Investigating Gender Differences in Distance Learning and Social Media During and Post-COVID-19

By

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Declaration

'This thesis is the result of the author's original research. It has been composed by the author and has not been previously submitted for examination, which has led to the award of a degree.'

Signed: Abdoalhamed Zngeena

Date: 25/04/2025

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Abstract

Technological advancements have greatly changed education delivery systems, with their effects especially pronounced during emergencies such as the COVID-19 pandemic. The growth of digital environments and technological progress established distance learning as a fundamental educational approach. This research examines gender-based perceptions and attitudes toward distance learning and the use of social media in higher education. The research also implemented a sequential explanatory mixed-methods approach. It used an online questionnaire to assess students' views about social media benefits and distance learning during and after COVID-19, highlighting the University of Strathclyde's platforms. The study collected survey responses from 173 students and conducted semi-structured interviews with 14 participants to explore gendered experiences and expectations in online education.

The statistical analysis of quantitative data through SPSS, which included Chi-square tests and Canonical Correlation Analysis, demonstrated significant gender-related patterns and responses to digital learning. Thematic analysis of the interview data further explored four main areas: perceptions and experiences related to distance learning, the influence of gender on learning, and methods to enhance digital learning environments.

The results indicate that both male and female students appreciate distance learning. Male participants choose it for its flexibility and convenience, while female participants choose mixed learning, influenced by personal and social variables. Importantly, the study found no clear evidence of gender discrimination in online learning environments, highlighting a generally inclusive digital learning culture.

In information science research, this study offers new insights into how gendered perceptions shape students' use of social media platforms and their engagement with digital learning environments. By applying sense-making theory to analyse students' reflections on online learning, the research contributes to understanding how learners interpret support, participation, and platform effectiveness across gender differences.

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List of Abbreviations

SM	Social Media
SNS	Social Networking Site
DL	Distance Learning
RDP	Researcher Development Programme
ICT	Information and Communication Technology
THE	Time Higher Education
STEM	Science, Technology, Engineering, and Mathematics
SIMD20	Scottish Index of Multiple Deprivation
UNESCO	United Nations Educational, Scientific, and Cultural Organisation
Athena SWAN	Scientific Women's Academic Network
ESL	English as a Second Language

Chapter 1: Introduction

1.1. Research Background and Motivations

Information technology has significantly expanded teaching and learning methods, leading to a transition from traditional face-to-face classroom education to distance learning across all levels of education, including higher education. Distance learning is defined as "a system in which the courses and support are supplied by various distance media, such as correspondence, although there may be face-to-face elements" (Simpson, 2018). With the aid of digital platforms and communication tools, this educational model enables students to learn and study from home.

Distance learning has developed while educational institutions have become more reliant on online tools to deliver education (Edwards-Fapohunda and Adediji, 2024). The COVID-19 pandemic of 2020 forced educational institutions across the UK and worldwide to instantly switch to fully online teaching methods. Educational institutions faced initial unpreparedness but needed to rapidly adjust their operations to maintain educational services during the quick shift. The pandemic-driven urgency made online learning the primary mode of distance education, aimed at reducing disruptions to students' studies (Daniel, 2020; Quezada et al., 2020; Baxter and Hainey, 2024).

The abrupt transition to online learning posed significant challenges for students and educators similarly. Students had to adapt to learning in an entirely digital environment, often in isolation due to public health measures, which impacted their academic experience, mental health, and overall well-being. Many students experienced increased stress and anxiety due to the public culture of fear and enforced isolation from their peers, exacerbated by the lack of face-to-face interactions even within family contexts (Kee, 2021). Consequently, social isolation and the new methods of educational delivery proved challenging for many (Shin and Hickey, 2021). Educators, on the other hand, faced difficulties in maintaining student engagement and participation in an online setting (Limniou et al. 2022).

The COVID-19 pandemic has brought to light the essential significance of online learning during crises, underscoring its importance in future educational settings beyond the pandemic. While universities provided students with remote access to internal networks, academic resources, and support services, the rapid shift revealed areas in

need of improvement. Alternatively, further study is needed to enhance the quality and outcomes of online learning, with a focus on the role of social media for assisting distance learning (Wang et al., 2024).

Hundreds of millions of people now use Web 2.0 and social networking sites (SNSs) such as Facebook and Twitter to contribute to social media content. Social media are determined as interaction techniques between individuals who share knowledge and collaborate online as creators of user-generated content in a virtual community social dialogue (Sobaih et al., 2016). Social media has recently become part of another culture that promotes correspondence and communication between people over the Internet. This can be compared with the improvement of information and communication technologies (ICTs), which are the hallmarks of the administrative area. They are available without restriction, and sometimes for free. The emergence of new widgets, for example, mobile phones, tablets, etc., as well as improved web applications, increases with the advent of new smart contacts that meet customer needs (Sunday et al., 2021; Gurunath and Samanta, 2022).

Numerous students use social media to post their questions or issues and receive instant support or solutions, and social media is playing an increasingly significant part in students' lives. With the assistance of these platforms, students can access information, retrieve data quickly, and communicate effortlessly with their instructors, peers, and classmates (Abbas et al., 2019; Shabbir et al., 2025). Social media also holds the potential to guide in a new era of visibility and provide alternative platforms for enhancing online learning, especially in developing countries that lack strong online learning infrastructures like learning management systems (Sobaih et al., 2020). Through social media, students can easily connect with their instructors and acquire knowledge and information effectively.

However, educators often criticise social media because students tend to spend their time and resources on these platforms ineffectively. The quick growth of social media platforms, including Facebook, Twitter (now X), Instagram, LinkedIn, TikTok, Pinterest, Snapchat, WeChat, WhatsApp, and YouTube, jointly with blogs and various online spaces, has completely transformed how information is received and distributed, which has led to new societal patterns. As stated by Woodward et al. (2025), social media platforms offer powerful tools for learning and communication, but it has also contributed to the decline of mental health amongst teenagers and young adults.

The addictive qualities of these platforms, together with cyberbullying trends and online identity management demands have led to these outcomes. Twenge (2019) contributes to this discourse by examining the ways social media promotes surface-level interactions while decreasing direct personal communication and increasing isolation feelings. Distance learning environments make these effects especially important because students depend heavily on social media to communicate with others and collaborate while accessing educational resources.

In higher education, social media exerts both positive and negative impacts. Students find platforms such as YouTube, Facebook, and WhatsApp useful for knowledge sharing and building collaborative communities (Esteban Vázquez-Cano and Paz Díez-Arcón, 2021), but these same platforms threaten students' mental health and well-being. The combination of positive and negative results highlights why they must carefully evaluate social media's function within educational environments to understand its impact on students' information behaviour and learning experiences. Nevertheless, higher education distance learning has palpably benefited from multiple implementations of social media platforms, as evidenced during the pandemic.

Even prior to 2020, YouTube stood out as a major platform that distributed educational resources to students and teachers, including interviews with research participants. This visual and auditory engagement enhances an increasingly engaging learning environment, enriching students' understanding of the subject matter (Mazurek et al., 2019). Similarly, communication platforms such as WhatsApp have been used to establish virtual learning environments which assist the exchange of academic information and extra materials. The use of WhatsApp in e-learning has proven effective in increasing transparency and expediting the process of obtaining knowledge, providing learners with a flexible and responsive educational experience. This approach has also garnered positive feedback from participants, highlighting its potential as a supportive tool in distance learning (Mwalwanda and Mhlana, 2022). Furthermore, educational tools now include social networking platforms such as Facebook, which serve to promote collaborative learning. Academic studies reveal that students who engage in Facebook study groups tend to achieve better educational outcomes and demonstrate greater interaction than those who use traditional learning management systems. This means that Facebook, with its familiar user interface and interpersonal interactions, can have a significant impact on promoting communication, collaboration, and community among

students in a distance learning context (Esteban Vázquez-Cano and Paz Díez-Arcón, 2021). Modern education depends on the connection between distance learning and social media platforms. Social media platforms create connections between students and instructors, which builds community engagement regardless of physical distances (Kuncoro and Thaha, 2023). Additionally, social media provides flexible paths to educational resources and peer support, which helps students stay motivated and overcome isolation challenges in distance learning (Prakash and Kumar, 2024). Integrating social media into distance education requires managing challenges such as distractions and privacy concerns to achieve maximum benefits. In the context of distance learning, understanding students' information behaviour plays an important role in shaping effective educational experiences. Information behaviour refers to how individuals seek, access, evaluate, and use information in various contexts for their respective purposes (Bates, 2010). This includes behaviours such as searching for academic resources, assessing their credibility, and applying the gathered information to learning tasks. In online and distance learning environments, where students must often navigate resources independently, strong information-seeking behaviour becomes essential for academic success (Weber et al., 2020).

The field of information science, which covers the study of how information is gathered, organised, stored, retrieved, and disseminated, provides a broader framework for understanding these processes (Bawden & Robinson, 2015). Information science focuses on creating functional information systems, like databases and retrieval algorithms, that power digital tools and platforms supporting distance education. Information science principles provide the foundation for developing learning management systems in distance education, where students can obtain educational content and communicate with their peers and teachers (Shurygin et al., 2021).

Information behaviour examines user interactions with information systems and resources within the broader field of information science. Students may utilise search engines to find academic articles or interact with learning communities through social media platforms while implementing information architecture strategies to organise their online learning environment according to digital information behaviour principles (Weber et al., 2020). The concept of "sense-making" is central to this process, whereby students interpret and give meaning to the information they face, particularly in complex or unfamiliar digital environments.

Unlike traditional classroom settings where guidance is often provided, distance learners must demonstrate self-reliance in these tasks, making effective information-seeking and evaluation key for academic success (Tang et al., 2022). Moreover, information behaviour in distance learning also relates to how students manage and process digital information from social media platforms. These platforms have become significant information environments, where students not only seek educational content but also engage in peer collaboration and knowledge sharing. Students utilise social media platforms such as YouTube, WhatsApp, and Facebook to obtain academic resources and to engage in discussion and group work, which helps integrate their information-seeking behaviour (Mazurek et al., 2019; Mwalwanda & Mhlana, 2022; Esteban Vázquez-Cano & Paz Díez-Arcón, 2021).

By examining self-reported learning behaviours within the framework of information science, this research seeks to contribute to a deeper understanding of how perceived gender differences shape the ways students navigate and utilise information in distance learning settings. The research investigates student gender-based perceptions regarding educational social media use and its association with information-seeking behaviours and social learning preferences, as well as perceived digital literacy. The study integrates technological aspects of information science, including information system support for retrieval and distribution, while focusing on human information behaviour elements, such as decision-making processes for selecting digital tools for learning (Bates, 2010; Wilson, 2024).

Gender differences have long been a source of concern for researchers, and numerous studies indicate that gender differences play a significant role in ICT behaviours. The major reason for this is that different genders approach measuring the value and effectiveness of science and technology in different ways (Hsiao and Shiao, 2018). The relative importance of gender differences in distance learning in higher education to educators as references in creating courses should be reflected in the analysis of gender disparities in distance learning. This environment of the rapidly developing potentials of modern distance learning and the galvanised urgency of the pedagogical challenges and opportunities experienced in the context of COVID-19 poses numerous areas requiring constant ongoing research, and this study seeks to contribute to these literature gaps and newly emerging studies, as explained below.

In this context, it is essential to define the terms “sex” and “gender” to clarify how they are used in this study. “Sex” refers to the biological traits that are typically associated with reproductive anatomy or physiology, including chromosomes, hormone levels, and reproductive anatomy (DuBois and Shattuck-Heidorn, 2021). On the other hand, “gender” refers to an individual’s personal and internal experience of their gender, which may or may not align with their physical characteristics or assigned sex at birth (WHO, 2021). In this context, gender can be understood as “culturally contextualised social and structural experiences as well as expressions of identity” (DuBois and Shattuck-Heidorn, 2021). This study, however, uses “gender” in the traditional sense, whereby gender is cognate with biological sex, focusing on individuals who identify as male or female or identify as a gender that is different from their birth role.

Furthermore, this study recognises how both “gender equality” and “gender equity” play critical roles within educational settings. “Gender equality” refers to a societal condition where access to rights, responsibilities, and opportunities is not dictated by gender. This concept requires that everyone receives equal treatment and opportunities regardless of their gender (British Council, 2018; Rosa and Clavero, 2022). Gender equality serves as a fundamental principle to preventing gender-based discrimination and ensuring that people of all genders can engage fully in different areas of life. On the other hand, “gender equity” involves fairness and justice in the distribution of benefits and responsibilities between genders, addressing imbalances to ensure equal outcomes. Equity may require different treatments that are considered equivalent in terms of rights, benefits, obligations, and opportunities (Johnson et al., 2015; UNESCO, 2022). Throughout this study, both equality and equity are consistently used, to ensure clarity and precision when analysing gender disparities in educational settings.

Evaluating gender disparities in distance learning needs to address the immediate challenges and opportunities that educational methods face because of the pandemic. The research investigates how male and female students utilise social media along with other digital tools to expand knowledge about how educational technology achieves fair results in higher education institutions.

1.2. Pedagogical Implications of Use of Social Media for Higher Education

Social media platforms like YouTube, Facebook, and Twitter offer higher education students unlimited access to a diverse array of educational resources that help with the growth of self-learning abilities. For instance, YouTube is often used to share educational videos and lectures. A study by Patera and Khamuani (2024) found that a significant number of students in the UK used YouTube for educational purposes. This accessibility enables students to review classroom lectures, investigate complex problems, and improve their understanding of academic issues. By providing additional resources outside the curriculum, these digital platforms allow students to obtain knowledge by their learning styles. For example, visual learners might benefit from video content on YouTube, while auditory learners might prefer podcasts shared on Twitter (X).

Social networking platforms allow higher education students to interact and work together with their instructors and fellow students outside of typical educational environments. In the context of distance learning in the UK, this is particularly valuable. Group chats, messaging platforms, and online interaction forums assist learning and make it easy for students to learn new concepts. These enhanced communication methods enable collaborative learning to occur without regard to geographical location or time constraints. Social media platforms often carry inaccurate information, which blocks students from identifying credible sources and evaluating information thoroughly.

Students may be exposed to incorrect or biased information, which affects their understanding of complex concepts, leading to misconceptions and cognitive deficits. This relates to the concept of information behaviour in information science, which involves seeking and using information in different contexts (Fourie & Julien, 2019). When students face incorrect or biased information, it can alter their understanding of complex concepts, which leads to confusion and faulty reasoning. Students need to learn information literacy skills that enable them to assess online information properly (Ellis et al., 2017). Moreover, social media usage in higher education creates ethical dilemmas and additional workload challenges for academic staff members. Personal and professional life limits can become indistinct, which may result in privacy issues (Anderson, 2019).

1.3. Justifications of the Research

This study selected gender as the main variable to evaluate behavioural differences between male and female students in how they interact with social media and educational digital tools. Previous research has examined gender differences, yet most studies have investigated social media usage without a specific focus. This study examines how gender affects students' utilisation of social media and digital educational tools in higher education settings. This point makes the study unique and sets it apart from other related research.

Students across multiple academic departments at Strathclyde University are examined in this study, including learners in the Engineering, Social Sciences, Humanities, and Business disciplines. This selection includes educational fields ranging from technical to conceptual studies to enable a full investigation of how students across different areas use social media for remote education. The research takes into account "home" (i.e., UK) and international students in order to understand their diverse and unique experiences and obstacles within online education settings. Students from the UK typically understand their educational system better, whereas international students often face obstacles related to language barriers and unfamiliar UK learning practices, which intensified during COVID-19 disruptions.

Other demographics could also have been studied, but gender is the main differentiating factor, leading to the study of other demographic factors like age and ethnicity. Therefore, gender has been selected as the primary variable to investigate the prevalence and behavioural differences in using digital tools for educational purposes.

Few studies have examined how demographics affect online learning, and this field is ripe for continuous investigations of various facets, to help educational content developers, instructors, and learners achieve effective educational and personal goals. Thus, this study analyses the impacts of online learning to identify strengths and challenges, to develop suggestions to improve such pedagogical options. This research is focused on the extent to which both genders make use of social media and distance learning in higher education (i.e., it particularly explores the gender implications of novel educational technologies).

As for the matter of the research's relevance to the information science field, this research expands the input and relevance of information science to the field of distance education, as it creates and validates a direct relationship between gender differences and the use of social media (an area of information science). Social media platforms are integral to information science because they serve as effective tools for information dissemination, retrieval, and communication. The study investigates how male and female students use social media for learning to demonstrate its impact on information-seeking behaviours, digital skills development, and the influence of online networks on experiences. Additionally, this study helps reveal the way social media platforms operate as information environments that depend heavily on information science principles, including information architecture and data management, as well as user behaviour analysis.

This investigation seeks to establish how gender differences relate to social media usage and aims to enhance information science theories as applied to distance education. The study reveals the social media platforms that male and female students choose to use for educational activities. Research into user behaviour during information-seeking and information-sharing activities represents a key focus of information science study. Additionally, the study examines the frequency of interactions male and female students have with peers on these platforms, highlighting differences in communication strategies and social learning.

This analysis contributes to the field of information science by exploring how gender influences how individuals' access, process, and disseminate information in digital environments. It seeks to enrich the role of information science in improving the use of social networking websites for both male and female students. Similarly, it attempts to identify avenues wherein the use of ICT-enabled distant learning programmes can be expanded in the changing educational dynamics. The implications arising from this research can also potentially help students revolutionise their learning by allowing them to arrange their learning schedule according to their particular needs, potentially increasing global connections and educational accessibility and equality.

1.4. Research Problem

Given the ubiquitous use of social media worldwide, it is increasingly being used to incorporate aspects of distance learning in higher education. This may range from simple social media communication to augment classroom content (e.g., teacher-to-student or student-to-student communication concerning individual and group tasks, respectively), to fully online activities with their own distinct learning goals. However, social media features, gender differences issues, and methodologies remain unknown, because of the novel and constantly evolving context of social media use in online education, especially in the context of the COVID-19 pandemic, and there is an insatiable need for more research into all aspects of the current milieu (Doo et al., 2023). The use of social media such as WhatsApp in the teaching and learning process has been noted as a significant phenomenon for some years, and it has been found to improve educational quality (as indicated by numerous metrics) in various studies (Donelan, 2016; Mwalwanda and Mhlana, 2022). Furthermore, there is increased demand for social networks in the education process in tertiary settings, and their use is now necessary for raising the level and quality of education (Dermentzi and Papagiannidis, 2018).

