2. self-efficacy and self-regulation as two aspects that were highlighted in particular in the articles included in this study.

4.1.1 Adapting to the New Normal by Learning to Learn

During the COVID-19 pandemic higher education institutions (HEIs) needed to adapt new approaches to advance learning. As highly complex organizations, HEIs and the multiple stakeholders involved needed to adapt to the new technologies and systems to ensure continuity (Warrier et al., 2021). This was a challenge for teachers who had limited experience with teaching online (Bao, 2020). The mental effects of isolation on top of the usage of new pedagogies can hinder students' and teachers' ability to perform to the fullest (Kaup et al., 2020).

As suggested by Vergara-Rodríguez, Antón-Sancho, and Fernández-Arias (2022), it is advisable for institutions of higher education to design continuous training programs for teachers focused on increasing their ability to adapt to the digital learning environment. This need for ICT support and training was also mentioned in other studies (Dorfsman & Horenczyk, 2022; Lee & Jung, 2021).

In addition to providing continuous training programs for teachers, learning during the COVID-19 pandemic highlighted the need to revisit the practice of learning to learn, or metacognitive skills. As we already know, the employment of metacognitive skills facilitates learning (Gage & Berliner, 1998). There are two types of metacognitions that can be employed during learning: (1) thoughts about what we know and (2) thoughts about regulating

how we go about learning (Brown, 1978; Chipman et al., 1985; Flavell, 1976). One such metacognitive ability is paying attention to how our nonverbal body language and level of tiredness can have a particular effect on our ability to learn.

During the COVID-19 pandemic regulating how we go about learning was particularly important as students engaged in learning from their own homes. The importance of spontaneous face-to-face interactions where our nervous system can also detect nonverbal cues intuitively and rapidly (Porges, 2020) was supported by Dorfsman & Horenczyk (2022) and their findings on how teachers felt anguish, failure, and personal offense when students kept cameras off during online meetings whereas when students turned on cameras during online meetings teachers felt this as a sign of success.

Another factor that was considered during the pandemic was paying attention to how sleep plays a role in advancing learning. This is based on the assumption that for short term memories (STMs) to be stored in the long-term memory (LTM) they must first be encoded in the LTM or otherwise they are forgotten. Sleep serves as an 'active system consolidation' of memory, as in a process during which the newly encoded memories become redistributed to other neuron networks for later retrieval (Born & Wilhelm, 2012). To ensure that memories could be stored effectively, the implication for online learning during the pandemic was being mindful that students had enough time for rest in between studying.

While some articles reviewed in this study suggested that learning stayed constant or improved while learning online (Bawa, 2020) others contradicted this finding (Septianasari & Wahyuni, 2021). This discussion is largely dependent on how we define learning (refer to synthesis matrix, Appendix 5). While some studies have pointed out how the pandemic a destructive, negative impact on learning achievement, performance (Sintema, 2020), others suggested that the pandemic was an opportunity during which students' learning approaches, efficiency, and learning achievement developed (Gonzalez, 2020).

The importance of the learning management system (LMS) is understandably emphasized in a flipped learning classroom where the attention shifts from the teacher's lectures to the learner and the learning process. One of the most common rationales for using flipped learning is to engage the students (Dalbani et al., 2022). The study by Bilgic (2021) seemed to suggest that satisfaction toward the LMS played a distinct role in advancing overall satisfaction among university students (n=3,540) in Turkey. Nothing can be concluded, however, due to the fact that this study lacked a control group and confounding variables were thus not accounted for.

Satisfaction can be derived from many things, for example, the autonomous mastery of moderately challenging tasks or the establishing, maintaining, and restoring of positive relationships with others. A well-organized LMS or video conferencing tool could serve as a channel for these implicit motives for achievement or affiliation. Learning environments that manage to engage students' implicit motives can instill a sense of flow in the learner (Engeser & Rheinberg, 2008) and thus promote further motivation and learning (Schultheiss & Köllner, 2014). A flipped learning approach which relies on a LMS more also relies on the students' ability to manage their time and be effective. This brings emphasis to the importance of teachers to learn new skills for handling the new complexity as well as contingencies related to online learning (Butnaru et al., 2021; Mathiasen & Schrum, 2010), while also clearly communicating the expected learning outcomes to students.

It is important to understand the added challenges that an online learning environment add to facilitating learning. These challenges include pedagogical considerations around engagement, access, community, and support (Gillett-Swan, 2017). Perhaps this is one reason the importance of self-efficacy and self-regulation were highlighted during emergency remote learning among students and teachers alike.

4.1.2 Self-efficacy and Self-regulation to Facilitate Learning

One topic that was highlighted in the articles reviewed for this study was the importance of self-efficacy (Almusharraf & Khahro, 2020; Taufiq-Hail et al., 2021; Vergara-Rodríguez et al., 2022). The concept of self-efficacy assumes that we are more active, rational learners in making choices that advance our ability to perform tasks (compare to behaviorist theory, discussed in Section 1.2).

Setting specific goals can help to direct attention to tasks, mobilize effort, increase persistence, and promote the use of new strategies when old strategies do not work (Locke & Latham, 1990). When it comes to time management, it is important to distinguish between efficiency and effectiveness. As Lakein (1973) points out, making the right choice about how time will be used (effectiveness) is more important than doing whatever task is at hand efficiently. When it comes to the teacher, the teacher can assist student learning by separating large tasks into smaller ones (Tharp & Gallimore, 1991). The ultimate goal is to help the student take over parts of the activity where now assistance from the teacher is needed and the students' interest in the task is maintained (Dembo & Eaton, 1997).

Perceived efficacy and influence motivation because a high sense of efficacy can lead us to take on more difficult tasks, expend greater effort, persist longer, apply problem-solving strategies, and have less fear and anxiety regarding tasks than those with a low sense of efficacy would have (Dembo & Eaton, 1997).

Looking at learning from a brain-based learning approach helps appreciate how learning involves the strengthening of synaptic connections between neurons, as originally proposed by Donald Hebb (1949). Hebb's theory is often summarized as "Cells that fire together wire together" (Löwel & Singer, 1992). The mechanism that makes Hebb-like plasticity possible has been identified at long-term potentiation (LTP) and it involves the strengthening of the functional connection between two brain areas (Bliss & Lømo, 1973).

In the early stages of learning a new behavior (e.g., staying focused and paying attention while learning online) this understandably requires a lot of effort to deliberately do the behavior (Tang et al., 2015). Later, in the middle stage of development, maintaining this behavior may require effort in mainly keeping the mind from wandering. Finally, in the advanced stage, the maintaining of the behavior becomes almost effortless being. Understanding this and being mindful of this is central part of metacognition. This includes skills like attention control, emotion regulation, and self-awareness, all leading to self-regulation (Tang et al., 2015), illustrated in Figure 3.2.1.

Self-regulation is a phenomenon that has received relatively little attention in the field of psychology until recently (Forgas et al., 2009). It is important to also distinguish the concept of self-regulation from self-control, which often get confused with each other. To regulate literally meaning to change, but as pointed out by Forgas, Baumeister, and Tice (2009) regulating is also more than change. Regulating oneself can be thought of as changing oneself to bring one's thinking and behavior into accord with some often consciously desired rule, norm, goal, ideal, or other standard (Forgas et al., 2009).

Being mindful of what goals we are aspiring toward and adjusting our thoughts and behavior accordingly understandably was emphasized by the isolation related to the COVID-19 pandemic. Self-regulation was not only important regarding our ability to keep the COVID-19 infections at bay while practicing social distancing but also being able to motivate oneself as a teacher and student. Our ability to self-regulate has important implications on learning from the brain-based learning approach. The brain region to which mindfulness training is most

consistently linked is the anterior cingulate cortex (ACC) (Tang et al., 2010). Particularly important for enhancing ACC activity is ensuring enough time for rest (Tang et al., 2009). Reserving more time for breaks has been studied to also have implications on preventing the impairing effects of accumulated strain, advancing students' general well-being and performance (Albulescu et al., 2022).

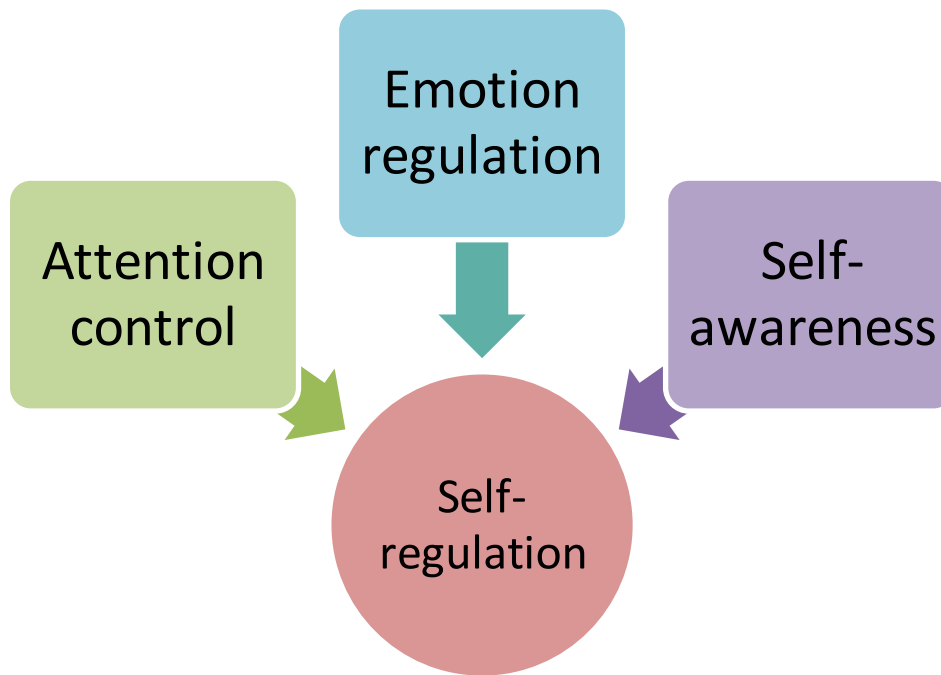


Figure 4.1.2. Elements of Self-regulation in Metacognition (Tang et al., 2015)

As a skill for the twenty-first century, self-regulation has been identified as one of the key skills for addressing most major social and personal problems that afflict people in modern, Western cultures, including alcohol addiction, eating disorders, obesity, crime and violence, prejudice and stereotyping, cigarette smoking, underachievement at school and work, unwanted pregnancy, sexually transmitted diseases, debt, failure to save money, gambling, and domestic abuse (Forgas et al., 2009). In other words, self-regulation was a key skill that was highlighted in the experience gained from the pandemic that could address some of the unnecessary stress that has been experienced prior to COVID-19.

4.2 Stress and Adapting to the Pandemic

This section discusses the needs for alleviating stress and various coping strategies that arose in the articles reviewed in this study.

4.2.1 Alleviating Stress

Based on articles reviewed in this study, technologies must be accessible and usable, as they can reduce the amount of stress connected to online learning (Maican & Cocoradă, 2021). The use of synchronous online lectures, discussion questions, and email communications have been identified to help engage students and reduce anxiety, while also increasing learning (Maican & Cocoradă, 2021).

As highlighted in the articles reviewed in this study, not only can stress impair learning (Noori, 2021) but also damage judgement and problem-solving strategies in the event of adversity (Taufiq-Hail et al., 2021). Bruce McEwen (1992) has shown how severe but temporary stress can result in a shriveling up of dendrites in the hippocampus. *Dendrites* (Latin for “branch”) are the parts of neurons that receive incoming inputs and are responsible for the initial phases of long-term potentiation and memory formation (Koch et al., 1992). As part of the nervous system, the brain is assumed to consist of units that function as a nerve cell (Kolb & Whishaw, 2021). Thus, to ensure a productive learning environment during the COVID-19 pandemic teachers did not only need to address questions of pedagogy but questions of how to cope with stress (Stevanović et al., 2021). Here both affective and cognitive empathy, or compassion, served as a critical ability for teachers in (1) validating the emotions of students and colleagues and (2) distinguishing what kind of essential support could be provided to help alleviate the stress that was being experienced alongside the COVID-19 pandemic. Also, having a proactive, optimistic approach was deemed helpful for advancing the process of learning by a number of articles reviewed in this study (Lee & Jung, 2021; Maican & Cocoradă, 2021; Rodrigues et al., 2021).