The urgent imperative to move online following the outbreak of the COVID-19 virus forced digital learning upon traditional school systems, putting at risk the students, especially groups that might be particularly disadvantaged in the virtual classroom (Chugh et al., 2021). The United Nations Educational, Scientific, and Cultural Organisation (UNESCO) and other experts have recommended addressing the gender differences issues of educational institutions closures due to COVID-19, particularly in light of the gender gap, and endorsed the use of open educational applications and platforms, as well as distance learning programmes (IIEP-UNESCO, 2020). Consequently, institutions and teachers may reach students remotely and reduce disruptions in the educational process (Hodges et al., 2020; Nefesh-Clarke et al., 2020). As there are longstanding studies indicating that gender differences persist in the use of technologies and related skills (Kayany and Yelsma, 2000; Colley and Comber, 2003; Li and Kirkup, 2007; Campos and Scherer, 2024), it is critical to investigate gender differences in the context of the usage of social media and distance learning. This stereotyped domain has become a necessity for both males and females during this era of pandemics and beyond.

1.5. Research Aim

This research aims to explore students' perceptions of gender-based differences in the utilisation of social media and distance learning in higher education, and to examine how these technologies were experienced during the COVID-19 era and beyond.

1.5.1. Research Questions

Main Research Question: How are gender differences perceived in the utilisation of social media platforms and distance learning in higher education?

Sub-question 1: How did gender differences shape how students engaged with social media for distance learning during the pandemic, and what broader patterns in social media usage emerged as a result of higher education?

Sub-question 2: What are the implications for promoting equitable use of social media for academic purposes?

Sub-question 3: How do gender differences impact the informational behaviours of students across different disciplines at Strathclyde University during distance learning?

Sub-question 4: To what extent do male and female students engage with distance learning and online educational settings, and what differences, if any, exist in their usage patterns and preferences?

1.5.2. Research Objectives

- To understand how perceived gender differences influence the use of social media platforms for distance learning in higher education.
- To examine students' perceptions of how gender differences affected the use of social media for distance learning during the pandemic.
- To explore the implications of these perceptions for supporting the unbiased use of social media for academic purposes.
- To understand how gendered perceptions influence information behaviours of students in higher education settings.

1.6. Significance of the Research

Previous studies have been conducted to determine how social media is being used for educational purposes. The novelty of this study is to undertake a comprehensive comparison of genders in the use of social media for distance learning and distance learning itself in higher education to explore their effects on the education process, in the newly emergent context of the COVID-19 disruptions from 2020 onwards. The results will support stakeholders in deciding on scientific methods to optimise the educational process. Additionally, this research contributes to the growing body of knowledge on social media and distance learning in higher education.

Furthermore, this study enhances information science knowledge through its investigation of student information-seeking, sharing and processing behaviours within digital learning settings. In distance learning settings, information behaviour becomes important, as students must independently evaluate and utilise vast digital resources to access relevant information. The research also highlights sense-making as a key aspect of information behaviour, where students must interpret, categorise, and apply digital information from social media and other platforms to support their learning objectives. This research also contributes to the theoretical framework of distance and learning by identifying the types and challenges of the COVID-19 pandemic and beyond.

As a result, students and educational institutions will understand the advantages and disadvantages of these media, particularly during the COVID-19 pandemic. This will encourage them to use them more effectively while limiting the negative consequences of their use. The study's findings also highlight some of the general barriers that affect or lead to the avoidance of distance learning in higher education. Identifying gender-specific barriers can enable educational institutions and individual educators and learners to be aware of them and to develop strategies to overcome them. This study offers several potential solutions that they might find useful. The goal of this study is to produce results that are unique to both genders of students at the University of Strathclyde, but suggestions with broader applications were also developed.

1.7. Thesis Layout

The remaining chapters of the thesis are organised as follows.

Chapter Two: The Research Context – Provides a general overview of higher education in Scotland, as well as specifics about the University of Strathclyde, and how the University was able to implement an effective distance learning system in response to COVID-19 during times of global adversity.

Chapter Three: Literature Review – Divided into three main sections, providing a critical review of the literature on the issue. The first portion is dedicated to the use of social media, including its various types and platforms, as well as how it can be used to higher education. The second portion discusses gender differences and its two key components: distance learning in higher education. The theoretical foundation that guides this research is also expounded in this chapter, situated in the context of existing knowledge pertaining to the field.

Chapter Four: Research Methodology – Discusses the methodology and methods used in the study. It explains why sequential explanatory methods were chosen, how the quantitative and qualitative data types were collected (via questionnaire and interviews), and how the collected data was analysed.

Chapter Five: Survey Phase Results – Presents the main themes that emerged from the analysis of the survey data.

Chapter Six: Interview Phase Results – Presents the major findings and outcomes of the interview phase are discussed.

Chapter Seven: Discussion – discusses the survey and interview findings in detail, relating them to existing knowledge to compare and contrast the emergent study outcomes.

Chapter Eight: Conclusion – Concludes the thesis by presenting the study's contributions and implications. It also acknowledges some of the study's limitations and points the way forward for future research. Finally, the appendices provide additional information about the data collection and analysis processes, and procedures used in both phases of the study.

1.8. Chapter Summary

The current chapter posits the background against which this study was conducted, explaining the research problem and its significance, particularly for higher educational institutions and learners of both genders. The study's key objectives and research questions are adumbrated, and an overview of the remainder of this thesis. The following chapter offers a reflective analysis of the thesis's overall theme and research context.

Chapter 2: The Research Context

2.1. Introduction

Academic institutions globally contribute significantly to career growth through teaching students' essential professional skills and knowledge. In response to the COVID-19 pandemic, universities throughout different regions demonstrated their flexibility by moving to online teaching platforms, which allowed them to maintain continuous educational services amid major interruptions. Post-pandemic recovery depends on higher education because it focuses on developing critical thinking abilities and creative skills through multidisciplinary methods. The educational differences between genders during the pandemic and beyond need acknowledgement. The higher education discourse incorporates the challenge of unfairness as institutions advance in their development.

2.2. Gender in Higher Education

As reported by Scott (2020), female students have predominated significantly in higher education in Scotland for over a generation, with women representing 59% of the student population compared to 41% for men, resulting in an 18% gender gap. This predominance highlights a significant trend in Scottish higher education, where women have made substantial progress in access and participation.

The ongoing challenges they experience remain unchanged despite these facts when compared to their male peers. Male students maintain their dominant status within the most socially privileged groups. The rise in Scottish Index of Multiple Deprivation (SIMD20) applications in Scotland is largely attributed to increased female participation, since 16.9% of women from deprived regions sought help compared to 14.3% of men. Furthermore, female students in Scotland are more likely to persist in college than male students, contributing to higher retention rates. Despite this, the percentage of students graduating with "good degrees" (first-class or upper-second-class honours) does not always reflect these trends. Gender disparities in academic fields remain particularly stark within the Scottish higher education landscape. Women constitute 86% of first-degree students in allied medicine and reach 85% in education; yet, they remain significantly underrepresented in male-dominated fields, with computer science having 82% men and engineering and technology having 81.5% male students. The existing

discrepancies highlight the ongoing challenges in achieving balanced gender representation across specific academic fields.

According to Advance HE (2023), the UK's higher education data reports track gender inequalities across subject areas. They also reveal that the UK has taken positive steps towards reducing these inequalities, but underline that significant challenges persist. The Equality Challenge Unit awarded the Athena SWAN Charter to institutions whose self-assessment indicates they are committed to equal opportunities for gender. Their primary focus is science, technology, engineering, medicine, and mathematics (STEM) subjects in higher education and research. The UK Parliament has investigated equality of access and outcomes in higher education in England in its 2023 report. The report examined how higher education is now more than twice as likely to be attended by women compared to men, with women overrepresented in education, health, and social work, but underrepresented in STEM fields (Ovseiko et al., 2017; UK Parliament, 2023). This research highlights the need to address structural and cultural barriers entrenched within institutions and policies that continue to generate significant gender differences in participation, outcomes, and experiences, including women's underrepresentation in some of the most important areas of higher education.

The British Council's (2022) report highlights the global need to address gender inequality in higher education. Even though more women are joining higher education institutions, women mostly enrol in certain fields and face continuing differences in career results and advancement opportunities. The report reveals that higher education systems show and strengthen gender inequality through unequal access opportunities, restricted resources, leadership underrepresentation and ongoing gender-based violence targeting both staff and students. The report advocates for joint action among policymakers, higher education institutions, and various stakeholders to modify discriminatory gender norms while addressing the practical obstacles that predominantly affect women. Through case studies and policy recommendations, this report directs institutions toward establishing equitable systems.

2.3. Strathclyde University's Commitment to Equality and Diversity

Strathclyde University's Access, Equality, and Inclusion service is committed to encouraging an inclusive community where everyone can succeed. Through the development of policies, training programs, and advisory support, the service ensures that diversity and equality remain central to the university's goal of providing an environment of respect and opportunity for all (Strathclyde University, 2024a). For example, decolonisation by the internship, developed by the Gender Equality, Diversity and Inclusion (GEDI) committee of Strathclyde's Faculty of Humanities and Social Sciences, to facilitate the creation of a resource for academics aimed at decolonising the curriculum (Ali et al., 2022).

Strathclyde University also participates in the Athena SWAN Charter, a charter that runs across universities worldwide, which has been beneficial in advancing gender equality in higher education and research. An institution can earn these Athena SWAN awards, and there are five categories. Strathclyde University has won several awards; the Athena SWAN Charter recognises advancements towards improving gender equality: representation, progression and success for all. The charter also advocates for recognition of higher education and research organisations that address gender equality in its entirety. Strathclyde is an award-winning promoter of women in science, technology, engineering, mathematics and medicine (STEMM). The university has also won established institutional departmental prizes in arts, humanities, social sciences, business and law (AHSSBL). This demonstrates Strathclyde's commitment to promoting equality in all aspects of its work (Strathclyde University, 2024b). According to Xiao et al. (2020), the Athena Scientific Women's Academic Network (SWAN) has been promoting and acknowledging the progress of women in higher education institutions (HEI) since 2005. This is accomplished through the execution of a charter commitment, the allocation of awards, the delivery of training, and proactive advocacy. The institution consistently produces equality and diversity reports that offer comprehensive insights into its initiatives and advancements in fostering equality and diversity. These studies encompass statistics on diverse equality metrics, evaluations of the efficacy of existing policies, and proposals for future initiatives. By transparently sharing this information, the university demonstrates its commitment to responsibility and continuous improvement in the areas of equality and diversity (Strathclyde University, 2024c).

2.4. The COVID-19 pandemic

2.4.1. A Brief History of COVID-19

The COVID-19 pandemic of late 2019 altered the world. Understanding the genesis and transmission of this virus is crucial. In December 2019, a viral epidemic in Wuhan, China, spread worldwide, triggering the pandemic we are currently experiencing. One infected individual can infect up to three others, spreading the virus worldwide. Before vaccines and treatments were widely available, the COVID-19 virus had a devastating impact on global health and economies worldwide (Ciotti et al., 2020; Brouwers et al., 2021).

2.4.2. The COVID-19 Pandemic in Global Health Crisis

COVID-19 has disrupted worldwide health, politics, and society. The epidemic was "one of the greatest health shocks in the previous century." The coronavirus has caused a "substantial reduction in life expectancy," with an anticipated 3.7 million deaths by July 2020. Furthermore, the epidemic and lockdowns disrupted almost 80 million hospitalisations and medical visits, and these interruptions have long-term effects on global health, affecting healthcare services and access to crucial drugs and equipment (Liu & Lee, 2020). In addition to these challenges, Williams et al. (2020) identified some beneficial social changes that emerged during the COVID-19 lockdown, alongside existing challenges. The COVID-19 lockdown prompted some positive social transformations, which included an increase in physical activity and the adoption of new health-related practices among specific groups. The pandemic resulted in beneficial changes for some populations but revealed social impact disparities since different groups experienced varied effects from the global health emergency.

Governments have had to move rapidly to reduce the worldwide effects of the coronavirus outbreak. Syropoulos and Markowitz (2021) argued that governments needed to prioritise public health and safety during the COVID-19 pandemic. The recommended response strategies should address the particular needs of populations according to principles of equality, transparency, and timeliness. The group highlighted that governments should face accountability for their delayed or inadequate responses to crises. Governments received guidance to examine how the pandemic impacted economic conditions as well as social and psychological well-being. The findings demonstrate how governments must help create effective pandemic responses through careful planning and meaningful engagement.

Additionally, COVID-19's long-term consequences on world health are complex. Wagner (2022) states that the pandemic had significantly influenced healthcare systems, particularly in the global south. The epidemic has disproportionately affected these nations in terms of death and health care. Healthcare disruptions in these nations have worsened health inequalities and increased poverty and social marginalisation. The epidemic caused mental health damage predominantly among people who are economically and socially isolated. The epidemic will create enduring psychological and physical effects on global health systems. The pandemic highlighted our need for more global health funding into fair and resilient health systems. International cooperation will become essential to address global health needs in response to COVID-19's extended impact on worldwide health.

The COVID-19 pandemic has had its impact in higher education, in the UK and globally too. In the UK, with the pandemic, learning accelerated into online courses, and this made things challenging for students as well as for teachers. Students exhibited reduced satisfaction with their academic and social experiences over the autumn season 2020, the Office for National Statistics report, and more than half indicated that their mental and physical health had become worse following the pandemic (ONS, 2020). Quality and quantity of education dropped, and students had problems finding the right resources to study online (GOV.UK, 2021). COVID-19 greatly influenced higher education globally. More than 220 million university students were disrupted in their learning, according to a UNESCO survey. The pandemic also expedited the digital transformation of education and more hybrid methods of teaching (UNESCO, 2021). But it also pointed out and compounded inequalities that were already prevalent because students from lower-income communities were less equipped to have digital devices and stable internet Azıonya and Nhedzı (2021). The pandemic also interrupted research and international student mobility, further straining the education system (Mok, 2022; Roshid and Ibna Seraj, 2023). The long-term effects of these disruptions are still emerging, although it is certain that the epidemic has prompted a reassessment of global higher education systems. There is an increasing necessity for investment in digital infrastructure, assistance for educators, and legislation that tackles the inequalities in educational access. Global collaboration and strategic measures will be essential for the adaptation and flourishing of higher education in the post-pandemic age (Farnell et al., 2021).

2.4.3. Impact of Novel Coronavirus (COVID-19) in Scottish Higher Education

The novel coronavirus (COVID-19) pandemic has profoundly and unprecedentedly impacted various aspects of human life, including higher education in Scotland. The virus outbreak has greatly impacted universities and colleges in this region. Webb et al. (2021) presented research on the negative impact of the COVID-19 pandemic on Scottish education. According to the survey results, the outbreak reduced the number of overseas students, which decreased the tuition revenue of Scottish universities. Prospective students decided against enrolling in Scottish universities during the pandemic due to future uncertainties. The transition to suboptimal online education platforms blocked Scottish students from receiving a proper education. The quality reduction in Scottish universities during this period may have had extended economic effects on Scotland, as academic standards directly influence societal developments (Scottish Government, 2020; Maddumapatabandi, 2020).

In contrast, Armstrong (2023) argued that Scottish universities, rather than experiencing financial losses or decreased enrolment, managed to retain and even enhance their income growth during the COVID-19 pandemic. The University of Glasgow rapidly expanded its student body and financial resources to become Scotland's largest university and the third largest in the UK by student numbers during the pandemic, while leading the Russell Group. This growth was primarily driven by a wave in international student enrolment, predominantly from Asia and Africa, which generated £1.7 billion in revenue from tuition fees in 2021 and 2022 (Armstrong, 2023).

The Scottish higher education sector continues to focus on designing and delivering practical online courses and learning materials while ensuring adequate support for students and staff. The epidemic has also necessitated that universities and colleges develop new testing and evaluation methods to maintain high learning and teaching standards. The loss of the “campus experience” affects university social life. The Scottish higher education sector prioritised creating effective online courses and supporting students and staff as essential tasks during the pandemic. The requirement emerged for universities to develop new methods for testing and evaluation to sustain superior standards of teaching and learning. The discontinuation of the “campus experience” notably impacted university social interactions, highlighting the importance of student well-being beyond academic achievements (Education Scotland, 2021). As Williams et al. (2021) reported, positive behavioural adaptations during the lockdown period included increased physical activity and better health practices among specific student groups.

Colleges have developed methods to sustain student motivation in academic pursuits while also offering support mechanisms for stress and anxiety.

2.4.4. Impact of Novel Coronavirus (COVID-19) at Strathclyde University in Particular

The COVID-19 pandemic brought about significant changes at the University of Strathclyde. The institution implemented distance learning programs, which produced distinctive educational experiences for its students. According to Williams et al. (2020) distance learning produces both positive and negative impacts on students. Students experience motivation when distance learning permits them to study at their own speed, as reported in the research. Student performance suffered in distance learning because of technological challenges, reduced face-to-face interaction, and increased workload, as the study found. These difficulties blocked student learning and assignment completion (Williams et al., 2021). In addition to the findings by Williams et al. (2021), studies by Crawford et al. (2020) and Watermeyer et al. (2021) also addressed similar challenges faced by students globally. Inadequacies in high-speed internet and access to digital devices presented major technological issues. Due to separation from face-to-face interaction, students' mental health and academic motivation suffered (Crawford et al., 2020; Watermeyer, 2021).

The University of Strathclyde students experienced mixed outcomes from their distance learning experience. The new study control system allows students to learn more quickly while saving money and working more effectively. Distance learning allows students to pursue their educational development at their own pace, combining online lectures with tutorials and assessments. It enables students with employment and familial responsibilities to manage their academic and personal commitments effectively (Hodges et al., 2020; Williams et al., 2021). The shift to remote learning also presented numerous difficulties. Students faced technological barriers, including inconsistent internet connectivity and a shortage of suitable digital devices. Students, however, experienced feelings of isolation and missed out on academic support because they were unable to communicate face-to-face with their peers and teachers. The absence of direct interaction between students and faculty created feelings of isolation and reduced academic support, which contributed to heightened learning difficulties (Aristovnik et al., 2020).