Considering the researched positive effect of empathy, or compassion, on outcomes in the field of psychology (Bohart et al., 2002; Elliot et al., 2018), it was concerning that compassion as a theme was covered the least in the articles reviewed in this study. In being able to bounce back from the effects of the pandemic, empathy was identified by one of the articles by Cutri, Mena, and Whiting (2020) as one of the key factors contributing to faculty online

readiness. The study by Bento et al. (2021) were most participants reported engaging in informal emergent discussion groups in which experiences of the pandemic were shared was supported by the results of two articles analyzed in the thematic analysis (Bawa, 2020; Cutri et al., 2020). Both Bawa (2020) and Cutri et al. (2020) reported how students wanted to discuss emotional, personal, and family issues more openly with professors and how a sense of vulnerability was an important foundation for this, underlined in Clark's (2020) theory on psychological safety. Resilience, or the ability to cope positively with adversity (Arnold & Boggs, 2011), was also reported to be supported by an optimistic and proactive attitude (Cutri et al., 2020; Dorfsman & Horenczyk, 2022; Lee & Jung, 2021; Rodrigues et al., 2021). This finding on the importance of a positive teacher-student relationship underlines the theory on how optimistic attitude is one of the key pillars for dealing effectively with the negative emotions involved with stress (Arkowitz, 1992).

4.2.2 Coping Strategies

According to the study done by Maican and Cocoradă (2021), support provided by teachers in the form of online resources like presentation slides, discussion forums, and examples have a significant influence on stressors and coping behaviors. To stimulate students' learning engagement and motivation, teachers can get involved to highlight the positive effects of cooperation, to lessen the feeling of isolation and loneliness in a situation where students are physically distant from each other (Maican & Cocoradă, 2021). By highlighting the positive effects of cooperation, teachers can also contribute to the students' sense of self-efficacy. Self-efficacy beliefs refer to a student's evaluation that they have the specific performance capabilities on a particular type of task (Zimmerman et al., 1992). A number of studies highlighted such proactive, optimistic approaches as critical for ensuring effective online learning and a more resilient working environment overall (Dorfsman & Horenczyk, 2022; Gautam & Gautam, 2021; Lee & Jung, 2021; Rodrigues et al., 2021).

The study by Biju, More, Armathlingam, Veluri, and Ismail (2020) seemed to suggest that both the convenience of working from home and the ease of student engagement played distinct roles in advancing teachers' (n=446) coping in India, Malaysia, and United Arab Emirates. Nothing can be concluded, however, since this study lacked a control group and it did not account for confounding variables.

The flexibility of working from home understandably provides its own opportunities to attend to other concerns, and at the same time, receive support from immediate family members, if living with family at home. Engagement can be defined here as active participation and involvement – and in the case of student engagement in study-related activities and academic tasks (Mercer & Dörnyei, 2020). Engagement can be critical particularly under a pandemic where students and staff are forced to isolate due to social distancing. The implications, however, are not limited to the pandemic. The “isolated” student, as Gilette-Swan (2017) points out, is often one who opts to study remotely to provide increased flexibility in engagement and participation to cater for their other commitments such as work, child-care, travel, volunteer work, international study, or other responsibilities. How to engage students will continue to be a critical question as higher educational institutions continue with remote learning policies post-pandemic.

Coping, on the other hand, refers to an individual's continually changing cognitive and behavioral efforts to manage external and internal stimuli (Lazarus & Folkman, 1984). Based on this conceptualization and other existing coping-related concepts and measures, Amirkhan (1990) proposed three distinct coping strategies—two of which are positive (i.e., problem-solving and seeking social support) and one that is negative (i.e., avoidance).

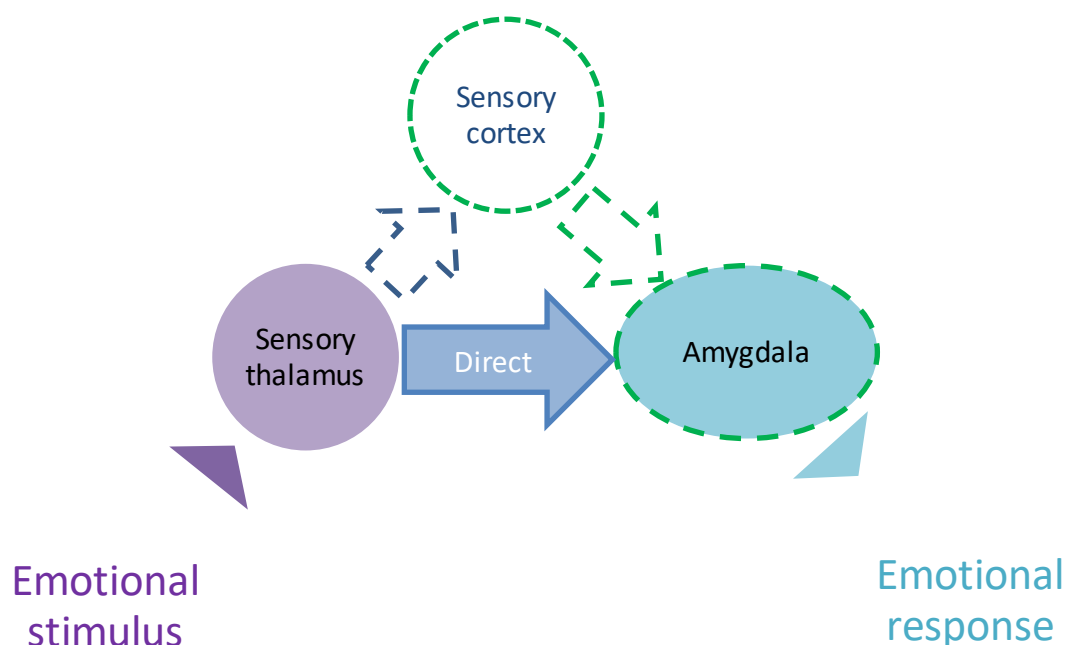


Figure 4.2.2. The Thalamic Pathways for Processing of Emotions (LeDoux, 2000)

The fast and direct thalamo-amygdala path allows us to respond to potentially dangerous stimuli before we actually know what the stimulus is (see Figure 4.2.2.; LeDoux, 2000). Amygdala outputs also target neurons that activate the sympathetic division of the autonomic nervous system, which releases adrenergic hormones from the adrenal medulla, and the hypothalamic-pituitary-adrenal axis, which releases cortisol, the stress hormone (LeDoux, 2012). As a part of the autonomic nervous system, the amygdala plays a central role in the visceral and homeostatic functions essential for life, which is balanced out by the parasympathetic components associated with rest (Lindsay et al., 1997). By incorporating cortical processing through the pathway via the sensory cortex, we slow down the process and can benefit from processing the emotions and weighing these in our decision making before reacting to a stimulus in a more “stressful” way that engages our more primitive survival circuits (LeDoux, 2012). By practicing emotional engagement (Clark, 2020) we also allow space for the vulnerability that is a prerequisite for more advanced forms of coping (Young et al., 2003), supported by the findings from the articles reviewed in this study (Bawa, 2020; Stevanović et al., 2021). Understanding how our emotional response can be regulated by more advanced cognitive processes also has important implications for understanding motivation and decision making.

4.3 Role of Leadership

This section discusses the role of leadership in facilitating performance in higher education during the COVID-19 pandemic and how these experiences provide an opportunity to revisit some of the underlying frameworks guiding decision-making at our higher education institutions.

4.3.1 Leadership's Role in Facilitating Performance in HE during COVID-19

A number of articles reviewed in this study underlined how institutions should spend resources on strategizing effective ways to deploy and administer online learning (Bawa, 2020) and institutional support crucial for profound change (Dorfsman & Horenczyk, 2022). The study by Mittal, Manti, Tandon, and Dwivedi (2022) also suggested that facilitation by leadership had a small effect on teachers' behavioral intentions towards adapting to online learning in Northern India.

The idea that general facilitation or encouragement may have a role in affecting motivation and general attitudes seems to support the path-goal theory. The path-goal theory emphasizes the relationship between the leader's style and the characteristics of the subordinates and the work setting. The underlying assumption of path-goal theory is derived from expectancy theory, which suggest that workers will be motivated if they believe they are capable of performing their work and their efforts will be worth it (Northouse, 2001). One important neuromodulator involved in motivation is dopamine. Understanding how dopamine plays a role when an emotional stimulus activates the sensory thalamus and leads us to goal-directed instrumental behavior is key when trying to understand how our memory systems are affected and new learning opportunities arise (LeDoux, 2012). When students are satisfied with school arrangement and faculty preparation due to a unified vision (Almusharraf & Khahro, 2020), students are also more likely to be able to attend to more advanced needs because their brain's resources are not monopolized by the task of coping (LeDoux, 2012).

One way to understand the role that leadership can play in the performance of an institute of higher education is the simple input-output model (illustrated in Figure 4.3.1.).

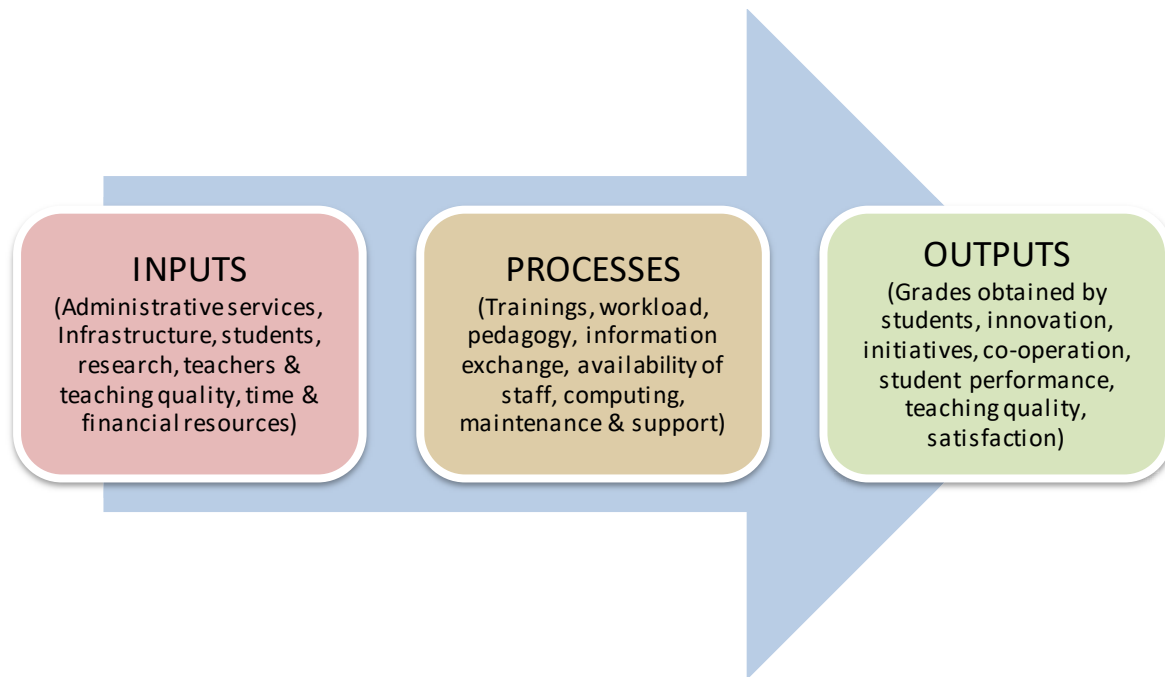


Figure 4.3.1 Inputs and Outputs in HE Management (Raudasoja, 2005)

The model of leadership depicted above is often used when leading organizations from an administrative perspective. Alongside this process it is tempting to view learning as a more passive process (e.g. rote learning) whereas we know that learning can include a number of other facets that contribute to our students becoming the active members of society that eventually contribute to their community's well-being and prosperity themselves. This is where it appears we have a disconnect – while we aspire to create independent learners our very conception of learning seems to still be up for definition. As a result, the way we lead the organic process of learning seems to be more oriented toward a more project- or task-based approach which fails to recognize the wider implications of developing the learner as a human being and the potential for a wider societal impact than that which happens within the confines of a workplace or lecture hall alone. To address this gap, it is necessary to return to the strategies and visions that guide the decisions made within the institutions that produce educational services.