The COVID-19 pandemic has required the building of a strong distance learning system at the University of Strathclyde, allowing students to safely and economically continue their studies during the outbreak. The implementation of this system has enabled students to remotely access education materials, resulting in time and cost savings associated with commuting. Additionally, it has offered a safer learning environment amidst the pandemic (Williams et al., 2021; Bao, 2020). The University of Strathclyde's response to the COVID-19 pandemic highlights both the advantages and challenges of implementing distance learning in higher education. It is essential to continue making efforts to address these issues and enhance the distance learning experience to ensure future educational flexibility. Savage, Morrissey, and Hasty (2021) illustrated practical examples of such efforts. For example, in the DM101 course (Integrating Studies 1), a hands-on, activity-based class at Strathclyde. Due to the pandemic, the course was restructured into an online format, maintaining its focus on practical skills despite the lack of physical workshops and labs. Furthermore, through innovative planning, the teaching team ensured that learning outcomes were not compromised, a success reflected in positive student feedback and high evaluation scores.

Additionally, the Civil and Environmental Engineering department implemented a program called CEE (Creative Education and Experience) to enhance online teaching. The program consisted of weekly, informal drop-in Zoom sessions for staff involved in online teaching, designed to address challenges and find solutions. This case highlights the potential for effective online learning, even in traditionally hands-on disciplines, when supported by thoughtful course redesign and institutional support.

2.5. Strathclyde University Faculties

UK-based Strathclyde University is known. Its faculties and departments provide high-quality degrees in business, engineering, science, and law. The university has four faculties and departments: Engineering, Arts & Social Sciences, Science, and Strathclyde Business School (Strathclyde University, 2022). Strathclyde also researches energy, industry, and health. Time Higher Education (THE) (2022). Multidisciplinary research helps Strathclyde University faculties. Interdisciplinary study helps us grasp the world and its intricacies (Strachan et al.,2021). Faculty recruitment affects university student achievement. In a study conducted by Comi et al. (2017), faculty recruitment at Strathclyde University aims to identify the most suitable individuals and provide a diverse and inclusive learning environment. These processes examine qualifications,

experience, and instructional approaches. Qualified and experienced faculty members can assist students to succeed by providing them with academic guidance. Diversity and inclusion boost student engagement, motivation, and success. Hence, Strathclyde University's faculty recruiting processes are fundamental to ensuring a successful learning environment.

2.5.1. Transition to Distance Learning System During COVID-19

The COVID-19 pandemic forced several universities to adjust to distance learning, including the University of Strathclyde. The University of Strathclyde developed a flexible, accessible, and durable distance learning system despite adverse circumstances (University of Strathclyde, 2024). The University of Strathclyde promptly adopted distance learning methods in response to the COVID-19 pandemic. The university has maintained its operations through distance learning, which allows protection of both student and employee health and well-being. The University of Strathclyde emerged as a developer in the United Kingdom by fully adopting distance learning protocols (University of Strathclyde, 2020).

The university now delivers high-standard courses which follow identical teaching and assessment standards to those used on campus. The university offers accessible education, allowing students to learn from any location with internet access. The university has now gained the ability to attract students from various backgrounds and geographical regions (University of Strathclyde, 2020). The university can now educate students who face financial or location-based challenges that prevent them from attending campus-based classes. University staff have enhanced both their educational approaches and instructional materials through distance learning. The institution has equipped its personnel with the necessary skills and resources to provide students with the same level of teaching and learning as on campus (University of Strathclyde, 2020).

2.5.2. Social Media Usage in Distance Learning

Social media has become widely recognised as a key platform for both communication and news distribution in recent years. Students and staff at the University of Strathclyde now have expanded opportunities for interaction and collaboration due to increased usage of various social media platforms and services. The study by Alshahrani and Pennington (2019) demonstrates that widespread social media usage has transformed student interactions among themselves and with their instructors. Research conducted by Sweeney et al. (2017) demonstrated that social media applications for learning

purposes enhance students' communication abilities and technical expertise, while providing deeper subject knowledge and motivation to engage with course materials. The research also demonstrated that the educational use of social media platforms enhances students' communication skills and technical expertise, while expanding their subject knowledge and deepening their engagement with learning content. The University of Strathclyde has extensively debated the impact of social media on distance learning over recent years. This is since social media use has revolutionised how students interact with each other and access learning materials. Recent research has found that students using social media in their distance learning have improved grades, better learning outcomes, and increased engagement (Brady, Holcomb, & Smith, 2010; Beltran-Cruz & Cruz, 2013; Alghizzawi et al., 2019). The results of the studies suggest that social media can be a valuable tool for educators at Strathclyde University and other institutions seeking to enhance student engagement in distance learning. Social media use in Distance Learning at Strathclyde University has been a successful tool for students during the pandemic. It offers a variety of opportunities to maintain communication, stay connected, and discuss important topics. It also enables students to develop their knowledge and skills through collaboration, even while they are not physically present in class. Although some challenges need to be addressed, social media can provide a platform where students can gain new insights and a sense of community. This success demonstrates the potential of social media to support distance learning in both the present and the future.

Furthermore, a recent study by He and Zandi (2022) on social media use and student engagement at the University of Strathclyde has revealed some interesting findings. The study found that the use of social media had a significant positive impact on student engagement at the University of Strathclyde. Specifically, on student well-being, students reported improved levels of self-confidence and mental health when using social media. The next chapter will review and discuss the importance of social media usage and Distance Learning during the COVID-19 pandemic.

2.6. Post-COVID-19 Era

2.6.1. Expected Transformations in Higher Education

The global pandemic precipitated an unexpected surge in online learning, prompting a rapid digital transformation of universities worldwide. Colleges needed to invest resources in acquiring new technology and enhancing their IT infrastructure to facilitate a smooth transition due to this rapid change. Both students and academic staff found themselves thrust into an environment that demanded proficiency in novel technology, necessitating rapid adaptation to innovative methods of instruction and learning (O'Dea and Stern, 2022). The pandemic initiated an important transformation in university student support, as most subjects were taught online during the lockdown. The change represented a revolutionary movement which required educational institutions to reassess established teaching methods and student support structures. The requirement for online learning during the pandemic presented a unique opportunity to advance teaching and learning methodologies. It allowed universities to explore innovative teaching methods that incorporated technology on a large scale (O'Dea and Stern, 2022; Chen et al., 2022). However, it is essential to examine the outcomes of this rapid shift critically. How effective were these innovative methods in maintaining educational standards? Did they address the diverse needs of students across various disciplines and levels of education?

Undoubtedly, as we navigate through and beyond the pandemic, additional measures should be taken to prepare for potential comparable circumstances adequately. Analyse and contemplate the challenges experienced during the rapid transition. Moreover, research must focus on identifying the necessary prerequisites and support systems essential for a seamless transition to entirely online education in the future (Greenhow and Lewin, 2021). Effective education requires technological advancements combined with a systematic analysis of teaching methods and ongoing evaluation of these methods. Online instruction existed before the pandemic, but it achieved extensive adoption and implementation during the pandemic due to necessity. When education unexpectedly shifted to online formats, it transformed the teaching environment and raised doubts about the effectiveness and viability of these methods over time. What lessons have we learnt from this unexpected shift? How effectively did online instruction meet the diverse needs of students across various academic fields? Evidence shows that online learning has had varied success. In response to the same survey by JISC (2022), 74 percent of UK

higher education students found online learning during the pandemic had its advantages, providing 'greater flexibility'. But the report also notes that 'almost half of students (45 percent) have also raised issues such as poor internet connectivity and a lack of digital devices, limiting access to higher education. Students benefit from recorded lectures as this format allows them to review content at their own pace, thereby augmenting their learning through the ability to pause and replay sections. Similarly, Keane et al. (2022) conducted a study examining student responses to the shift from traditional classroom environments to online education during the pandemic. The research investigated student reactions to the transition from traditional classrooms to online education during the pandemic. Many students appreciated the increased flexibility from online learning, while others lost interest, especially in technical subjects like engineering and science, which require practical exercises.

Online teaching will remain a component of university operations, although most prefer a return to normal conditions and face-to-face instruction. The effects of the pandemic have drawn attention to the potential benefits of employing a blended teaching strategy that combines face-to-face sessions with digital components. The transformation of education systems presents an opportunity to thoughtfully consider future directions, rather than merely reacting to an emergency. Chattopadhyay (2023) underscores the evolving nature of higher education. The blended approach demonstrates its value by addressing the preferences and requirements of all stakeholders. The post-pandemic educational era demands a careful evaluation of traditional classroom instruction versus online learning to develop an approach that adapts easily to changing needs. UK universities moving forward must embrace a hybrid educational system which combines online learning with traditional classroom teaching. This strategy will ensure the inclusion of students with different requirements while maintaining a sense of physical presence and community in higher education.

2.6.2. Outlook for Continued Integration of Technology

The COVID-19 pandemic has highlighted unusual challenges and potential transformations for the future of education, marking a revolutionary influence. The conclusion drawn from this experience underscores the necessity of integrating technologies into future research considerations. The incorporation of digital technology is significant for promoting a resilient approach, aiding institutions, and shaping the landscape of distance learning in the post-COVID-19 future (Ratten, 2023). The pandemic has not only necessitated a rapid shift to distance learning but has also

exposed the weaknesses of traditional educational systems. In light of the consequences of this global disruption, there is a pressing need to explore innovative methods that extend beyond mere emergency measures. However, a growing movement is already acknowledging these challenges and seeking to enhance the learning experience by integrating technology. The COVID-19 pandemic necessitated an unexpected transition from in-person to online learning, forcing educators to adapt their content to this new format, despite often lacking the requisite training or pedagogical background (Rapenta et al., 2020; Collins, 2023). Moreover, learning management systems and video conferencing were utilised before the COVID-19 pandemic, but Zoom and other interactive systems were also used. Students might observe classes and offer comments and emoticons to express themselves. Following the COVID-19 pandemic, face-to-face teaching has gradually resumed, but many disciplines continue to be taught online. New technologies, such as artificial intelligence and augmented reality, have revolutionised digital technology (Ratten, 2023). This finding inspires further research into the use of digital technologies in teaching and learning. The pandemic has also revealed significant gender differences. Women, for instance, have faced increased unpaid care work and higher rates of job loss compared to men (Power, 2020). These gender-specific impacts underscore the need to integrate gender perspectives into educational research and practice. What inventive methods have emerged as effective responses to unprecedented disruptions? In a post-pandemic educational context, how can institutions use digital technology to adapt and succeed? These key concerns invite scholars and practitioners to thoughtfully examine the changing role of technology in education (Okoye et al., 2023).

2.6.3. Implications for Gender Trends in Post-COVID Education

As time passes and humanity emerges from the COVID-19 era, the far-reaching effects of the disease in various domains become increasingly apparent. The education sector requires our attention because of the rising gender disparities that appear in this new environment. The post-COVID-19 era has increased gender disparities in education, which affects online learning experiences across genders, while also impacting academic achievement, work-life balance, and accessibility to educational resources. Understanding gender differences in education requires an analysis of participation rates, alongside access to technology and academic outcomes. Saw et al. (2020) found that the pandemic worsened gender education differences. Second, student issues related to distance learning have unequally affected females. In addition to distance learning, gender differences are also influenced by limited technology and internet

connectivity, higher household responsibilities, and societal norms that favour males' education over females. Third, the gender gap in education has grown due to these discriminations. Women who lack access to devices or the internet face difficulties participating in virtual classes and completing their assignments. Additionally, the growing load of household and caregiving tasks has created extra stress for females, which prevents them from fully participating in distance learning. Williams et al. (2021) also found that throughout the pandemic, social behaviour changed, including health awareness and participation in new activities, although these changes varied among social groups. Women who carried greater home and caregiving burdens found their educational opportunities more restricted because of these changes, which exacerbated the existing gender gap in education. A range of approaches exists to address gender disparities in education following the COVID-19 pandemic. González-Sánchez et al. (2021) found that focused interventions improved women's education. Women who face academic challenges can access scholarships and financial aid, along with instructional initiatives and targeted educational programs specific to their gender, as well as behavioural support. The transition beyond COVID-19 requires us to recognise and focus on emerging educational gender disparities. Recognising the distinct challenges each gender encounters after the pandemic allows us to create effective solutions and build equitable educational settings.

2.7. Chapter Summary

This chapter explores Scottish higher education, with a specific focus on the University of Strathclyde's role. The chapter also examines how the university effectively moved to distance learning during the COVID-19 pandemic and its effects on both students and staff. The chapter demonstrated how social media enhances online learning and emphasised the need to address gender disparities in shaping the post-pandemic future of distance learning. This section of the chapter analysed gender disparities within UK higher education and found that women dominate education and healthcare sectors but face under-representation in STEM areas. Strathclyde University's commitment to equality and diversity was underscored, with the institution promoting a perfect environment through dedicated access and equality. The next chapter of this thesis will go deeper into the role of social media in higher education and its intersection with distance learning, with a particular emphasis on gender disparities and how these may influence educational outcomes.

Chapter 3: Literature Review

3.1. Introduction

In recent years, social media has penetrated all forms of organisations and institutions to aid communication, research, and the transmission of information. Higher education institutions have adopted the phenomenon like other institutions and organisations. For instance, higher education institutions utilise social media platforms, including networking sites and blogs, to demonstrate how their administrators and educators achieve institutional goals. The rapid increase in social media use presents substantial opportunities for higher education institutions to enhance their educational methods and programs. Students develop technological proficiency through social media usage, enabling them to deepen their knowledge and enhance participation and engagement in educational activities. Additionally, social media platforms now enable students and teachers to share educational content more effectively than before. Research on the educational use of social media in higher education remains sparse, with a particular focus on the impact on gender. Research studies tend to focus primarily on the broad functions and effects of social media platforms. The way male and female students participate in online educational activities and social interactions through social media platforms varies based on gender-specific usage patterns. Studies reveal that female students tend to use social media more frequently for educational purposes, including assignment completion and interaction with teachers.

In contrast, male students often use it for enjoyment and social interactions. The differences reflect that gender significantly influences the utilisation of social media in educational contexts. Therefore, this chapter aims to analyse existing literature to determine gender differences in social media use for distance learning within the academic sector. It includes a summary of information behaviour, incorporating sense-making and relevant theoretical frameworks. In understanding these gender-based differences, educators and institutions can more effectively customise their strategies to help all students. An important role is played in the utilisation of social media within educational settings.

3.1.1. Approaches for Conducting a Literature Review

3.1.1.1. Approach and Scope Strategies:

The present study employed a narrative review approach to conduct the literature review. The process was designed to provide academics with a resource to read on the topic, covering various themes and perspectives. The literature search drew on numerous theoretical and empirical articles in journals, books and relevant conference proceedings. As social media technologies, platforms, and user trends have advanced rapidly, it was a deliberate decision to limit the literature search to the past five years, ensuring that the review encompasses all the latest developments and trends. Although social media is indeed fast-changing, more recent research tends to provide a more accurate representation of the latest shifts in platform functionality, user patterns, and the effects of these new technologies on learning contexts. Moreover, focusing on recent literature helps address the time gap associated with the publication process, ensuring that the findings and discussions remain relevant to the current educational and technological landscape. This approach provides a more accurate and timely analysis of how modern social media practices influence distance learning and gender differences in higher education. The inclusion criteria focused on studies that directly addressed the research questions and provided substantial insights into the topic. Relevant methodologies, including case studies and both qualitative and quantitative approaches, were considered. Conversely, studies not written in English were excluded. The search process involved utilising multiple databases, including ProQuest, ERIC, Scopus, and Web of Science, using a combination of keywords such as "**Social Media**," "**COVID-19**," "**Gender Differences**," "**Higher Education**," and "**Distance Learning**," along with controlled vocabulary specific to the research topic. Additionally, a manual search was conducted by reviewing the reference lists of relevant articles to identify any additional sources that might have been missed during the initial search.

3.1.1.2. Selection and Evaluation Strategies

The selection and evaluation process for the literature review involved a systematic approach to ensure the inclusion of high-quality and relevant sources. The criteria used to determine the quality and relevance of the literature included multiple factors. Firstly, the study design played an important role, with preference given to quantitative studies during COVID-19 for their ability to provide measurable and generalisable data. However, qualitative studies were also prioritised, offering deep insights into human experiences, perceptions, and behaviours. Additionally, the methodological accuracy of the studies was assessed, considering factors such as the clarity of research objectives, appropriateness of data collection methods, and transparency of data analysis procedures. The significance of the research questions and objectives was also a crucial factor to consider. Priority was given to studies that directly pertained to the research topic and offered significant insights.

3.2. Information Behaviour and Sense-Making

Information behaviour refers to the whole area of information seeking, information processing and information use in all situations (Wilson, 1997). At the heart of this is "sense-making," the way people make sense of what they are learning. Sense-making applies in complex, uncertain, or new situations where understanding is not always immediate. It involves an active process of navigating through ambiguity and complexity, enabling individuals to construct meaning and reorganise information in a way that aligns with their unique context and needs (Dervin, 1998). According to Brown et al. (2015), sense-making is a significant aspect of how individuals navigate and interpret their environments, particularly within organisations. In the context of distance learning and social media use in higher education, sense-making becomes a vital process as students interact with huge amounts of information online. In order to achieve academic success, individuals must actively analyse and successfully utilise this information. Moreover, sense-making is not just a passive reception of information but an active process involving the reconstruction of meaning based on personal experiences, social interactions, and cultural contexts. Dervin (1998) expands on this by highlighting that sense-making is contingent upon the actor's orientation, whether relating to oneself, another individual, or a collective, each interaction influencing how meaning is constructed within a specific context. Gender further influences this process, as individuals of different genders may approach and interpret information differently,

particularly in technological settings. The intersection of information behaviour and sense-making is key for understanding how students engage with digital learning tools and platforms. By prioritising the analysis of how students interpret the content they come across on social media platforms, this research can shed light on the cognitive and social processes underlying effective learning in online environments (Lim and Richardson, 2016; Naga Venkata Sai Sri Durga and Sandra Carmel Sophia, 2023). Beyond sense-making, other forms of information use, such as information sharing and collaborative learning, are also significant. These behaviours not only assist knowledge acquisition but also enhance the sense-making process by allowing students to co-construct knowledge with their peers. Gaining extensive knowledge of these processes is essential for educators and policymakers aiming to design more effective digital learning environments that meet varied student needs (Savolainen, 2019).