As highlighted by Raudasoja (2005), one element that could be integrated into the traditional framework of optimizing inputs and outputs (illustrated in Figure 4.3.1.) is the question of understanding the critical success factors contributing towards our (learning) goals. Adapting Kaplan and Norton's (1996) balanced scorecard approach, we can look at how an organization is performing through the various goals set by different stakeholders and see how these

goals have been met. In facilitating the performance of a higher educational institution and trying to ensure that the desired learning outcomes are met, it is important to remember how teacher's conception of teaching is an important factor in bringing about pedagogical change (Dorfsman & Horenczyk, 2022). As highlighted in the articles reviewed by this study, frequent communication, technology infrastructure, and support are key to adaptation of online tools (Lee & Jung, 2021). As suggested by Mittal, Manti, Tandon, and Dwivedi (2022), social influence seemed to play key role in ensuring online learning adoption when making the transition to emergency remote teaching. Determining whether individuals will be ready to take on new change are a number of factors, as suggested by Bronfenbrenner's ecological systems theory (1997). In the post-COVID-19 world, included in this new economic thinking will also be revisiting the paradigms with which we approach decision making in the "new normal" (Barnes, 2020). Decision making in the new normal will require radical thinking, a multidisciplinary perspective, and doing more with less, or what Radjou and Prabhu (2015) have called frugal innovation.

If we take a step back to understand *pedagogy* as simply the leadership of the learning process and *learning* as an ability to change our behavior due to experience (i.e., neuroplasticity), it is also important to recognize in this process of change a number of factors intersecting a contributing in both synergistic and divergent ways. Take, for example, an adolescent who discovers new capacities and begins to see themselves as more autonomous. Such changes lead adolescents to interpret what they do differently (e.g., refusals previously viewed as transgressions now become assertions of autonomy). Parents and others in the environment may not consistently agree with the adolescent's desire for autonomy. Moreover, the adolescent's own habits may bring up old behavioral patterns, such as being reliant on the parents. Accordingly, change can sometimes be characterized by disorganization, altercations in the pace of change, and backsliding (Kielhofner, 2002). Here it is important to remember how change can serve as a catalyst for adapting the visions and strategies of an organization and for revisiting the structure which has been created to serve the learning organization. While the pandemic offered employees an opportunity to rapidly change work practices and conduct meetings remotely for the first time, it left out older citizens without the Internet with less access to digital communication, online shopping, and opportunities to improve mental health. This digital divide was also reflected in the fact that some students from poor communities were shut out of online education (Barnes, 2020). This concern for equity was also highlighted in the result of the study by Long et al. (2022).

4.3.2 COVID-19 Pandemic as an Opportunity to Reframe Educational Leadership

The COVID-19 pandemic served as a prime opportunity to revisit some of the underlying assumptions that had been guiding our educational institutions for long. For example, faculty members who were highly resistant to using the technologies necessary for arranging remote learning began doing so in Spring 2020. While faculty was quickly trying to pivot to remote learning, students were simultaneously affected by corresponding difficulties. Some students had limited or inadequate access to resources such as computers, webcams, reliable internet, and/or learning spaces free of distractions (Noori, 2021; Neuwirth et al., 2020). Throughout the world, students faced job loss or housing insecurity (Povian, 2021), or were sent home to unsafe and unsupportive homes (Brown, 2020). Without informal in-person interactions between their peers, students were reliant on sometimes limited and confusing communication from the higher education institution, its staff, and their teachers (Gelles et al., 2020).

As COVID-19 has revealed and heightened existing inequalities in society, so too are these imbalances reflected within higher education. As a result, COVID-19 has challenged us to rethink what are the various factors that can contribute to our ability to learn, and as a result it has challenged us to revisit what is meant by learning itself. One of the most difficult experiences students highlighted in a qualitative study conducted by Gelles et al. (2020) was the feeling that they could not get help. This was particularly prominent for courses where students could not attend synchronously, as in at the same time during a shared remote session, whether due to personal situations or because the teacher only posted asynchronous recordings (Gelles et al., 2020).

One important realization in higher education that came up in the article by Rodrigues, Silva, and Franco (2021) was that alongside adapting a more holistic understanding of learning we also need to reconsider how we measure productivity and understand its underlying factors. One central finding that surfaced from this study in the thematic analysis (see Table 3.2.3.) was that it is important to organize meetings that focus on care and support in addition to “business-focused” meetings (Rodrigues et al., 2021). This supports the notion that good leadership and teaching take into account both the people and the task at hand, referred to in Blake’s and Mouton’s (1964) managerial grid as the *team style* of leadership. This also supplements the idea of how emotional intelligence plays an important role in the pedagogical decisions motivating learning. By understanding the various dimensions of learning and how these factors contribute to the learning process, educational leaders can also appreciate the importance of these various

factors when weighing important decisions on where to dedicate the time, resources, and efforts of higher education institutions and their staff.

When we are able to understand the learning process as not only a static subject matter but the very process of being engaged in, and participating in developing, an ongoing process, we begin to appreciate the role that our awareness of these multiple factors plays in better understanding what all learning can mean (see synthesis matrix, Appendix 5). Part of learning can also include giving up old conceptions and attitudes so that one can adopt new ones (Repo-Kaarento et al., 2009). Critical to being able to facilitate this process in a way that produces significant results is also an ability to help the student to accept the possible distress associated with learning and to see the learning goals as an appealing outcome to strive for (Repo-Kaarento et al., 2009).

As learned from the articles reviewed in this study, not only do the institutions policies play an important role in helping faculty cope with crisis and facilitating change (Lee & Jung, 2021) but more attention must be given to emotions and life experiences of students (Rodrigues et al., 2021). Instructors play an important role in motivating learning, in fact, students' satisfaction with the learning environment can be due to multiple instructor-led factors (Almusharraf & Khahro, 2020). To make learning possible during the COVID-19 pandemic, one article reviewed in this study mentioned how enabling learning included recognizing the importance of providing asynchronous materials to students (Paliwal & Singh, 2021). During the pandemic, asynchronous materials allowed for more flexibility and choice, for opportunities to develop higher cognitive functions, and may have prevented negative performance (e.g., not meeting assignment deadlines), highlighted in multiple articles covered in this study (Bawa, 2020; Bilgiç, 2021; Paliwal & Singh, 2021).