3.3. Social Media

3.3.1. Definition of Social Media

Social media is a global tool in today's society, defining and influencing individuals' daily lives. From Facebook to Twitter to Instagram, it is easy to see how much of an impact this technology has had on daily lives and communication patterns. In 1994, a Tokyo online media environment called Matisse first used "social media". The term "social media" (SM) is generally used to refer to a wide range of online platforms, including blogs, business networks, collaborative projects, enterprise social networks (SN), forums, microblogs, photo sharing, product reviews, social bookmarking, social gaming, SN, video sharing, and virtual worlds (Aichner et al., 2021). A study by Giglio et al. (2019) demonstrates that social media has significantly impacted modern society. While the internet was only a few decades old when the study was conducted, social media has transformed how individuals communicate with one another and consume information. Individuals can now communicate with anyone on the globe, even if they have never met in person. Social media has made it easy to stay updated with news and cultural events and instantly access or trade information. The technology revolution produces massive volumes of data daily, and social media has helped people become more educated and establish their perspectives on current events. Social media has greatly influenced society. Facebook and similar social media platforms now serve as essential tools for staying in touch with family and friends, participating in public discussions, and finding communities that share interests. This has helped people connect and spread their ideas, breaking conventional media barriers. It has also helped promote news, civil involvement, and cultural and political understanding (Zsila and Reyes, 2023). According to Aichner et al. (2021), researchers' interest has modified the definition of social media from 1994 to 2020. (see Appendix A). Instead, negative effects on society via social media are also possible. It raises the risk of being bullied online, leads to inflated expectations, and even compromises our security. Social media's effect is equal to that of any tool since its results depend on its application, which can lead to both advantageous and harmful outcomes. Because of this, avoiding harm when using social media and acting appropriately is essential.

3.3.2. Types of Social Media

Social media is everywhere; they are part of modern communication, learning, and sharing. Facebook (Meta), Twitter (X), Instagram, WhatsApp, YouTube, LinkedIn and Snapchat changed the face of interaction in universities and other fields of study. Subsequently, these new platforms like TikTok, Instagram Reels, Clubhouse, and numerous others are extremely popular among the younger generation and are very applicable to a university. These platforms are chosen because they are widely used in a student population of university age. After all, a representative evaluation of the role of social media in teaching and learning can be done.

During the COVID-19 era, these platforms enabled the faster dissemination of vital knowledge, relevant scientific findings, and global comparisons of methodologies (González-Padilla and Tortolero-Blanco, 2020; Tang et al., 2021). The pandemic also contributed to a rapid increase in social media usage due to mandatory online education, prompting researchers to examine the relationship between social media and higher education in response to new educational challenges (Sengupta and Vaish, 2024). These platforms allow users to share views, opinions, and experiences, but present limitations. Sun (2023), for example, discovered that social media affects mental health and leads to depression, anxiety and loneliness. All these disadvantages are outweighed by all the advantages that social media can offer, from enabling people to stay connected to providing messages and awareness of good things about essential issues. To emphasise classifications, the most popular categories will be explained;

3.3.2.1. Social Networking Sites (SNSs)

Internet SNSs and their use are problematic. SNSs had more than three billion users in 2020, tripling in size over the previous ten years from 970 million users in 2010. By then, 49% of the world's population had used SNSs (Williams et al., 2020). The most popular types of SNSs are Facebook, Twitter, Instagram, Snapchat, and LinkedIn; Facebook is arguably the most popular SNS, providing a platform for users to share photos, post updates, and keep in touch with friends (Masciantonio and Bourguignon, 2023). Moreover, Twitter (X) is another popular SNS allowing users to share short messages and follow others. Instagram is a popular photo-sharing platform where users can post pictures and videos for their followers to see (Laor, 2022). LinkedIn is also a social media platform for professionals to network with one another and discover job opportunities anywhere in the world (Cho and Lam, 2020). Some people use and benefit from each of

these SNS services in different ways. According to Smith (2019) at the Pew Research Centre, 72% of Americans have Facebook, 31% have Instagram, 24% have LinkedIn, and 22% have Twitter. These data show that Facebook is the most popular SNS. Each place has pros and cons. Facebook allows friends and family to connect worldwide but also annoys and procrastinates. The strength of Twitter is breaking news and trends, but it is also a hub for misinformation and hate speech. Instagram is excellent for creating content, but it can also make people jealous and make them compare themselves. Instagram is fantastic for creative material, but it may cause jealousy and comparison. Eventually, YouTube may provide great enjoyment, but also harmful stuff (Congressional Research Service, 2020). Gender users determine how to use social media correctly. TikTok is a social network platform created in 2016 with millions of active users daily (Masciantonio et al., 2021). TikTok is no less like YouTube (video sharing) or Instagram (the necessity of having a straightforward user interface), as well as being able to make and share short videos. Despite the matches, TikTok distinguishes itself by presenting a platform where consumers can discover novel and randomly generated content from unfamiliar individuals globally and by offering easy video production tools that allow users to become content creators (Miranda, 2024).

3.3.2.2. Microblogging Sites Internet

Microblogging is effective and popular. Microblogging has grown from message boards and chat rooms to Twitter, Instagram, and Tumblr. Twitter and Instagram have grown in popularity in recent years. Alshalawi (2022) found that these platforms offer educational and professional benefits to users. Through microblogging systems, users can distribute their resources and ideas to broader audiences, thereby achieving greater visibility. Other platforms enable users to form professional connections and work with individuals with similar interests. Microblogging systems also enable users to track industry trends and stay current. Microblogging systems are helpful for education and work, as shown. Microblogging systems have grown in popularity. They can rapidly spread information and engage a broad audience. Warbung et al. (2023) found that microblogging platforms benefit enterprises. Microblogs boost brand exposure, customer loyalty, and consumer engagement.

3.3.2.3. Content Communities

Content communities are a great way for people to share and receive information. Individuals live in an age where information is readily available, but the various types of content communities allow for more in-depth information than can typically be found through general internet browsing. From these content communities, users can access up-to-date information from a range of sources and engage in meaningful conversations. One of the most popular content communities is YouTube, with over 1 billion registered users, and YouTube allows users to upload unlimited videos, comment, and rate other videos (Farag et al., 2020). Digital technology enthusiasts can profit from popular content communities. Virtue, Maddox, & Pfaff (2019) found that communities can help people network and learn. Content communities allow users to exchange ideas, ask questions, and discuss their interests. This fosters collaboration and exchange that benefits both individuals and the community.

Content communities include online tutorials, discussion forums, and networking events. Content communities enable individuals to connect with peers who share their ambitions, which can lead to new job opportunities and career advancement. Membership in content communities provides professional growth opportunities and enables individuals to expand their knowledge and build significant relationships with people who share similar interests. The development of the digital age has led to multiple content forms circulating within digital communities. As Malinen (2015) discussed in his research, these types of content communities can majorly impact digital communities. It is found that content communities can largely shape digital communities' values, knowledge, and lifestyles. For instance, content communities that focus on specific topics, such as health and fitness, fashion, or lifestyle, can lead to digital communities that are more focused on these topics. Content communities that focus on specific themes may also lead to digital communities that discuss and debate these issues. Digital groups that consume and exchange entertainment or news information are also more inclined to do so. In conclusion, content communities' material may greatly influence digital communities' values, knowledge, and lifestyles.

3.3.3. Pros and Cons of Social Media in Education

Social media's potential to revolutionise education lies in its ability to facilitate real-time interaction, promote collaborative learning, and enable students to access information. Platforms such as Facebook, YouTube, and Twitter have enhanced opportunities for cooperative education, digital literacy development, and even academic identity formation (Willems et al., 2018; Li and Wong, 2021). However, the rapid expansion of social media in educational contexts raises critical issues, including concerns about privacy, misinformation, and the widening digital divide (Amjad et al., 2024).

The ability of social media to enable immediate communication is the primary benefit to the education sector. Student-teacher interactions benefit from immediacy because it allows for immediate clarification of misunderstandings and instant feedback delivery. As cited by Khan (2021), the use of various social media platforms, such as WhatsApp, plays a significant role in synchronous learning, as well as facilitating live chats and collaborative projects. Educational quality in blended and online classrooms improves when such tools enable students to engage in real-time conversations and collaborative activities. Social media enables learning through collaborative student projects and resource sharing and allows students to receive feedback from their peers. Essential thinking and problem-solving work best when implemented through this collaborative approach. Vandeyar (2020) states that social media can also facilitate virtual learning communities where students feel more supported and connected, resulting in improved academic outcomes. Another advantage is the growth of digital literacy. As students navigate social media platforms, they develop proficiency in information literacy and online etiquette, acquiring essential skills that are highly valued in today's workforce. As Wong et al. (2021) point out, these competencies are also important for students' future employment, as digital literacy is becoming required for various professions.

However, the rapid growth of social media in educational settings brings significant concerns, particularly regarding privacy. Integrating social media into education often involves exchanging personal information, potentially compromising students' and educators' safety and security. Marín et al. (2023) highlight the risks associated with data breaches and emphasise the need for strong privacy policies to protect user data. Misinformation is another significant issue. Social media platforms share massive amounts of information, including false and inaccurate content. In educational environments where precise information is essential, false or misleading data becomes

particularly damaging. The study by Topal and Shargh (2023) highlights that educators should instruct students in evaluating source credibility and identifying trustworthy information.

Additionally, the digital divide remains a persistent challenge. Disparities in access to the internet and technological devices among students could worsen pre-existing inequality. This difference may restrict some students' capacity to engage entirely in social media-based learning activities. Bakkar and Ziden (2023) urge institutions to address these differences by providing access and assistance to all students accessing digital learning technologies. Although there are many positives to social media in education, such as increased interaction, learning, and digital literacy, there are also downsides, including privacy issues, fake news, and the digital divide. With these concerns addressed and best practices, the educators could prepare the power of social media for a more engaging and efficient learning experience.

3.3.4. The Utilisation of Social Media in Higher Education

Social media has been transformed from its original aim of communication into a highly effective teaching and learning platform in higher education (HE) (Perez et al., 2023). Its incorporation into HE teaching and learning has become a particularly hot topic for improving student engagement, communication, and collaboration (Anderson, 2019). One of the most significant benefits of social media in higher education is that it can foster greater engagement among students. Research shows that social media can significantly improve students' classroom engagement and learning outcomes (Bharucha, 2018; Li & Wong, 2021). Platforms such as Facebook (Meta) and Twitter (X) have shown their capacity to promote a more interactive learning environment, allowing students to collaborate on projects and exchange resources beyond traditional educational environments (Ansari and Khan, 2020). Additionally, social media is essential for instant communication between students and teachers, facilitating rapid feedback and support for student success (Babić, 2022; Edumadze & Demuyakor, 2022). In addition to Facebook and Twitter, platforms such as WhatsApp and WeChat were extensively utilised throughout the pandemic, particularly in higher education, as tools for accessing educational resources (Omar, 2023). However, the implementation of social media in higher education (HE) is not without its challenges. Privacy concerns, the potential for distraction, and the perception that social media is primarily a social rather than an academic tool can hinder its effectiveness in educational settings (Blackmon and Major,

2023). Additionally, a significant digital divide exists between students and teachers regarding adopting social media platforms, as many instructors are unwilling to integrate new technology into their teaching approaches (Anderson, 2019).

Recently, newer platforms like TikTok and Clubhouse have gained traction in higher education. Yélamos-Guerra et al. (2022) highlight how social media tools, such as TikTok, combine education and entertainment by utilising multimodal resources (e.g., texts, images, videos, and audio), which motivates learners to engage more actively in the learning process. TikTok, in particular, has emerged as a potential educational tool by delivering small learning modules in short times, typically under 60 seconds. Designing and delivering creative learning content through TikTok can enhance pedagogical approaches focused on nano-learning principles, thereby facilitating the development of high-quality e-learning materials (Khlaif and Salha, 2021). This platform's ability to create short, engaging videos provides educators with a creative and accessible means to present their material.

Similarly, Clubhouse has emerged as a valuable tool for English language practice and the formation of virtual communities of practice, particularly among non-native English speakers. This voice-based platform facilitates global participation in real-time conversations, creating opportunities for language practice and informal learning. A case study on the Smart and Easy English Club, a prominent English-speaking community on Clubhouse, found that the platform effectively encourages non-native speakers to participate in English-speaking practice due to its features and community structure (Zahra and Yappi, 2023). Despite these advantages, the educational potential of TikTok and Clubhouse has been mostly overlooked in favour of more traditional platforms like Facebook and Twitter. However, recent initiatives such as EduTok demonstrate that students' attention is increasingly shifting towards a more democratised type of learning environment, where they can learn beyond the confines of the classroom (Ucar & Goksel, 2020; Rach & Lounis, 2021).

Universities focus on helping students obtain high-quality jobs after graduation and stand out in a global economy, whereas LinkedIn is a business- and employment-focused social media platform. Policymakers and businesses expect colleges to produce skilled graduates for the workforce, but students demand tangible job outcomes from their education. LinkedIn Learning pleases students and instructors. LinkedIn Learning enables students to build their identities on the world's most outstanding professional

network and study in-demand skills online (Kumar and Nanda, 2024). Integrating such platforms into higher education can support collaboration, creativity, and self-directed learning, making it a valuable addition to modern educational strategies.

3.3.5. Perils and Barriers of Social Media Usage in Higher Education

In principle, educational institutions are aware of the web-based world and the potential of pedagogical social media use, and many teaching staff use these tools consistently for learning purposes. However, there has been some debate over online technology in education in light of the emergence of distance learning in the COVID-19 outbreak. Privacy and security issues related to sharing users' data on web-based sites could concern students and educators. Additionally, faculty members may be concerned about social media's intrusion into their personal lives ("SOCIAL MEDIA PRIVACY AND SECURITY CONCERNS," 2022). This pandemic has brought out both the problems and opportunities of online education for students dealing with distraction, flexibility and time management. Responding to challenges caused by COVID-19 in disciplines such as medical and surgical training, where one is physically present, new ICT methods (social media, telemedicine) have been proposed to ensure continuity of learning. Innovations such as the flipped classroom, blended learning, and virtual learning have also been promoted as solutions to make sense of the new normal. By appropriately establishing these ICT solutions, online education can lead to more sustainable and long-term educational practices. However, there remain practical barriers to deploying social media usage by educators, including a lack of time, facilities, skills, and interest. Furthermore, negative perceptions of the value of specific social media tools, mainly blogs, persist, limiting their adoption in supplementing the learning process. Despite the challenges, incorporating such tools can enhance the educational landscape if integrated thoughtfully and sustainably, addressing both short-term needs and long-term goals for higher education. (Brouwers et al., 2021; Aristovnik et al., 2023). Recent studies have shown that academics generally accept the importance and potential of social media tools, but they struggle to agree on effective ways to incorporate them into the curriculum (Chugh et al., 2021; Perez et al., 2023).

3.3.6. The Value of Social Media in Improving Educational Involvement

Effective communication and message dissemination depend on the sharing of information. Students must establish connections with instructors and extend their network to include friends and peers. The internet and social media platforms make sharing data incredibly straightforward. Students maintain connections with friends and instructors using multiple communication devices, including mobile phones and computers. However, all these devices require an internet connection. Therefore, they can only effectively share information through social media. Students must share information, daily tasks, opinions, study material, academic assignments, and other educational materials. With the help of social media, students can easily share and acquire this vital information. Students at numerous universities and colleges can connect with their peers through social media platforms like Facebook, Twitter, Snapchat, and YouTube. Additionally, micro-learning sessions on platforms like TikTok use short, engaging videos to teach concepts, offer suggestions, or summarise courses, making learning engaging and accessible.

Discord is also being utilised to build community areas where students can collaborate on projects, join study groups, and chat outside of class, creating community and participation. Moreover, some instructors offer AMA (Ask Me Anything) sessions on Reddit, enabling students to ask questions and engage in conversations with professionals across various subjects, thereby increasing engagement and access to a broader range of opinions. These channels prove to be valuable and effective in providing and sharing university news, all the information, and messages related to education, making announcements, and providing more significant information to students (Zhou et al., 2018; Hara et al., 2019; Gama et al., 2021; Chikhi and Guetaf, 2023; Goar et al., 2023). This is extremely helpful in creating connections between different schools, universities, and colleges, which helps manage a large number of students by forming networks and groups. Students can also opt for online task administration to learn about the credibility of social media.

Additionally, social media's role in education extends beyond content sharing; it enhances students' sense-making abilities. As students interact with digital tools, they actively interpret and reconstruct knowledge based on personal experiences, social interactions, and contextual indicators. Platforms like TikTok enable the easier application of complex ideas in bite-sized formats, which helps break down challenging concepts. Similarly, collaborative tools such as Discord foster a community of shared

inquiry where students can interpret and co-construct meaning through peer interaction (Koretsky et al., 2018; Craig and Kay, 2023; Perez et al., 2023). According to Anderson (2019), in the "social media era," researchers have found and, in many cases, argued for the potential benefits social media can bring to higher education. The research also shows that the use of campus-based, distance, and blended learning contexts is continuing and expanding, with preliminary findings indicating significant educational gains, including:

- Opportunities and support for collaborative and cooperative learning.
- Enhanced digital/media literacy, including essential literacy growth.
- Development of academic and personal identities and the acquisition of social capital.
- The push and mobile features of social media have increased course participation.
- Training in attention management and self-organisation
- Research study dissemination and collaborator recruitment
- Support a long-term partnership between institutions and graduates to promote lifelong learning and alumni participation.

3.3.7. The Current Role of Social Media in Universities

People of all ages use modern technologies daily, which have become integral to our lives. The importance of social media in our lives cannot be overstated. Emerging trends, especially, catch the attention of the "Z-generation" (those born in 2000 and beyond), according to Çınar (2023). It is a fact that more and more children are starting to use technologies early, and youths are particularly active on social networks and tend to spend more time there than necessary with this in mind. There is significant potential to harness the widespread interest in social media for educational purposes (Chugh & Ruhi, 2018). The current role of social media in universities goes beyond just communication and entertainment; it can be used not only as a popular pastime but also as a valuable source of educational materials. Digital materials based on social media can be prepared and integrated into learning, teaching, training, and youth work at various levels (Klar et al., 2020). By creating engaging activities for students, this approach aims to increase their motivation towards learning and their overall interest in university. Given that using social media and networks is common among teens, teachers often face situations where students prefer social media over traditional class tasks. Demonstrating the various educational uses of social media can benefit their development. However, as Anderson (2019) noted, there remains considerable resistance despite the numerous

potential benefits of incorporating social media into higher education and its frequent use by teachers and students for non-formal learning. This resistance is rooted in the disparity between the extent of a positive view of social media and the extent of practical use.