When we understand learning as a process that includes making the pedagogical choices that allow for new learning opportunities to take place, learning obtains a new meaning; learning is no longer simply achieving outcomes but rather about making choices within a specific context that advance the interests of the learning process and learning community overall. When learning is seen as a process within a wider community, it includes all the facets of learning, like aspects where teachers act in an emotionally encouraging and reinforcing way and also a more demanding challenge to accept each other's incompleteness (Repo-Kaarento et al., 2009). This need to create positive experiences on one hand while also recognizing the challenges involved with learning was supported by a number of articles reviewed in this

study (Almusharraf & Khahro, 2020; Maican & Cocoradă, 2021; Taufiq-Hail et al., 2021). The pandemic also brought light to a faculty need to reorganize priorities, giving prominence to collective rather than individual objectives (Rodrigues et al., 2021), suggesting the importance of reframing the learning process as a community pursuit. As defined by Wenger (1998) learning in practice includes the following processes for the communities involved:

- **Evolving forms of mutual engagement:** discovering how to engage, what helps and what hinders; developing reciprocal relationships; defining roles
- **Understanding and tuning the enterprise:** aligning engagement with the enterprise, and learning to become and hold each other accountable; struggling to define the enterprise and reconciling conflicting interpretations of what it is about
- **Developing their repertoire, styles, and discourses:** consulting on the meaning of various elements; producing or adopting tools; recording or recalling events; inventing new terms and redefining or abandoning old ones; telling and retelling stories; creating and breaking routines

As Wenger points out, this kind of learning is not just a mental process; such learning has to do with the development of our practices and our ability to negotiate meaning (1998):

To assert that learning is what gives rise to communities of practice is to say that learning is a source of social structure. [...] [I]t is an emergent structure. Indeed, practice is ultimately produced by its members through the negotiation of meaning. The negotiation of meaning is an open process, with the constant potential for continuing, rediscovering, or reproducing the old in the new. The result is that, as an emergent structure, practice is at once highly perturbable and highly resilient.

The combination of imbalance and a capacity to withstand these disturbances is a key characteristic of adaptability. Thus, learning involves a close interaction between order and chaos (Wenger, 1998). The continuity of an emergent structure is born from its adaptability, not its stability. This need for adaptability during the COVID-19 pandemic was evident not only on an organizational level but on a more individual level (Rodrigues et al., 2021; Taufiq-Hail et al., 2021).

The study by Logemann et al. (2022) seemed to suggest that high-belonging teams (teams with greater perceived emotional investment) the sense of being supported or validated by others

had played a distinct role with respect to low- and medium-belonging teams. Nothing can be concluded, however, due to the fact that this study lacked a control.

In general, we could assume that high-belonging teams have more psychological safety. This concept of belonging coincides with the condition for feeling included in a psychological safe team (Clark, 2020). Since the Hawthorne experiments in the 1920s, it has been clear that social relations with co-workers and supervisors determine productivity (Karasek & Theorell, 1990). Much research has been done on how social support relations can affect psychosocial health (Cohen and Syme, 1985; House, 1981; Johnson, 1986). The mechanisms by which social support may affect well-being are diverse. Social support can refer to buffering mechanisms between psychological stressors, elaborated in several studies (Berkman & Syme, 1979; Karasek et al., 1987; LaRocco et al., 1980; Marmot & Syme, 1976). Social contacts and structure also affect the basic processes that contribute to maintenance of long-term health and acquisition of knowledge (Karasek & Theorell, 1990). Social support can also facilitate coping patterns that not only affect health but affect productive behavior (Pearlin & Schooler, 1978).

During the COVID-19 pandemic faculty have played important role in helping students adapt and persevere. While students admitted that remote learning is not the same as learning in person, they appreciated the effort and adaptability of staff. This compassionate flexibility was identified as one central theme in the study by Gelles and colleagues at the University of San Diego (2020):

This type of pedagogy was fortified with faculty showing compassion and care for students by emotionally supporting them, being flexible in grading and assignments, providing accommodations (e.g., grading policy changes), and being accessible to students.

At the same time student self-discipline was a central theme and here the role of time management, removing distractions, and setting boundaries were deemed important (Gelles et al., 2020):

Time management often went hand-in-hand with setting additional boundaries between school-time and free-time. This was achieved through various ways including attending class synchronously and removing distractions. [...] The students remarked how it was easier to stay motivated and pay attention if they attended class synchronously with their web cameras on.

Having the webcam on contributed to a sense of community and accountability:

“It just kind of makes you feel a little more present because when my webcam’s off, it’s just way easier to just go on my phone, but when my webcam’s on, it’s awkward to be on your phone in front of the professor. [...] I’ve noticed that just when I have mine on, not only do I learn better, but it’s easier to stay focused ...”

In the light of the experiences gained from learning during the COVID-19 pandemic, seem to highlight three important goals from the perspective of institutions producing educational services: (1) practicing compassion in taking into account the initial needs of the learning community; (2) adapting to the changing needs while setting individual and collaborative learning goals; and (3) teaching things aspire to meet these shared learning outcomes and contribute to community well-being. One approach to addressing this final goal can be reframing the learning goals in terms of acquiring knowledge or skills, not just in terms of completing tasks or obtaining particular grades (Brophy, 2010). This brings us back to the question of how we define learning and its function in society at large; a process that is incomplete – and will remain so as we continually encounter new changes – yet vital for the well-being and prosperity of our communities not only locally but globally.

4.4 Limitations of this Study

One important distinction that is important to note when reading this study and the articles included in it is that online learning (OL) should not be confused with emergency remote teaching (ERT) (Bingimlas, 2021). While OL and ERT are similar there were likely other confounding variables that the pre-post studies included in this review did not account for and could have otherwise been accounted for if the articles were strictly touching upon OL alone. This has implications on the reliability of the results covered in this study, and in particular, the meta-analysis.

When trying to consider factors that contributed to advancing learning during the pandemic, it is important to recognize that none of the articles included in this study consisted of random control trials (RCTs). For this reason, all the articles included were quasi-experimental and any measurements of the effectiveness of learning during the pandemic must be only taken as suggestions. With that said, because the studies were not RCTs we could not account for a number of other confounding factors that could have influenced students' learning, such as personality traits (Maican & Cocoradă, 2021). As with measuring successful medical interventions during COVID-19 (Jefferson et al., 2023), more high-quality studies are still needed to evaluate the most effective strategies for promoting learning during emergency remote teaching in higher education.