3.3.8. The Effectiveness and Impact of Social Media in Delivering Distance Learning During the COVID-19 Pandemic

Events worldwide have given new insight into the importance of social media in our lives, and now this same understanding has led to its use in higher education. The COVID-19 pandemic has particularly required a move towards education via social media and the digital age. Since the COVID-19 pandemic hit, the world has had to accept a "new normal" of class. Remote education, therefore, has become the first source of learning for millions of students worldwide. As this transformation has occurred, social media in distance education is now more critical than ever (Dutta and Smita, 2020). Students can now share, interact and study over social media. Students may use social media to participate in online conversations, exchange textbooks and materials, and communicate with their peers.

Furthermore, social media can provide teachers with insights regarding their course content, including student engagement levels and the appropriateness of the material's difficulty. The COVID-19 pandemic has transformed the study routines of numerous college students. Some universities must resort to these new teaching and learning methods to serve their students, as it is not possible to teach classes and hold study sessions in person. Social networking is a popular resource for distance education. Reed and Dunn (2021) found that social media may 'allow student participation and cooperation' and 'provide interactive learning possibilities.' Students and teachers can communicate on platforms like Twitter, Instagram, and Facebook for a more personalised learning experience. Social media also provides students access to many resources, enhancing the possibility of studying away from the classroom.

Therefore, social media was necessary for remote learning during the COVID-19 outbreak. This transition has relied heavily on students' sense-making abilities as they navigate the vast and often complex digital information landscape to interpret, evaluate, and apply course materials without traditional classroom guidance (Brown et al., 2015). Platforms like Twitter, Facebook, and Instagram enable students to engage in online discussions, share resources, and seek peer support, promoting knowledge sharing

through collaborative learning. This participatory effect of social media encourages active sense-making, allowing students to organise and interpret information in ways that reflect their personal and academic contexts. Through this sense-making process, students transform digital content into meaningful insights that support their learning goals (Jivet et al., 2020; Chukwuere, 2021; Alalwan, 2022). Lungu and Lungu (2021) further examined the impact of social media on student involvement during the pandemic, finding that platforms such as Twitter and Facebook increasingly encourage student participation and community building. Their survey also indicated that teachers use social media to interact, share course materials, and offer real-time support, demonstrating how these tools bolster remote learning.

3.3.9. Best Practices for Using Social Media in Distance Learning

In today's world, distance learning has become an increasingly important part of the education system. With the help of social media, distance learning can be more effective and engaging. Social media integration into distance learning produces multiple advantages, such as better student communication, faster feedback, wider learning resources, and enhanced engagement. This creates a collaborative learning environment and improves learning results. Students experience enhanced educational success through more complete learning experiences (Sahakiants & Dorner, 2021). Using social media for distance learning can enhance student engagement by providing a modern and accessible platform for interaction. However, balancing engagement and accountability is significant in maximising its pedagogical benefits. Strategies to achieve this balance include establishing a clear social media policy, monitoring its use, and setting expectations for online interactions.

Additionally, providing students with resources on responsible use helps promote a safe and accountable learning environment while fostering active participation. While studies have shown the potential of social media in higher education, further research is necessary to align its use with educational theories to enhance learning outcomes (Perez et al., 2023). Research suggests that social media can benefit remote learning when used effectively. Best practices for designing practical social media assignments include setting clear learning objectives, explaining expectations, and providing detailed student engagement and interaction instructions. Additionally, offering guidance on the proper and ethical use of social media platforms and being receptive to student feedback is crucial. These practices help create a structured yet flexible learning environment that maximises student success. According to Vandeyar (2020), utilising social media tools in

limited resource educational contexts can enhance pedagogy by enabling technology-enhanced teaching. Further studies are needed to explore how academics and students adapt and engage with social media as a tool for education in these growing contexts. There are several benefits to adding social media to remote learning, and it is never too early to begin. It can be used to increase student interaction and connection, and to give important instructional feedback to teachers on student responses. Best practices for using social media in distance learning involve ensuring all information is accurate, regularly monitoring posts and conversations, and providing clear expectations to learners. Student privacy and safety must also be considered when utilising social media in distance learning. The successful use of social media in distance learning also requires students and educators to engage in sense-making, particularly when adapting to evolving digital norms and expectations. Sense-making theory explains how individuals construct meaning in ambiguous or dynamic environments (Dervin, 1998). When students are asked to use platforms with unclear academic and social limits, they must interpret instructions about appropriate behaviour, learning goals, and engagement standards. Supporting this process through clear communication and guidance helps promote more intentional and effective participation.

3.3.10. Research on the Educational Applications of Social Media

According to multiple studies, multitasking on a laptop hurts one's and others' learning (Yeliz Eseryel et al., 2020; Kuznekoff, 2022; Tugtekin and Odabasi, 2023). Yet, a recent meta-analysis indicated that mobile devices in the classroom improved learning considerably. Some studies suggest that learners can benefit from social media via multitasking, which they seem to be good at. Students might exploit social media's chances (Rodríguez-Triana et al., 2020). Social media platforms have affected users' private lives, routines, and educational environments. Thus, instructors have tried to incorporate these tactics into classroom education to maximise social media technology's benefits and improve students' critical thinking on social media platforms. This maximises social media technology potential (Sabah and Altalbe 2022).

3.3.11. The Effects of Social Media Use Research

The use of social media has become increasingly popular in recent years, with many individuals accessing various platforms daily. This increased reliance on technology can cause a significant impact on how students engage with research within higher education. These could positively or negatively affect knowledge acquisition, information storage, and the sharing of ideas. De Peralta et al. (2019) and Rahman et al. (2020) reported that higher education institutions have been utilising social media platforms to connect with students, promote learning, and encourage collaboration. Research findings demonstrate that students who integrate social media into their learning experiences exhibit higher levels of engagement and achieve better educational results than students who avoid social media. Students who used social media for over two hours daily received lower grades than those who used it for less than two hours. Students' learning strategies in terms of their engagement, collaboration, and learning outcomes in higher education have been changed as a result of the various social media platforms due to the impact that these platforms have had on societies all over the world in terms of their communication and means of accessing information. In addition, the utilisation of social media in educational settings at a higher level plays an integral part in moulding the students' professional identities and improving their academic reputations through online social capital (Sabah and Altalbe 2022).

3.3.12. Constructivism Theory

My research is based on Lev Vygotsky's constructivist theory, developed through his work on social constructivism, which emphasises the role of social interaction and the cultural environment in cognitive development. His ideas were widely introduced to the West in the 1970s, gaining significant attention in educational research during the late 20th century. Social constructivism, or Lev Vygotsky's constructivist theory, focuses on social interaction and cultural environment in learning. Vygotsky believed that social interactions and cultural tools shape cognitive development and construct knowledge. His "Zone of Proximal Development" (ZPD) concept, which compares what a learner can do independently to what they can do with help from a more knowledgeable person, emphasises the importance of collaborative learning environments (Zavershneva and Van Der Veer, 2018; Kim, 2024). The complexity approach describes how learning is a multi-faceted psychological process. Still, at heart, the concept of constructivism, the active construction of knowledge, is rooted in the original psychological ideas expressed by Vygotsky and his colleagues that we know today. Constructivism was presented as a

multi-faceted learning theory that argues individuals actively construct knowledge by interacting with the world around them. In that context, Vygotsky's principles, for example, that knowledge is co-constructed through interaction, perfectly exemplify how learners interact with colleagues, teachers and educational content on social media (Fosnot, 2005; Paschal et al., 2022). This constructivist approach believes learning is most successful through a learner-centred methodology at the classroom level.

Yet still, Vygotsky's socio-constructivism is remarkable when placed alongside other learning models, for example, behaviourism and, to an extent, cognitivism, that only look at stimulus-response patterns and stimulus internalisation within the learner, respectively. Because of the centrism Vygotsky places on collectivism and the environment, learning in this manner is effective, particularly in the contemporary world ruled by information and social networks. Learning is, however, seen in behaviourism only through actions, while in cognitivism through abstraction. Instead, Vygotsky's constructivism covers the particulars of the learner and the functions of the community within education and hence suits the investigation of social network systems, outlining collaborative content generation and interacting with others (Brandon & All, 2010; Mohammed & Kinyo, 2020). Constructivism argues that, during a learning experience, learners construct new concepts and ideas based on what they already know. Students can then focus on selecting and transforming the information, creating hypotheses, making decisions, and building on a cognitive structure. The cognitive structure offers organisation and meaning to experiences, empowering learners to learn new ideas beyond what they learn in the classroom.

Constructivism supports using problem-based learning and active-learning principles to leverage the significance of social media in education. Teachers can use constructivism to paradigm shift towards concept-based curricula, enhancing student learning and academic achievement in classroom settings (Brandon & All, 2010; Mohammed & Kinyo, 2020; Tam, 2000). In this context, in a world where social media plays such a central role in many aspects of education, constructivism is particularly poignant. According to Zhang (2020), the use of modern digital technologies such as social media on platforms like Facebook, YouTube, TikTok, etc., where both learners and educators can interact and share knowledge, supports the principles of constructivist learning by providing new opportunities for interaction, collaboration, and co-construction. Thus, by applying Vygotsky's social constructivist theory, this research situates itself within the

constructivist paradigm, underscoring how social media benefits collaborative learning and knowledge construction. The interaction between students, digital tools, and peer engagement reflects the co-constructive process that Vygotsky identified as essential to meaningful learning. While other learning theories, such as behaviourism or cognitivism, offer valuable insights into instructional design, Vygotsky's constructivism stands out in its focus on social context (Ertmer and Newby, 1993; Taber, 2024). This makes it particularly suited to studying the role of social media in education. Social media platforms, like Facebook or YouTube, align with Vygotsky's view that learners construct knowledge not in isolation but in a community of practice, where learners build upon each other's ideas (Kimmerle et al., 2015). Constructivist theory is also essential to information science, especially concerning information behaviour and practices. In distance learning and online education, students must actively seek, access, and evaluate information through digital tools, much like Vygotsky's theory emphasises active participation in learning. Social media tools align with constructivist principles, allowing students to share and engage with information dynamically and supporting information-seeking and sense-making processes (Perez et al., 2023).

The application of constructivism in problem-based learning (PBL) and active learning principles is significant for leveraging the benefits of social media in education. Learners can use constructivist techniques to develop concept-led curricula with a social media foundation in which students participate, collaborate and think collaboratively (Brandon & All, 2010; Mohammed & Kinyo, 2020; Tam, 2000). The way students interact socially, share ideas, and support one another in their growth demonstrates Vygotsky's Zone of Proximal Development (ZPD) principle about how learners develop through the influence of peers or teachers. Further, Vygotsky's theory supports self-exploration and dialogical engagement, assisting students to interact with social media platforms. This aligns with information behaviour research, where learners seek and evaluate information collaboratively. Teachers can use constructivist strategies to help learners construct knowledge about how social media impacts their education, encouraging active inquiry and information sharing (Kritt, 2018; Mohammed & Kinyo, 2020). Thus, applying Vygotsky's constructivism theory helps justify how social media, when integrated into education, provides an environment conducive to collaboration, problem-solving, and critical thinking, all essential for effective information behaviour and practices (Flynn, Jalali, & Moreau, 2015).

3.4. Gender Differences

3.4.1. Overview of Gender Differences in Technology Use and Digital Divide

The COVID-19 epidemic has underscored the persisting gender disparities in technology use and the digital divide in society. More recently, Matczak et al. (2023) studied the effect of the COVID-19 pandemic on gendered tech utilisation in higher education. According to the study, the pandemic has dramatically increased student dependence on digital technologies and services. This online learning has brought on the increasing use of technology by both male and female students. Interestingly, while both genders have experienced increased usage, female students reported a more significant increase in technology use than their male peers, with broader access to digital resources and a stronger preference for online learning approaches.

Furthermore, research conducted with safety and security management students in the Netherlands during the pandemic showed that female students expressed higher satisfaction with online education than their male peers. This non-intuitive finding revealed that despite being more "tech-savvy," male students reported lower satisfaction with online learning environments. According to these results, female students demonstrated greater efficiency and more active participation in the online education model (Matczak et al., 2023). These findings show that the pandemic has increased the gender gap in technology use and online education satisfaction, requiring specific methods and policies to address these discrepancies and ensure equitable access to digital learning for all. The digital divide has grown due to COVID-19. Watts (2020) in The Lancet Digital Health links this discrepancy to technology's availability, understanding, and utilisation. Access and comprehension cause the pandemic's digital gap. Computers and the internet are less accessible to low-income people. This is especially true for minorities and underdeveloped nations. Non-technical people may struggle to get pandemic information and services. Consequently, technological knowledge contributes to the digital divide during the pandemic. Technology cannot be appropriately used without understanding. Hence, access to technology and the skills and training to utilise it are needed to overcome the digital divide. The gender digital divide is a significant concern, particularly during the COVID-19 epidemic. Mathrani et al. (2022) argue that globalisation has beneficial and detrimental impacts on societies. A significant adverse consequence has been the global disparity in internet availability.

This has resulted in a digital gap between genders, with women and girls in low- and middle-income nations experiencing the least access.

3.4.1.1. Digital Divide in Advanced Countries During the COVID-19 Lockdown

At least in the advanced countries, the COVID-19 pandemic significantly impacted the learning experience. Schools and universities have been closed; online education has been created, but this has opened our eyes to some of the disconnects and conflicts in education. The COVID-19 pandemic impacted the entire world of education, and most countries had to access learning on the internet to continue educating. Previously, Abduh (2021) wrote about how online learning was accessed and used during the COVID-19 lockdown. According to the study, these countries experienced similar challenges of limited resources and inadequate infrastructure. The digital literacy skills of many students were insufficient for operating the available technologies.

Furthermore, the lower-income students in the study were especially vulnerable, since they were less likely to have the resources and equipment required for online learning success. This was why governments should consider the disadvantages sufficiently to ensure that people can all access online education during the pandemic. The digital divide, the difference between those who have access to the internet and those who do not, was a big problem for online learning in advanced nations during the COVID-19 lockdown. There was a need for possible solutions to fill this gap and make online education more equitable. These solutions should begin by recognising the complex factors contributing to the digital divide. These factors include technology and high-speed internet costs, digital literacy, and the communities' social and cultural environment (Mathrani et al., 2022).

Furthermore, programmes must be flexible for each student and focused on technology and internet access, digital literacy, and equitable learning. By shifting to online learning, advanced countries could safely provide education during the lockdown. However, for those in rural, faraway, or remote areas of their developing countries where access to the internet and digital devices was limited, as well as with the challenges that arose at home, such as people around, children, social isolation, and other such challenges. The digital divide made learning during the pandemic nearly impossible. This highlights the importance of bridging this digital divide to ensure access to education regardless of the situation.

3.4.1.2. Social Media Usage and Gender

Social media and its good and bad effects have permeated every aspect of modern culture, transforming communication, learning, research, and education. The accessibility of social networking via mobile phones and tablets has further facilitated its widespread use (Mirembe et al., 2019). Numerous studies have explored how men and women utilise social media, yet no definitive conclusions have been reached. While many experts believe women are more likely to join social media networks (SNSs), some studies suggest that men are more willing to engage (Reyes et al., 2022; European Parliament, 2023). Research indicates that women tend to have more intimate connections than men and often reciprocate these connections by being sociable and developing their social capital.

In contrast, men are more inclined to seek new acquaintances rather than maintain existing ones (Koc and Turan, 2020). Ali et al. (2021) examined gender discrepancies in social media usage among younger students, revealing that most men use social media primarily for entertainment. In contrast, most women use it for communication and knowledge acquisition. Notably, gender differences in social media use are also notable in terms of professional, educational, and informational goals. Women are more likely to utilise new connections to advance these goals, while men are more likely to initiate new connections. Research on the influence of social media on academic attainment has shown that its use has increased alongside technological advancements. The studies included research on multiple geographical areas, such as the United States, European nations, and Asian regions. The research considered age groups from teenagers to young adults, encompassing ages 13 through 25. The study included participants who represented a range of socioeconomic statuses, educational backgrounds, and physical abilities, which allowed for a detailed examination of how different demographics use social media.

3.4.1.3. Research Findings on Gender Differences in the Adoption and Usage of Social Media for Education During COVID-19

Women students accessed social media more actively than men during the COVID-19 pandemic (Sobaih et al., 2022). The study identified a gender divide in social media education usage. Due to its simplicity, accessibility, and supportive learning and peer environment, female students were more likely to utilise social media. The report emphasises the need for educational social media assistance for female students.

Jatmiko et al. (2020) revealed gender-based disparities in COVID-19 in academic social media use. The research of Indonesian students indicated that females used social media for education more than males. Males utilised social media for fun, while females used it for assignments and teacher connections. Females were more motivated to utilise social media for education. Female students are more likely to use social media for learning during the pandemic, which might influence educational institutions' future use of social media. Women were also more educated on social media than men during the COVID-19 pandemic. Female students preferred social media to watch tutorials, participate in online classrooms and debates, and access online learning resources. Male students were more likely to use social media for entertainment, such as online games and movies. Female students were more motivated to use social media for education, and throughout the epidemic, social media has helped preserve learning (Khan et al., 2021). Although Aucejo et al. (2020) and Khan et al. (2021) discovered a difference in social media use for education between male and female students during the pandemic, gender is not the only element that impacts its acceptance and use. Age, socioeconomic level, technological access, and technology experience can also affect technology use. Throughout the epidemic and beyond, all students, regardless of gender, should have access to and support for using technology and social media for education.

3.4.1.4. Differences in Attitudes and Perceptions Towards Social Media Usage for Learning Among Male and Female Students

Research by Lewis & Nichols (2016) examined gender differences in attitudes and patterns of social media usage for learning purposes, finding that while both genders viewed social media positively as an educational tool, their usage patterns varied significantly. Female participants were more actively engaged, frequently interacting with academic content and sharing insights within their social networks. Male participants, however, were more passive and primarily saw social media as a source of entertainment. Supporting these observations, a study conducted by Aran-Ramspott et al. (2024) within an R&D framework in Spain also noted gender disparities, showing that young female social media users felt more pressure regarding appearance and self-image on platforms like Instagram and TikTok, whereas male participants more commonly associated social media with fun and social status (R&D+i Project). These findings highlight the importance of considering gender-specific usage patterns and the pressures female users often face, prompting a need for educators to address these distinctions when using social media as a teaching tool. This matches Sabah and Altalbe's

(2022) exploration of social media's impact on learning outcomes, showing that educational social media use enhances students' recall, critical thinking skills, social skills, and language proficiency. The study highlights that social media usage positively influences learning outcomes, although factors such as task technology fit, and perceived risk affect genders differently. For instance, significant gender differences were found in information sharing and perceived risk, suggesting that these variables may shape how male and female students experience social media's educational benefits. These findings underscore social media's potential to support sense-making processes, including critical thinking and language skills, with varying impacts based on gender. In a recent study, Kurdi et al. (2022) explored how social media and digital technology improved students' learning attitudes. The authors suggest using social media to provide students with videos and articles to help them develop a positive learning attitude. The study also found that students' academic performance improved when they used social media to contact classmates and discuss academic assignments. The authors observed that social media can help students get more interested in their classes and develop a good learning attitude. Furthermore, sense-making theory provides insight into how students interpret gendered social media use patterns for learning as they make sense of complex digital environments. Female students who participate actively in academic content and peer discussions display their efforts to understand and balance educational demands and social norms. Male students demonstrate distinctive cognitive framing patterns and academic value perceptions in their passive or entertainment-focused approach to social media usage. Designing gender-responsive social media teaching strategies requires understanding interpretive differences between genders (Ali et al., 2021).

3.4.1.5. Impact of Gender Differences on Student Engagement, Achievement, and Satisfaction with Distance Learning

Gendered expectations and stereotypes have been shown to impact student engagement with distance learning. Stella (2020) found significant disparities in engagement based on gender, with male students often having more success in distance learning environments. Gendered expectations and preconceptions create gaps in confidence levels between female and male students when they face distance learning challenges. New learning systems and demanding workloads can make female students feel overwhelmed and less confident, compared to male students, who tend to approach these challenges with greater self-assurance. Gendered expectations and stereotypes generate different academic performance expectations, where male students are

frequently expected to achieve higher results than female students. These gender stereotypes cause female students to lose confidence, which reduces their chances of participating in distance learning. Educators must identify the gendered expectations and stereotypes in education and actively work to establish a gender-inclusive environment that supports and enhances student engagement in distance learning. Gender-dependent characteristics also affect student performance in distance learning. Almasri (2022) found that gender-specific characteristics such as teaching methods, student engagement, and family support affect student achievement. Student-centred teaching and parental participation may assist female students, whereas authoritative teaching and peer interaction may benefit male students. Female students are motivated by learning activities, and male students by performance-based goals. Consequently, educators must investigate how gender-dependent characteristics may affect distance learning student accomplishment and apply measures to boost student success.

Furthermore, Vera Gil (2024) examined gender differences in university grades and found that women always did better than men at every level, including STEM ones. Although the researchers did not find a gender difference in distance learning achievement, women are much more likely to have more self-controlled learning techniques, time management, setting goals, and self-monitoring, which helps them succeed. These results show that distance learning environments can provide a gender-neutral field where students can grow according to their learning styles, which could neutralise the discriminatory practices of academic settings for women. Nonetheless, further research is needed to determine if these trends carry across the continuum of universities and education settings. Koca et al. (2024) examined the role of gender in distance learning satisfaction, focusing on the impact of academic self-efficacy on students' satisfaction levels. The study found that male and female students had similar learning experiences; however, gender differences emerged in satisfaction. The technical aspects of the course, along with the instructor's explanation ability and engagement tactics, pleased male students more than female students. Female students demonstrated higher contentment with their chances to interact with instructors and peers. Course designers and instructors in online learning environments should target gender-specific learning preferences to improve student satisfaction by providing technical clarity for male students while creating interactive opportunities for female students to build community. These patterns can also be understood through the perspectives of sense-making theory, which explains how individuals interpret and

respond to complex, ambiguous environments. When gendered expectations shape students' perceptions of their roles and abilities in distance learning, sense-making processes influence their confidence, motivation, and academic engagement (Kezar, 2013; Wibeck & Linnér, 2021). Recognising these internal meaning-making processes is essential for designing gender-inclusive learning environments that support all learners and promote equitable participation.

3.4.1.6. The Role of Institutions and Educators in Addressing Gender Differences in Social Media Usage for Distance Learning

Research demonstrates that social media usage has beneficial and detrimental impacts on students' learning outcomes across genders, affecting their academic success, social skills and language usage development. According to Smith and Storrs (2023), social media platforms become practical educational tools that boost student collaboration and information sharing when integrating digital literacy principles in higher education environments. The authors highlighted the need for academic institutions to reconcile students' high regard for digital literacies with their current underrepresentation in undergraduate programs. The difference between male and female social media usage stands out in privacy-related issues because female users experience more substantial concerns while using social media platforms. Sabah and Altalbe (2022) further illustrated this by highlighting significant gender differences in social media behaviours, with females showing more substantial privacy concerns and engaging in protective behaviours more than males. These differences can affect how female students engage with digital platforms, potentially limiting their participation in distance learning environments. There is also evidence that the gender stereotyping of distance education can be detrimental to the academic success and involvement of female students. It could increase the difficulty that women see social media as untrustworthy or unsafe, pointing to the necessity of fair digital literacy education and a study of the impacts of gender stereotyping on distance learning performance. This version integrates the findings from both Smith and Storrs (2023) and Sabah and Altalbe (2022), addressing gender-based differences in social media use, privacy concerns, and the need for further research into the impact of gender stereotypes on distance learning.

On the other hand, a study by Novakovich et al. (2017) found that educators play a substantial role in directing students' social media use for educational purposes, which affects gender equity within the learning environment. According to the authors,

educators should advance gender equity through student dialogues, supply guidance and resources, and promote student participation across all demographics. Educators can also enable students to develop digital skills, which helps social media use encourage gender equity and improve distance learning experiences.

3.4.1.7. The Implications of Gender Differences in Social Media Usage for the Future of Distance Learning

The recent study by Iqbal et al. (2022) points to the opportunity of social media to increase access to distance learning, particularly during crises. However, they have not conducted any studies regarding the impact of gender differences in social media use on the availability of distance learning. Several studies have identified gendered disparities in social media usage; however, additional investigation is required to analyse how these discrepancies may influence accessibility (Twenge and Martin, 2020; Song et al., 2023). For example, men are more inclined to utilise social media for professional purposes, while women predominantly engage with it for communication and entertainment. These usage differences could affect access to resources related to distance learning; men could access more information and resources, while women might have access to less information. There may also be differences in the type of online platforms used for distance learning, with men using more professional development-focused platforms and women using platforms that emphasise leisure activities. Zheng, Khan, and Hussain's (2020) study examined how gender differences in social media use affect distance learning course quality. The statistics show that male students use social media for academic objectives and female students for social and professional engagement. This shows how vital gender variations are when designing and assessing distance learning courses. This study's findings provide insight into gender variations in social media usage and suggest future research to understand better how they affect remote learning.

3.4.2. Gender and Levels of Education

Several studies have evaluated the impact of demographic factors, such as gender and educational level, on online learning outcomes. The ability of academic degrees to predict online learning results remains contentious, yet the effect of gender on these outcomes remains unclear. According to some research, women achieve superior results in online learning because they display more remarkable persistence and commitment. They also have better self-regulation, which explains their more favourable results than men (Boyte-Eckis et al. 2018; Alghamdi et al. 2020; Yu, 2021). COVID-19 has posed particular

challenges for both men and women, but education was significantly affected for women. It will also significantly impact women's educational opportunities worldwide, resulting in a “massive disruption.” Women who constitute the majority of educators and teachers have been particularly affected by the closures of institutions and by perpetuating existing gender disparities in access to education, for example, the gender wage gap and employment discrimination (Schleicher, 2020). The pandemic highlighted the need for investments in digital infrastructure, as many institutions have since deployed digital tools to teach. However, this reliance has further exposed the digital divide between those with access to technology and those without, impacting women’s access to education. These effects will be addressed by investing in digital infrastructure, equal access to technology and gender equality in access to education. A report from Flor et al. (2022) discovered that, in many countries where the pandemic occurred, the level of gender equality in education has fallen significantly, with women receiving less than men. The study also found that more females are more likely to leave university or switch to distance learning due to the disruption of the pandemic. This is especially worrying since this might result in a further increase in gender disparity in educational attainment, with women underachieving relative to men. The COVID-19 pandemic also raised concerns about women’s access to education. Chakraborty et al. (2021) and Onele's (2023) research explores technology’s role in confronting these anxieties. The technology, they contend, could give women equal access to education as their male peers via virtual education, access to resources, mentors and support. As the authors stated, technology can be an essential part of enhancing education for women during the pandemic, and further research is needed to learn how it helps.

3.4.3. Perceived Assistance

The global COVID-19 pandemic caused students worldwide to transition to online courses quickly. A study by Liu et al. (2021) examined the gender disparity in perceived support from teachers during the shift to distance education. According to the research, females and males might get different help from teachers during the pandemic. Female students reported feeling better aided regarding communication and feedback, and male students reported better aided regarding technical support and the material. There is no secret: gender affects motivation and student learning in distance education under COVID-19. ‘Gender should be considered when considering the effects of distance learning on student learning’ (Yin, 2022). Numerous factors can influence the gendered aspects of student motivation and engagement. Female students, for instance, might

suffer from more physical and mental health challenges from increased housework and childcare. Additionally, female students might be less accessible to digital technologies because of the lack of resources. In addition, gender inequalities in many societies might add responsibility to female students, reducing motivation and student engagement in distance learning. Furthermore, students may be male in terms of digital technologies, and because more is available, this will result in more motivation. Unequal resource access is another reason for demotivation and engagement in distance education. Therefore, it is a standard procedure to be gendered when evaluating the impact of distance education on student learning. In his report "Sustainability," Yu (2022) discussed the need for gendered interventions to aid teachers during the COVID-19 pandemic and its effects on education. According to the author, such steps were imperative to provide teachers with tools and support for distance education. These measures need to be gendered and meet the unique needs of female teachers. Gender-specific interventions are essential for student learning and teacher professional development. These gendered perceptions of support during the pandemic can be further understood through sense-making theory, which highlights how individuals interpret and adapt to rapidly changing environments. In distance learning, students made sense of their experiences based on how support was delivered, how accessible resources were, and how aligned the learning environment felt with their responsibilities and expectations (Preuss et al., 2023; Mitchell et al., 2024). By understanding interpretive processes, institutions can create equitable support systems that respond effectively during educational disruptions.

3.4.4. The Influence of Agreeableness and Openness to New Experiences

Harvey et al. (2017) explored the impact of gender on student satisfaction with distance learning. The authors used a case study approach to examine the relationship between gender and student satisfaction. The results showed significant differences in satisfaction between male and female students, with male students reporting higher satisfaction levels with distance learning. However, the authors acknowledged that this could be due to the higher proportion of male students in the study. Gender plays a factor in students' happiness with distance education, and further study is necessary to determine why these inequalities exist. The authors recommended that gender-specific techniques be utilised to enhance both genders' overall quality and enjoyment of remote education. This study is significant for educators as it underlines the necessity of taking gender variations into account when designing courses and programs for students.

Adding to this perspective, Koca et al. (2024) found that academic self-efficacy mediates the relationship between students' attitudes towards distance education and academic life satisfaction, with gender moderating. Specifically, female students showed a stronger connection between self-efficacy and satisfaction than male students. Rajabalee and Santally (2021) studied online. They blended learning to understand its effects on student satisfaction and performance and found a positive relationship between satisfaction and performance despite technical issues reported by some students. Research demonstrates that gender, self-efficacy, and student engagement greatly influence satisfaction levels in distance education environments. This highlights the necessity of implementing targeted policies and personalised interventions to improve learning experiences for various student demographics.

On the other hand, during COVID-19, research has been invested in investigating if there is a relationship between learners' satisfaction and the knowledge obtained through online learning scenarios. The outcome of a person's online learning might reveal certain things about them, depending on personality traits like agreeableness and willingness to experience. Learners with comparable characteristics, such as agreeableness and openness to new experiences, may choose a similar online learning situation where their learning outcomes could be improved. These learners also tend to hold positive attitudes towards emerging online technology-assisted learning (Yu, 2021).

3.4.5. The Influence of Gender on Digital Learning

The role of gender in digital learning is a significant and complex topic. From examining the impact of gender-based digital learning stereotypes to assessing gender equality in access to digital learning resources to analysing the influence of gender on digital learning outcomes, gender plays a vital role in digital learning and its effects on students. Wladis et al. (2017) found that gender influences student outcomes in digital learning environments. Specifically, in self-managed learning environments, gender did not affect outcomes, whereas in instructor-managed environments, female students tended to outperform males. This implies that gender's impact differs depending on how the online learning context is structured, and that specific teaching should exist.

Additionally, gender affects online learning differently based on instructional design, which requires specialised teaching approaches. Yu (2021) highlighted that educational background and personality characteristics influence online learning outcomes because postgraduate students and individuals with conscientiousness and openness traits tend

to achieve higher academic success. Educational designers and instructors need to factor gender together with educational level and personality characteristics into their online learning frameworks. Educational support for male students in structured settings or methods to promote self-directed learning for diverse student groups could be beneficial. This can lead to more equitable digital learning environments for all students, but during the pandemic, the situation changed. According to studies, clear concerns about the lack of equity in digital education have been voiced because it appears that females encounter unique challenges and roadblocks in their interactions with computers and ICT. It has been suggested explicitly that males may have an edge over females in online learning merely based on their better perceived skill, comfort, and computer involvement (Venable, 2021; Qazi et al., 2022).

Furthermore, research shows that gender differences in attitudes towards ICT continue in higher education. For instance, a study found that female students often have fewer positive beliefs about their ICT skills and the value of ICT than their male counterparts. This disparity can lead to lower levels of satisfaction with digital learning among female students (Campos and Scherer, 2024). Another study focusing on Sweden highlighted that while females may outperform males in digital knowledge and skills, their attitudes towards technology and digital learning environments are less favourable, impacting their overall satisfaction and engagement (Kurti et al., 2024). Febro et al. (2020) advocate for gender-equal access to digital learning tools. Technology access is essential to 21st-century learning, and gender equality requires equal access to digital resources. Yet, socio-cultural and socio-economic variables often limit women and girls' access to digital resources, creating a digital gender gap in education. The public libraries should be in underprivileged neighbourhoods, and training and assistance should be provided to enable fair usage of digital learning resources for all genders. Digital learning materials can promote gender equality in education. In addition, a study by Santos et al. (2022) examined how gender-based digital learning stereotypes affect students' academic achievement. The study examined gender-based digital learning stereotypes and student performance. College-level students showed considerable academic performance gaps between men and women. The authors believed gender-based digital learning stereotypes caused these discrepancies. Educators can provide an egalitarian learning environment and do additional studies to understand the causes of these preconceptions and devise ways to combat them. Addressing these misconceptions will improve student equity and inclusion.

3.4.6. Gender Differences in Social Media Usage for Research Purposes

The gender gap in social media use has been an ongoing issue since its inception, and the COVID-19 pandemic only increased its relevance. According to Hou et al. (2020), during the pandemic, the gender gap in social media use for research was extensive, with male users being more active than female users. The study establishes that men were more able to post information about their health, thoughts on prevention and control measures, and opinions on the pandemic. At the same time, women were more likely to post or search for general information about the pandemic. Additionally, men tended to engage with online platforms for public discussions and activities about COVID-19. During this period, women predominantly used online platforms to find medical information and maintain contact with family and friends.

The current situation reveals an urgency to address the existing gender disparity in social media usage so both men and women can utilise online resources during the pandemic (Magno and Weber, 2014; Hou et al., 2020). Furthermore, Alshare et al. (2023) investigated how different genders used social media platforms for research throughout the COVID-19 pandemic. Research shows that males and females exhibit distinct social media platform preferences, while females prefer Instagram and Facebook. Men show a higher frequency of use on social media platforms such as Twitter, YouTube, and Reddit. Gender differences exist on social media platforms where females access lifestyle-oriented content while males focus on news-related content. Researchers must understand that gender differences in social media engagement during COVID-19 present essential research implications. The different ways men and women use social media and unequal access to resources might impact their full participation in pandemic research activities. Researchers can ensure balanced representation and improve research quality and accuracy by recognising and integrating these differences. Researchers who integrate gender distinctions in social media usage into their analysis will achieve more precise research outcomes.

3.4.7. Gender Differences in Perceived Benefits and Limitations of Social Media Usage in Research During COVID-19

There have been numerous studies to investigate social media usage in research during COVID-19 (Ali et al., 2020; Zeballos Rivas et al., 2021) that examined how gender influences perceptions of social media usage as a research tool during the COVID-19 pandemic. Both male and female respondents viewed social media as a research tool positively, but their perceptions differed. Women consider social media platforms valuable for data collection, but men view them as distracting. Women were more concerned about privacy and security than men, who primarily used social media to connect with friends and family. Gender gaps can affect individuals' views on utilising social media for research purposes. It is essential to understand these distinctions to use social media effectively and appropriately during a pandemic for data collection. Researchers use social media platforms to gather demographic details while engaging participants in direct conversations, which reveal their experiences and reactions to COVID-19. The research indicated potential problems with false information alongside "echo chamber" effects. Despite these issues, the study concluded that social media can be a valuable data source for researchers, especially in emergencies such as pandemics, where traditional methods may be impossible or difficult. In addition, Pikoos et al. (2021) state the impact of social media usage on gender-based attitudes toward COVID-19. They found that female participants who reported higher social media usage had more negative gender-based attitudes towards the disease, viewing it as more threatening and having more implications for women. On the other hand, male participants who reported higher social media usage had more positive gender-based attitudes toward COVID-19. The results show that social media usage has a particular impact on gender-based attitudes toward the illness, and it may be possible to use it to promote positive gender-based attitudes.

3.5. Distance Learning

3.5.1. A Brief History of Distance Learning

Distance learning has gained popularity in recent years owing to continuous technological advancements; however, it predates this period. Communication requires a message, a sender, and a receiver. The method of contact significantly influences the results of a distance learning program. It also depends on interactions between the instructor and the course participants and the effectiveness of the chosen communication medium, which is vital to the success of a distance education program (Sadeghi, 2019). Distributed learning, also known as distance learning, is a method of education that allows learners to attend in-person classroom sessions in favour of self-paced study using digital resources such as course materials and lecture recordings made available online and easily accessible via computer or mobile device (Bukhsh and Chaudhary, 2015). Moreover, distance learning, also known as online education, web learning, and remote learning, is a vital aspect of e-learning. Its goal is to enrich users' knowledge and raise the quality of learning (Jogezai et al., 2021).