5 CONCLUSION

To conclude this study found that the research that has been done on learning in higher education during the COVID-19 pandemic from both a student's and teacher's perspective largely included a number of quasi-experimental studies that addressed learning from a number of different dimensions, or themes. 32 mixed-methods and quantitative articles were collected, out of which a majority were written to address the students' perspective and experience of the pandemic. While the studies on the teachers' perspective were limited, these consisted roughly of a third (37.5%) of the studies found. The themes that were evident in the articles collected included five initial themes and their subthemes: attitude, support, coping, resilience, compassion, emotion, learning, pedagogy, motivation, and performance. Among the articles the most common theme that arose from the thematic analysis was pedagogy and the least covered was compassion. From the studies that could be done during the COVID-19 pandemic the meta-analysis proved to be limited to primarily pre-post studies that lacked a control. Thus, nothing could be concluded about effect size estimates across studies for various variables related to the process of learning. Nonetheless, one of the more rigorous studies by Taufiq-Hail, Sarea, and Hawaldar (2021) where an effect size was measured concluded that self-efficacy was a significant factor (+1.1 standard deviations) in advancing the performance of teachers during the pandemic. Self-efficacy was understandable important as factors that were easier to facilitate in the face-to-face learning environment were more challenging to maintain, including considerations around engagement, access, community, and support (Gillett-Swan, 2017).

Research gaps identified during the course of this review and the limitations of this study suggest that more research needs to be done before one can conduct a more rigorous meta-analysis of how significant of an impact the COVID-19 pandemic had on learning in higher education. Since the pandemic is now largely behind us, it is likely that it will never be possible to conduct a more rigorous meta-analysis that gives an estimate of effect size on the learning impact of the pandemic. Understandably, the fact that the COVID-19 pandemic came as a surprise and there were so many external factors that could have affected the learning outcomes also presents a challenge for producing a high-quality study that answers to this research question. With that said, this challenge poses an opportunity to further develop the practice of quantitative research in the field of education. While the lack of quantitative skills has been seen as one of the significant 'defects' among researchers in the field of education (Gorard et al., 2003), this does not have to be the case in the future. As a mixed-methods study in the field of education itself, this

study has tried to advance the researcher's understanding of quantitative methods and how they can be carried out in a more rigorous fashion. At the same time the qualitative part of this study recognized the value for more subjective points of view, brought up in the data extracts of the thematic analysis which were later synthesized to provide a more holistic understanding for the various conceptions of learning and the five initial themes that this study attempted to further understand. The results of this study suggest that further research should be done on the role of compassion in the learning process, especially during crisis. This initial step of understanding our conception of learning – and where further research is needed – is an important prerequisite for further confirming our understanding of learning later on with the help of more close-ended, numerical data (Teddlie & Tashakkori, 2009).

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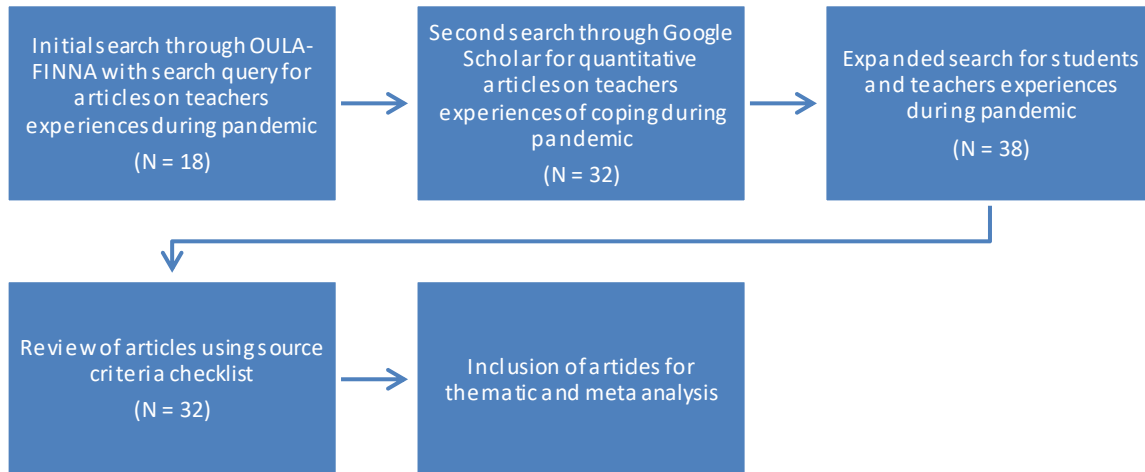
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Appendix 1

Figure A1. Search Process for Systematic Literature Review



Appendix 2

Table A1. Population Statistics by Country

Country	Population	Student enrol- ment in ter- tiary education	Teachers in tertiary educa- tion	Year	Source
Afghanistan	38,000,000	371,000	17,000	2018	World Bank
Bahrain	1,700,000	47,000	2,000	2019	World Bank
Canada	37,065,000	1593,000	174,000	2016	World Bank
China	1,345,035,000	31,308,000	1,607,000	2011	World Bank
Ecuador	16,196,000	669,000	40,000	2015	World Bank
Finland	5,500,000	295,000	15,000	2018	World Bank
France	67,000,000	2,338,000	11,000	2013	World Bank
Germany	83,000,000	3,128,000	416,000	2018	World Bank
Greece	10,700,000	767,000	17,000	2018	World Bank
Hungary	9,814,000	295,000	22,000	2016	World Bank
India	1,400,000,000	35,000,000	1,400,000	2019	World Bank
Indonesia	268,000,000	8,000,000	295,000	2018	World Bank
Israel	8,883,000	374,000	-	2018	World Bank
Lithuania	2,800,000	1,200,000	110,000	2018	World Bank
Malaysia	32,000,000	1,200,000	77,000	2019	World Bank
Nepal	27,382,000	477,000	8,000	2013	World Bank
Nigeria	163,000,000	1,513,000	67,000	2011	World Bank
Romania	19,000,000	540,000	26,000	2018	World Bank
Serbia	6,945,000	250,000	12,000	2019	World Bank
South Africa	57,340,000	1,178,000	-	2018	World Bank
Saudi Arabia	35,827,000	1,653,000	84,000	2019	World Bank
South Korea	51,600,000	3,084,000	221,000	2018	World Bank
Spain	47,000,000	2,052,000	172,000	2018	World Bank
Sweden	10,175,000	431,000	35,000	2018	World Bank
Turkey	82,500,000	7,600,000	348,000	2018	World Bank
United Arab Emirates	10,000,000	192,000	10,000	2017	World Bank
United States	325,000,000	19,000,000	1,580,000	2017	World Bank
United Kingdom	66,460,000	2,467,000	161,000	2018	World Bank