3.5.2. Types of Distance Learning

3.5.2.1. Fixed Schedule Online Learning

Fixed-schedule online learning is a prevalent type of distance learning in which students are expected to sign into an online classroom website at a specific time. Institutions offering English as a Second Language (ESL) online learning services, such as VIPKID, use fixed timetables where students are expected to log into their classes for lessons with their teachers at a specified time. While students can learn from different environments, they have a fixed timetable for when to attend the online classes. With the improvement of technology, people are choosing to learn more online. Moreover, many universities are considering adopting a fixed schedule for online settings. Veletsianos et al. (2021) argue that online learning has become a more popular teaching method as many educational institutions move away from traditional classroom models. Whilst online learning offers more features, such as flexibility and convenience for learners, having a fixed schedule has been identified as one main factor in the success of online learning.

Furthermore, the structured timetable establishes a sense of order and consistency, which is especially helpful for beginners to online learning environments. Fixed schedules help instructors and learners better understand their roles, which creates an

enhanced, productive learning environment. A fixed schedule develops structure and consistency, which benefits new online learners the most. Fixed schedules help establish clear expectations for instructors and learners while creating a more productive learning environment (Jorre De St Jorre, Oliver et al. 2018).

In addition to facilitating greater possibilities for cooperation and communication between students and teachers, a consistent timetable can help foster community in the classroom. A set timetable will help students keep working towards their goals and finish their projects on time. Many positive outcomes can result from establishing a routine for online education. Students benefit from online education since it allows them to work at their own speed. However, there are specific difficulties with sticking to a set routine when studying online. A disadvantage of online education is the reduced opportunity for teacher-to-student engagement. These obstacles should be considered when considering whether a schedule suits a course (Shakya et al., 2018).

3.5.2.2. Video Conferencing

Video conferencing can be conducted in two ways: with a teacher and a single student or involving the entire class. The instructor may mute other participants, but only the teacher can be heard speaking or a student selected to contribute to the conversation. Video conferences provide chat boxes which allow the teacher to request typed responses from students after asking a question. To minimise COVID-19 transmission, many teachers use digital platforms such as Zoom for video conferencing with their students. This educational approach falls under the fixed schedule online learning category because students must join Zoom during predetermined times without the option to view lessons at their convenience, similar to YouTube videos (Earon, 2020).

According to Nikou (2021), the world's universities were pressured to move their traditionally held classes into the online land. As various online technologies became more widespread, they provided fantastic opportunities for coping with social distancing and the closure of institutions. This emergency switch of instructional delivery to online can be considered a global "experimental setting," offering opportunities to study online technologies and pedagogical practices for utilisation during the lockdown and in the post-pandemic landscape. Such research could be helpful during the lockdown and in the post-pandemic landscape. Web-based videoconferencing is one of these online technologies; students from all over the world were encouraged and/or forced to use videoconferencing systems (such as Google Hangouts, Zoom, Microsoft Teams, etc.) for

their classes rather than the conventional face-to-face lectures, seminars, and other learning episodes. Skulmowski and Xu (2022) argue that the rise of digital technology has ushered in many fascinating new educational possibilities. Learners can use technology to explore virtual realities, use their tablet computers to interact naturally with their learning applications, and acquire knowledge through high-fidelity simulations of the real world. Despite these kinds of technologies' benefits and positive aspects, they negatively affect both genders in distance learning. Yet, recent studies have shown that digital learning can raise mental strain due to several design characteristics. Immersion in a virtual world while completing a learning task, for example, can provide a novel learning experience that cannot be replicated with traditional media; however, this immersion may lead to a depletion of learners' cognitive resources on that experience itself, rather than contributing to learning (e.g., Frederiksen et al., 2020).

3.5.2.3. Open Schedule Online Learning

Unlike fixed-schedule online learning, open-schedule online learning allows students to work on their projects or term papers and submit them at their own pace. Students may resort to the use of different online materials. However, students are expected to deliver their work on time. Students benefit from this style of online education since they can choose their schedules, provided they submit their work by the due date. Khalil et al. (2020) examined the efficacy of synchronised online learning in a Saudi Arabian medical university. Regarding time management and effectiveness, students generally perceive synchronous online learning positively.

Furthermore, they reported methodological (content delivery), behavioural (individual personality), and technical challenges (internet connectivity and tools). Salleh et al. (2020) stated that open-scheduling online learning is a form of asynchronous learning not bound by a specific time or place. Students enrolled in this fashion of online education are free to access course materials and turn in assignments whenever it is most practical for them to do so. It also eliminates the need for students to physically attend university, which has been a problem during the recent COVID-19 outbreak and minimises the likelihood of overcrowded classrooms. Students who learn online benefit from increased self-discipline because they must take charge of their education. As previously reported in the literature, open scheduling is a form of online learning that allows students to access content, activities, and assessments at any time and from any location (Hodges et al. 2020). The outbreak of COVID-19 has created a new set of

challenges for open-scheduling online learning. For example, educators who are not accustomed to working with online students may struggle when the focus suddenly shifts to that method of education. Students may be less invested and motivated when they cannot see their teachers face-to-face. The study advocates for professors to accommodate student schedules and give them more than one chance to finish homework. The worldwide spread of the COVID-19 epidemic has affected many industries, including distance education (Faize & Nawaz, 2020).

3.5.2.4. Hybrid Online Learning

Hybrid, also known as blended online learning, uses both traditional and online learning well. Students are expected to do a part of their coursework through in-person meetings in the classroom and complete the other part online. This type of arrangement enables the students to have a deeper level of engagement with the teacher and fellow students. There are several advantages to hybrid online learning for both students and teachers, as Triyason et al. (2020) bring out in their research. It puts learners in command of their learning by allowing them to learn more whenever and wherever works best for them. It helps close the "digital gap" by giving students access to information and resources not usually available at educational institutions. It also allows educators to focus more on learner instruction and less on paperwork during class time. As a result of the COVID-19 pandemic, universities have begun implementing hybrid online courses. A study by Li et al. (2021) identified several critical challenges that need to be resolved for it to be successful. Moreover, learners' lack of interest and motivation is a significant issue. Learners frequently lose motivation and enthusiasm in their studies due to a lack of direct human contact. In this regard, improved training and support are required for educators to successfully employ technology in the classroom.

On the other hand, the epidemic forced educational institutions to adopt hybrid online learning, which presented unique challenges. The transition to this new learning model created challenges because students lacked the necessary materials and equipment and missed the physical classroom environment. Bergdahl and Nouri (2021) stated that there are various ways to overcome these issues. They advise teachers to provide learners with the appropriate resources and technology, such as laptop computers and an internet connection, to promote online learning. Giving students tools like goal planning, time management, and regular virtual meetings with teachers is also critical to help them focus and stay motivated. Teachers should also employ movies, audio

recordings, interactive quizzes, and other activities to create a more enjoyable learning environment. It is critical to encourage student collaboration through group projects and group discussions. Institutions can ensure the success of the hybrid online learning process by implementing these measures.

3.5.3. Advantages of Distance Learning

3.5.3.1. Accessibility and Flexibility

Distance learning allows students to access course materials on any electronic device. For instance, students who missed classes because of sickness should not face disadvantages since they can access online lesson materials whenever they choose. Students who experience challenges with traditional classroom participation find their educational experience improved through distance learning. It allows the students to manage their own time during the coursework period. More students are choosing education methods that provide flexibility through distance learning. Students benefit from distance learning because it allows for both accessibility and flexibility. One of the key benefits of remote education is its accessibility. Because most courses are delivered online, students can access the course materials anytime. This adaptability can be especially useful for older students who must balance work and family obligations with their academics (Ilgaz and Gulbahar, 2017). Simamora (2020) argued that in several challenges for students and instructors, the most significant obstacles consist of problems with communication and collaboration, a lack of time management skills, and an inability to track the development of the students. In addition, these issues can be overcome by making use of the technologies that are currently accessible as well as by giving students the tools and training they require to manage their time and remain organised effectively.

On the other hand, according to Xie et al. (2020), this change was motivated by the need to decrease physical contact and preserve the safety of students during COVID-19. The authors also highlight that distance learning has made it easier for students to access courses and has provided many other advantages, such as improved access to resources and greater flexibility in study patterns. This is especially beneficial for individuals with restricted access to actual classrooms owing to job or family obligations. In addition, remote learning has enabled students to acquire autonomous learning skills, as they can assume responsibility for their education and tailor their timetable to their specific needs. Furthermore, online learning has been beneficial in allowing students to complete

their studies during the Covid-19 pandemic, as well as an effective way to improve the accessibility of educational resources, and it is expected to continue to be a popular type of education in the future (Xie et al., 2020; Chavarría-Bolaños et al., 2020).

3.5.3.2. Enhancing Traditional Educational Methods

Current problems facing traditional schools and universities, such as increased tuition, budget cuts, and course shortages, prompt many students to seek alternatives. In addition, it is not a secret that, due to quarantine, every university in 2020 had to move to Online Education. Online education has become a prominent alternative to traditional higher education in the UK, following the COVID-19 pandemic. Many universities are now integrating blended learning models that combine online and in-person teaching methods to enhance flexibility and accessibility for students (Universities UK, 2021). Online learning's consistently improving reputation helped fuel its spread, as initial mistrust collapsed in the face of research showing that online learning may be just as successful as face-to-face education (Mirkholikovna, 2020). One of the advantages of distance learning is that students can connect to other professionals from other parts of the world. This is unlike traditional mortar and brick classrooms, where students only have access to their teachers. Relevant educational facilities, such as free virtual field trips to zoos, enable the students to gain experience about places they may not get a chance to travel to by themselves. Although the list of benefits of distance learning appears to surpass the list of drawbacks, some students may find that pursuing their college or university education through distance learning is not the best option for them (Sadeghi, 2019).

Nevertheless, Kotrikadze and Zharkova (2021) argue that distance education will take precedence over traditional education in the future, but traditional education should not be abandoned. Distant education is a unique style of education that includes full-time and distance learning features in its technologically based combinations. Current communication technologies and electronic publications enable you to avoid the problems of traditional education while retaining all its benefits. This has also been explored in prior studies by Abuhammad (2020) during the COVID-19 pandemic that examined the financial benefits of distance learning, and distance learning saved money and can minimise expenses like facility and labour costs associated with physical classrooms, which are sometimes a significant expense for educational institutions. In

addition, distance learning can help firms save money by reducing their energy expenses and offering access to digital tools and resources that can enhance traditional learning.

3.5.3.3. Secondary or Postsecondary Education Benefits

Students at secondary and college levels benefit greatly from distance learning. They can join a full or part-time workforce even as they pursue their degrees online. Equally, distance learning saves students from incurring other extra costs, such as travel and accommodations. According to Mirkholikovna (2020), distance education enhances technical capabilities. Only the most basic online courses necessitate the development of new programming skills, as students learn to navigate various learning management systems and tools. Participation skills developed by students in their online courses are transferable to multiple vocations, such as authoring and sharing papers, incorporating audio and video assets into assignments, and completing online training sessions. Several schools also supply children with free laptops or iPads. (Goegan et al., 2022; Al-Ansi et al., 2021) explore the advantages of postsecondary online education during the COVID-19 epidemic. The study shows that online learning has enabled students with learning difficulties to participate in postsecondary education, allowing them to work at their own pace and in their preferred environment. Additionally, the report notes that distance learning has enabled students with learning difficulties to receive educational accommodations, such as extended time for assignments or assistive technology. Moreover, distance learning has enabled students with learning difficulties to engage in meaningful interactions with their instructors and peers, thereby enhancing their success.

Furthermore, distance learning during a pandemic can reduce the cost of secondary education for students and their families by eliminating the need for costly physical infrastructure and resources. During COVID-19, Lei and So (2021) conducted comparative research on the advantages of distance learning for secondary and postsecondary education. The investigation showed that distance education provided multiple benefits for secondary and postsecondary students by giving time flexibility and learning pace control without physical classes and improved instructional resource access through digital platforms. Distant learning provides better educational access to students from disadvantaged families who face barriers in traditional classrooms. Moreover, Al-Ansi et al. (2021) argue that these days, everyone from learners to professors to administrative personnel uses social media platforms like WhatsApp and

Facebook to stay in touch with one another, collaborate on projects, plan events both within and away from campus, and get answers to many questions. In recent years, social media has overtaken traditional communication patterns and become ubiquitous in educational settings. Social media usage, sharing and processing knowledge, and enhancing the quality of education were ranked as the top three advantages of ICT-based learning, while distant learning, more time, adoption of new skills, and additional technologies.

3.5.4. Challenges of Distance Learning

During the COVID-19 epidemic, for example, in California, United States, students of various genders in higher education have encountered significant psychological distress, such as mental health issues, exacerbated by the necessity to adjust to virtual learning settings (Rubach et al., 2022; Van De Velde et al., 2023). Distance learning has allowed students to pursue their education throughout epidemic issues, but it has additionally limited their sense-making processes, essential for academic adaptation and success (Pregowska et al., 2021). Sense-making, where students interpret, evaluate, and organise information to form meaningful insights, is very stressful in a virtual setting, where personal interactions are limited and students face obstacles in developing a coherent understanding of their academic and social environments (Du Plessis et al., 2022).

Online education has highlighted these challenges, with students having to independently reconstruct their learning routines and manage new forms of information (Paudel, 2020; IAL, 2020). This shift to digital platforms has emphasised how different age demographics encounter diverse issues in distance learning. For example, Pozas et al. (2021) discovered that younger students often find online education activating and better aligned with their digital interests, while older students may find it more challenging to adapt, requiring more significant sense-making efforts to navigate unfamiliar technological tools and methods. Distance education, as a newer mode of learning, demands psychological, motivational, and cognitive adjustments, which impact the sense-making process differently across academic disciplines, especially for first-year students who are still adapting to the higher education system (Karpovich and Krepkaia, 2022; Fiorella, 2023). Effective sense-making in such settings is vital for students' academic resilience and success, highlighting the need for targeted support mechanisms to aid diverse learners in this ongoing transition (Polat, 2024).

3.5.4.1. High Possibility of Getting Distracted

Distance learning has its share of distractions. Time management gets more difficult due to distractions and having new duties. Managing one's time well relies solely on one's drive, making it possibly the most challenging obstacle for learners to overcome. Students must take their education seriously, develop time management skills, create daily schedules, and study despite interruptions. This can be due to a lack of structure or accountability, and the many distractions in a home environment. Students can set boundaries, create a schedule, and eliminate distractions, when possible, to combat this.

Additionally, they can contact their teachers or classmates for support and accountability. Due to COVID-19, many students switched from the traditional classroom to distance learning. One of the most significant disadvantages of distance learning is the increased likelihood of becoming distracted, particularly for female students who are mothers (Fensie et al., 2024). Distance learning has also become increasingly popular due to the growth of technology and the flexibility of learning from anywhere (Garlinska et al., 2023). Despite its convenience, it can be difficult for learners to stay focused and avoid many distractions. Previous research showed a few strategies to support students staying on track while engaging in distance learning (Renzulli, 2015; Martin and Bolliger, 2018; Tulaskar and Turunen, 2022). First, learners should create a designated learning area in their homes. When they have a specific area free from distractions, they are more likely to remain concentrated and have a better learning experience.

Additionally, they should build a daily schedule and stick to it; learners may be less productive without a routine because they are more likely to become distracted. Furthermore, they should also set realistic aims. This will help them stay motivated and be more productive (Kebritchi et al., 2017). In terms of outcomes, the negative effects of distractions on learning outcomes were found to be more significant when learners engaged in activities that required high levels of attention and cognitive load, such as reading and problem-solving tasks. Zureick et al. (2018) suggested that reducing distractions during distance learning by promoting better time management, increasing self-regulation, and providing a conducive learning environment could improve learning outcomes and student performance.

3.5.4.2. Difficulty in Adjusting to Online Settings

It can be challenging for some individuals to comprehend studying in their homes or private areas. Personal spaces are for recreation and relaxation, while education systems like schools and universities are instructional settings. The learners' first dislocation in learning environments may impact their learning attitude. The COVID-19 pandemic has had a devastating impact on education systems worldwide, and with online settings becoming the new norm, many people have faced significant difficulty adjusting to this new reality (Meng et al., 2024). A study by Zhang et al. (2022) explored the psychological effects of the pandemic on the education community, which cannot be overstated. Many teachers also feel more stressed and burned out as they get used to teaching from home and dealing with their problems related to the pandemic. Some researchers have asked that mental health be given more attention in institutions and targeted interventions be made to help students and teachers. In addition to providing psychological support, universities may need to reconsider how they assess and grade students, considering the pandemic, the unique problems students face and the need for flexibility and understanding. This could mean changing grades, giving students different grading methods, and considering how the pandemic has affected student performance (Minkos and Gelbar, 2021).

3.5.4.3. Technical Problems for Students

Unfortunately, in a world where everything is done online, technical problems will inevitably arise. Although it may seem obvious, internet connectivity problems and technical difficulties only frustrate online users' experiences with distance learning, which are disrupted. It can be challenging to keep up with virtual peers and the learning environment when the computer crashes or weak monitors are used. Furthermore, technical problems can be an immense burden for students in the digital age. From slow internet speeds or malfunctioning hardware to complicated software programs, modern students often find themselves in dire need of technical aid. Online learning is an option available to at-risk students; in giving learners autonomy and control, online learning has been found to raise student satisfaction and establish a conducive learning space, as described by Cullen and Oppenheimer (2024). This setting is ideal for high-risk students as it enables them to study individually and under reduced stress. Education has experienced significant changes due to advances in artificial intelligence technology. Additionally, the datafication of education has assisted the creation of automated techniques to identify patterns within vast datasets, enabling the estimation of unknown

facts and behaviours regarding students. The challenge reduces the possibility of student failure or disengagement by shortening the time between risk identification and actual at-risk status (Bañeres et al., 2020).

Online learning can deliver the essential teacher or mentor support needed for at-risk learners to stay engaged. Students who face unexpected barriers that prevent them from attending campus classes can gain significant advantages from online education because it enables them to study rapidly and conveniently. Educators can use technology to help students at risk of not reaching their educational potential. As a result of COVID-19, several schools and institutions now utilise distance learning to continue teaching and learning while remaining out of harm's way. A study by Armstrong-Mensah et al. (2020) analysed the effects of distance learning on Georgia State University School of Public Health students. The research demonstrates that distance learning impairs student performance and well-being due to technological problems and insufficient student-faculty communication. The research discovered that students' motivation and interest in their studies diminished due to reduced personal interaction with classmates and teachers. The findings show an urgent need for increased student support and resources to effectively cope with distance learning challenges and maintain student engagement and motivation. The teaching process presented obstacles for instructors because interactions felt inauthentic, and natural teaching intentions were lost. While teachers quickly learned to use technological platforms, interaction was not of high quality.