Appendix 3

Table A2. Cluster Analysis on Word Similarity

Code A	Code B	Pearson correlation coefficient (<i>r</i>)
Pedagogy	Attitude	0.795483
Resilience	Pedagogy	0.754324
Motivation	Learning	0.710309
Resilience	Attitude	0.681247
Resilience	Learning	0.660244
Pedagogy	Learning	0.656847
Motivation	Compassion	0.640066
Pedagogy	Motivation	0.625799
Motivation	Attitude	0.622096
Motivation	Coping	0.594172
Support	Pedagogy	0.586591
Resilience	Motivation	0.579496
Learning	Coping	0.571413
Resilience	Coping	0.568333
Learning	Attitude	0.564733
Performance	Pedagogy	0.5592
Support	Attitude	0.555855
Performance	Emotion	0.549386
Support	Resilience	0.543731
Compassion	Attitude	0.531069
Resilience	Performance	0.527132
Support	Coping	0.512695
Support	Motivation	0.507942
Resilience	Emotion	0.503803
Pedagogy	Coping	0.501793
Coping	Attitude	0.501756
Performance	Attitude	0.495313
Performance	Learning	0.490703
Resilience	Compassion	0.488638
Learning	Compassion	0.481431
Support	Performance	0.474106
Pedagogy	Compassion	0.468592
Support	Learning	0.460359
Learning	Emotion	0.453773
Performance	Motivation	0.453112
Emotion	Attitude	0.445709
Support	Compassion	0.422349
Coping	Compassion	0.422187
Emotion	Coping	0.418795
Pedagogy	Emotion	0.414032
Motivation	Emotion	0.405679
Support	Emotion	0.386923
Performance	Compassion	0.350665
Performance	Coping	0.344083
Emotion	Compassion	0.31897
Pedagogy	Attitude	0.795483
Resilience	Pedagogy	0.754324
Motivation	Learning	0.710309
Resilience	Attitude	0.681247

Appendix 4

Table A3. Cluster Analysis on Coding Similarity

Code A	Code B	Jaccard's coefficient (J)
Performance	Pedagogy	0.692308
Resilience	Pedagogy	0.692308
Coping	Attitude	0.642857
Pedagogy	Learning	0.64
Performance	Learning	0.608696
Resilience	Performance	0.6
Motivation	Coping	0.5625
Resilience	Attitude	0.55
Support	Motivation	0.529412
Performance	Emotion	0.5
Resilience	Emotion	0.5
Support	Learning	0.5
Support	Performance	0.5
Support	Resilience	0.5
Pedagogy	Emotion	0.482759
Pedagogy	Motivation	0.48
Support	Coping	0.470588
Motivation	Emotion	0.454545
Learning	Emotion	0.44
Performance	Motivation	0.434783
Motivation	Learning	0.428571
Resilience	Learning	0.423077
Support	Pedagogy	0.423077
Motivation	Attitude	0.411765
Support	Attitude	0.411765
Emotion	Coping	0.409091
Pedagogy	Attitude	0.4
Resilience	Coping	0.391304
Support	Emotion	0.391304
Pedagogy	Coping	0.384615
Resilience	Motivation	0.375
Performance	Attitude	0.347826
Coping	Compassion	0.333333
Performance	Coping	0.333333
Learning	Coping	0.318182
Emotion	Attitude	0.304348
Learning	Attitude	0.272727
Compassion	Attitude	0.25
Motivation	Compassion	0.214286
Support	Compassion	0.214286
Learning	Compassion	0.166667
Pedagogy	Compassion	0.166667
Resilience	Compassion	0.142857
Emotion	Compassion	0.095238
Performance	Compassion	0.090909

Appendix 5

Table A4. Synthesis Matrix on Learning and Teaching during COVID-19

Articles Included in Meta-analysis with Key References to Learning and Teaching Strategies						
	Almusharraf & Khahro 2020	Bilgiç 2021	Maican & Cocoradă 2021	Paliwal & Singh 2021	Stevanović et al. 2021	Vergara-Rodriguez et al. 2022
Definition of learning			Knowledge, skills, and learning strategies retained after a learning experience that can be transferred in other circumstances, underpinned by a proactive attitude (Rieckmann et al., 2017)			
Definition of online learning				Engagement to support and boost meaningful interaction between students, teachers, and resources (Dogbey et al., 2017)	Style of education where every segment of the teaching and learning process is realized online (Ally, 2008; Bates, 2005)	

Articles Included in Meta-analysis with Key References to Learning and Teaching Strategies

Almusharraf & Khahro 2020	Bilgiç 2021	Maican & Cocoradă 2021	Paliwal & Singh 2021	Stevanović et al. 2021	Vergara-Rodriguez et al. 2022
Definition of learning as a process	Interaction between the content and learner, learner and learner, and instructor and learn are part of the process of learning (Bilgiç, 2021)				
Teaching strategies to cope with COVID-19	Immediate and continuous formative assessment for students, utilizing opportunities available through LMS (You, 2016)	Encouraging learning and reduce competition by highlighting the positive effects of cooperation: lessening feelings of isolation and loneliness (Maican & Cocoradă, 2021)	Having the training in the right online teaching techniques and strategies is important to keep learners engaged (Paliwal & Singh, 2021)		Proactive self-regulation and co-regulation (Pyhäntö et al., 2020); communicating expectations clearly, with ample time for completion (Morgan, 2020); collaborative learning (Vergara, 2020)

Articles Included in Meta-analysis with Key References to Learning and Teaching Strategies

Almusharraf & Khahro 2020	Bilgiç 2021	Maican & Cocoradă 2021	Paliwal & Singh 2021	Stevanović et al. 2021	Vergara-Rodriguez et al. 2022
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Learning strategies for online learning	Metacognitive awareness and multidimensional approaches, including self-regulation, learning competence, and engagement (Bakhtiar, 2019; Almusharraf & Khahro, 2020)	Addressing motivational obstacles like depression, anxiety (Bilgiç, 2021)
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