Additionally, teachers were concerned about their students' progress. Despite students' descriptions of heavy workloads and motivation problems, teachers failed to recognize them (Niemi and Kousa, 2020). In this study, many respondents confirmed that faculty digital literacy and competency still require improvement and a more systematic approach.

3.6. Chapter Summary

This review provides insights into the complex relationship between social media use and academic performance, particularly from an information science perspective, where understanding information behaviour and sense-making is essential. Information behaviour describes how individuals seek, process, and use information in digital contexts like social media. At the same time, sense-making refers to how individuals create meaning from this information, particularly when navigating complex or new environments. Within higher education, these concepts shed light on how students interpret and interact with content on social platforms, influencing learning outcomes and engagement. Furthermore, the research demonstrates that a deep understanding of contextual and cultural factors is essential to comprehending the impact of social media use on learning. Studies show that female students prefer technology-based learning more than their male peers. The pandemic worsened the existing divide between technology accessibility and digital literacy. Low-income individuals, minority groups, and underdeveloped nations experience the most significant effects of this accessibility gap. Studies on the digital divide in advanced countries during the COVID-19 pandemic identify many potential disparities. A comprehensive examination of mitigating techniques is required to address the digital gap in these countries. This could involve a thorough examination of policies and initiatives. Secondly, while challenges are mentioned, the studies lack quantitative data to support claims, which could enhance the findings. A deeper, interconnected analysis that considers the enhancing effects of factors like race, gender, and geographical location with diverse data sources and types is warranted.

Furthermore, regarding gender differences, the potential gaps identified in the factors influencing gender-based differences during the COVID-19 pandemic could delve deeper into the underlying factors contributing to these differences. For example, exploring the societal, cultural, or psychological reasons behind these variations would be beneficial. Also, considering potential intersections with other factors like age, technological access, or experience, including a long-term implication, how might these differences affect future educational practices and outcomes, especially post-pandemic? We also need to consider the gaps in academic strategies. While there is a need for educational social media assistance for female students, detailed strategies and recommendations to address gender-based disparities in social media use for education are lacking. Exploring potential solutions could enhance the search. In addition, studies do not examine

potential variations in the usage of different social media platforms. Investigating whether certain genders prefer specific platforms could provide valuable insights. Regarding differences in attitudes and perceptions towards social media usage for learning among male and female students, one gap is the lack of exploration into the underlying factors contributing to these gender-based distinctions. Moreover, gender differences affect student achievement and satisfaction with distance learning; however, the gap is the limited exploration of how these gender-based variances develop over time. Researchers have not examined how these differences might improve or alter as students' progress through their educational experience. Previous studies also provided insights into the impact of gender and educational level individually; little research has been done on how these variables affect people's ability to obtain education in times of crisis, such as the pandemic.

More in-depth research is needed to understand these variables and their complex interactions and causal connections. Research has demonstrated that gender-based perceptions reveal distinct ways males and females understand social media usage. Researchers have not yet conducted an exhaustive examination of what drives these beliefs. The potential long-term sustainability of hybrid educational methods requires additional research to understand their effectiveness and cost-efficiency in distance learning. There is limited research on the post-graduation outcomes and employability of students primarily engaged in distance learning. The study examines whether distance learning students experience unique employment obstacles or benefits compared to students from traditional educational backgrounds. Exploring methods and strategies to assist higher education students in overcoming distractions during distance learning is essential. Discover practical techniques to help students and teachers adjust to online learning environments during significant disruptions such as the COVID-19 pandemic. While it is acknowledged that many have faced difficulties in transitioning to this new educational model, the role of psychological support in helping students and educators overcome the challenges and stressors associated with online learning environments is also acknowledged. This review of existing literature has helped the researcher thoroughly comprehend social media's complex functions in education. By addressing the potential gaps identified above, this study can contribute to an in-depth and significant analysis of gender differences in the adoption and usage of social media for higher education after the COVID-19 pandemic and evaluate technological impacts on learning.

Chapter 4: Research Methodology

4.1. Introduction

The methodology employed in research is a fundamental cornerstone of scientific inquiry, seeking to reveal novel knowledge and perspectives. The process of systematically executing research involves utilising a structured set of techniques, designs, and methods (i.e., procedures for gathering and analysing data). The significance of a research methodology lies in its ability to ensure an accurate plan that helps maintain the researchers' focus and facilitates a smooth, efficient, and controlled process. It also allows the reader to understand the strategy and procedures used to reach conclusions. The study's goal, the models to be utilised, the type of information to be gathered, the plan to gather information, and the procedures to be used for information inquiry and acceptance should all be included in the study approach (Tutunji, 2015). In this chapter, the research will discuss and explore the definition and importance of research methodology and common research methods, including literature reviews, surveys, and interviews.

4.2. Research Design

"Research design" refers to the comprehensive approach employed to conduct a research investigation. To be more precise, a research design refers to the systematic and structured approach that researchers use to address a particular research inquiry. In essence, a research design encompasses three discrete components: a systematic scheme, a coherent framework, and a well-defined approach (Bloomfield and Fisher, 2019). This systematic design functioned as a thorough plan that accurately described every stage of the study procedure. The framework organised the development of research questions and guided the selection of appropriate methods while ensuring systematic data collection and analysis. The systematic approach of this plan improved the study's organisational framework and maintained consistent progression throughout the entire research process.

4.2.1. Mixed Methods

Mixed methods are research methods that combine quantitative and qualitative research methodologies, methods, approaches, concepts, or language into a single study. Philosophically, mixed methods are defined as a third research movement that provides a rational and practical alternative to traditional research paradigms or methodologies. Additionally, integrating mixed-methods research provides readers with greater trust in the study's findings and conclusions by providing a more in-depth and comprehensive understanding of the research topic from multiple perspectives. (Johnson and Onwuegbuzie, 2004, p. 14; McKim, 2017). This research used the mixed methods of an explanatory approach. Integrating qualitative and quantitative approaches in research has been a well-established practice. Employing multiple methods to investigate a common issue might have reduced, to some degree, the errors of each. In a single study, a researcher may choose to utilise both qualitative and quantitative methods. (Harrison, Reilly, & Creswell, 2020; Heesen, Bright, & Zucker, 2019; Natow, 2020).

These mixed methods are based on sequential explanatory research, which involves a first stage of quantitative data gathering and analysis, followed by a second stage of qualitative data gathering and analysis that builds upon the conclusions drawn from the first quantitative step. The first stage is often given more weight, and the data are blended by integrating quantitative data analysis with qualitative data collection. Thus, researchers use the outcomes of one method to shape and advance the subsequent one (Creswell, 2007). This study adopted a sequential approach to understand the research questions better. The initial quantitative phase allows for the efficient identification of broad patterns and trends. The subsequent qualitative phase then explores motivations, perceptions, and differences in the context not fully captured by quantitative measures alone. The methods embraced for this study include a literature review, a questionnaire-based survey, and interviews. A roadmap was designed to explain how the research methods were chosen to meet the study's objectives. The accomplishment of each goal relies on the appropriateness of the selected research strategy. The first goal can be completed by recovering information from the previous literature review. The other goals will depend on the results of the questionnaire-based surveys and interviews. The overall methodology is visually summarised in Figure 4.1, which illustrates the integration of the literature review, survey, and interviews in addressing the main research question and sub-questions.

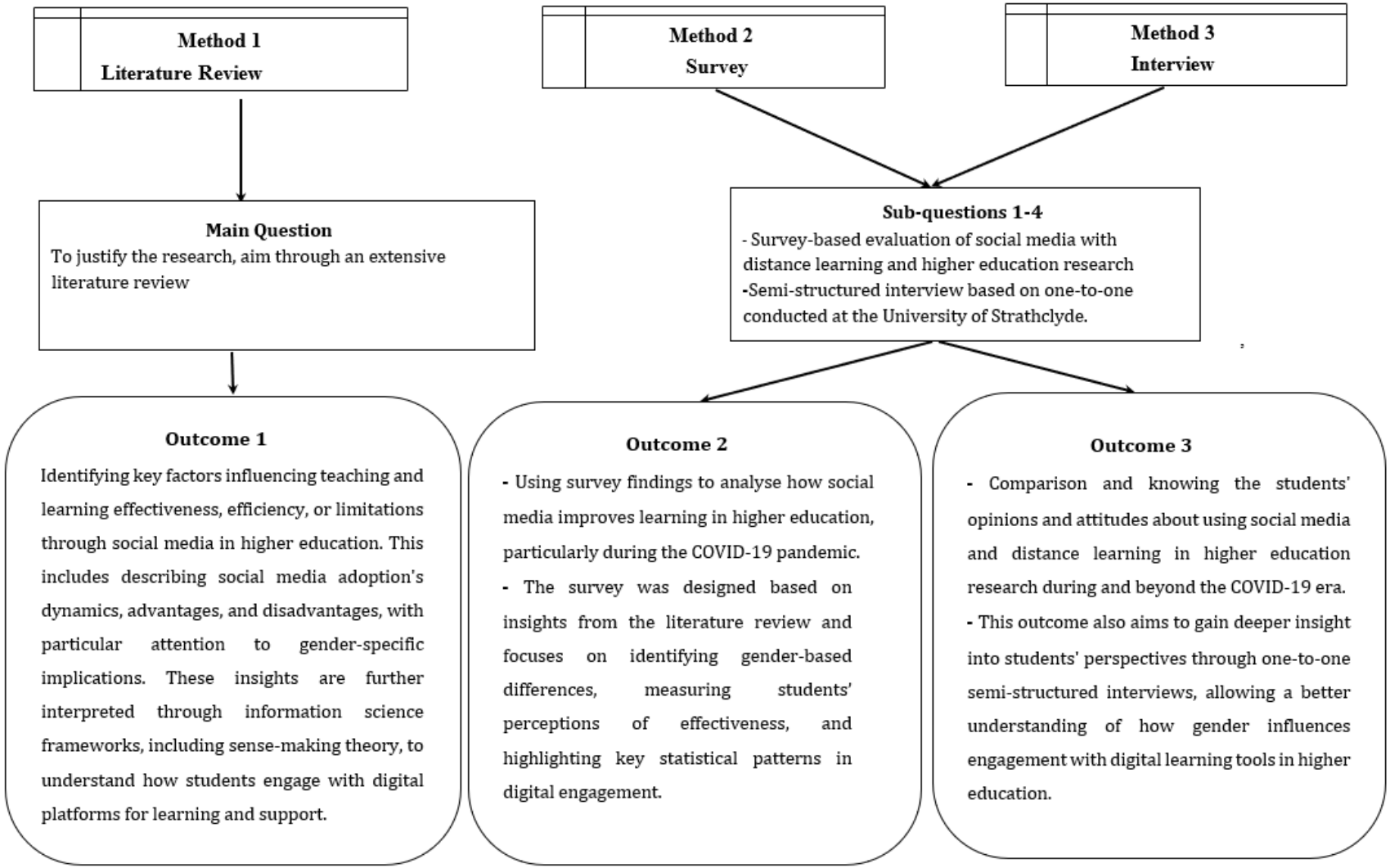

Figure 4.1: Research Methodology

4.2.2. Mapping Research Questions and Objectives to Methods

As mentioned earlier, this study adopted a sequential explanatory mixed-methods approach to investigate gender differences in the use of social media and distance learning in higher education. The research questions and objectives were directly linked to the two main phases of data collection, quantitative (survey) and qualitative (interviews). Each method served a specific function in answering the research questions and achieving the study's objectives. Both methods contributed to the main research question, which explored how gender differences are perceived in utilising social media platforms and distance learning in higher education. The survey identified trends in usage, attitudes toward technology, and perceived gender-related obstacles. The interviews explored students' lived experiences and their views on digital confidence, support, and equity in online learning.

The survey addressed **Sub-question 1**, which aligns with the objective: "To examine students' perceptions of how gender differences affected the use of social media for distance learning during the pandemic." The interviews supported this by exploring perceived engagement levels and confidence, comparing students' practices during the pandemic.

The interviews primarily addressed **Sub-question 2**, aligned with the objective: "To explore the implications of these perceptions for supporting the unbiased use of social media for academic purposes." This phase focused on perceived gender barriers, support systems, and institutional efforts aimed at promoting inclusivity.

The survey also addressed **Sub-question 3**, linked to the objective: "To understand how gendered perceptions influence the information behaviours of students in higher education." It collected data on information-seeking practices, platform use, and academic engagement. The interviews added depth by describing how male and female students assess and interact with academic materials.

Finally, the survey addressed **Sub-question 4**, linked to the objective: "To understand how perceived gender differences influence the use of social media platforms for distance learning in higher education." This included analysis of engagement levels, preferences, distractions, and platform effectiveness. The interviews further enhanced this understanding by providing insights into personal learning routines, overcoming strategies, and perspectives on flexibility. A summary of how each method is aligned with the research questions and objectives is presented in **Table 4.1**.

Method	Purpose	Linked Sub-question(s)	Linked Objective(s)
Literature Review	To inform the development of the main research question, sub-questions, and objectives. Provided the theoretical and conceptual foundation.	Main Research Question and Sub-questions 1–4	All objectives
Survey	Identified perceived gendered patterns in usage, engagement styles, and learning preferences related to social media and distance learning.	Sub-question 1, Sub-question 3, Sub-question 4	• Examine perceived gendered use of social media • Understand learning engagement in digital environments • Explore preferences for online platforms
Interviews	Explored students' perceptions, experiences, and equity-related challenges in distance learning.	Sub-question 2 (direct) supports Sub-questions 1, 3, and 4	• Explore perceptions of support for unbiased use • Deepen insights into information behaviours and engagement in online learning

Table 4.1: Overview of Research Methodology of Methods Connection with Research Questions and Objectives

4.3. Literature Review

The development of the main research question, sub-questions, and objectives in this study was based on a narrative literature review, as detailed in Chapter Three (3.1.1), which provided the theoretical and contextual foundation for the methodological approach. A literature review synthesises prior research to reinforce the basis of knowledge by offering a detailed analysis of literature relevant to a topic, theory or method (Paul & Criado, 2020). Furthermore, the literature review helps create the research map framework and identifies key principles that aid in achieving the research objectives. Establishing a foundation for one's research by linking it to pre-existing knowledge is a fundamental aspect of academic research, irrespective of the field of study. A literature review is a systematic approach to gathering and integrating prior research findings. A research method conducted effectively and precisely, such as a review, can establish a strong foundation for advancing knowledge and developing theory. When well-executed, a literature review can synthesise empirical evidence and diverse perspectives to provide valuable insights that may not emerge from a single study alone (Snyder, 2019). This study builds upon an integrative literature review, which addresses new and emerging topics in the context of social media and distance learning in education during the COVID-19 pandemic. However, this research may be utilised as a review for further analyses, such as a scope review.

Additionally, the primary objective is to generate preliminary conceptualisations instead of revisiting established models. The aim is typically not to provide a comprehensive overview of all literature about the subject matter but rather to integrate viewpoints and understandings from diverse fields or research paradigms. The literature review did not directly answer the research questions. Instead, it revealed research gaps and conflicting results while identifying emerging themes, subsequently shaping the creation of research questions and objectives for the empirical investigation:

Main Research Question: *How are gender differences perceived in the utilisation of social media platforms and distance learning in higher education?*

Sub-question 1*: How did gender differences shape how students engaged with social media for distance learning during the pandemic, and what broader patterns in social media usage emerged as a result of higher education?*

Sub-question 2: *What are the implications for promoting equitable use of social media for academic purposes?*

Sub-question 3: *How do gender differences impact the informational behaviours of students across different disciplines at Strathclyde University during distance learning?*

Sub-question 4: *To what extent do male and female students engage with distance learning and online educational settings, and what differences, if any, exist in their usage patterns and preferences?*

Research objectives

- *To understand how perceived gender differences influence the use of social media platforms for distance learning in higher education.*
- *To examine students' perceptions of how gender differences affected the use of social media for distance learning during the pandemic.*
- *To explore the implications of these perceptions for supporting the unbiased use of social media for academic purposes.*
- *To understand how gendered perceptions influence information behaviours of students in higher education settings.*

4.4. Survey

This study begins with collecting and analysing quantitative data to explore a novel research domain, aiming to define and elucidate the essence of the problem. As previously indicated in this section. The outcomes of this stage were used to formulate a set of interview questions, which were subsequently employed to conduct the second phase. The formal, objective, and systematic process of describing variables, testing relationships between them, and examining cause-and-effect associations between variables is known as quantitative research (Bloomfield and Fisher, 2019). Quantitative research is characterised by producing numerical data and is primarily influenced by positivist or post-positivist paradigms (Davies & Fisher, 2018). Bloomfield and Fisher (2019) argue that quantitative research typically involves testing a hypothesis, often the null hypothesis, which posits a specific relationship between independent and dependent variables. This is accomplished by selecting a representative sample from a known population, collecting data on the variables of interest, and subjecting them to statistical analyses. Nonetheless, the utilisation of quantitative methods also entails

certain drawbacks. A significant drawback associated with using numerical data is the potential for oversimplifying complex phenomena, as variables may be reduced to numerical values that fail to capture the phenomenon's complete complexity fully. Furthermore, quantitative methodologies do not facilitate a thorough investigation of individual experiences and viewpoints, which qualitative approaches can capture more efficiently. Notwithstanding these constraints, quantitative research methodologies persist as a crucial instrument for education scholars endeavouring to comprehend intricate social phenomena (Queirós et al., 2017).

4.4.1. Questionnaire-Based Survey

The survey questionnaire gathers data from a predefined sample population through structured questions. Respondents' high-quality responses depend on their appropriate knowledge of the survey's theme. Respondents must have access to the information and the ability to answer questions relevant to them. A structured set of questions collects statistical information about a population's attributes, attitudes, or actions (Preston, 2009). The questionnaire survey is a widely used research method in indoor environments (Xu et al., 2021; Yang et al., 2020; Catalina et al., 2022; Sharma, 2022), with four benefits. First, it is efficient since investigators can employ group surveys and mail or publish questionnaires. Second, classified surveys enable respondents to remain anonymous and openly share their genuine views and experiences. Thirdly, uniform questions allow investigators to compare outcomes. Finally, an extensive survey, with no distance limit, and responders can take their time answering each question, yields more accurate answers. The primary targets for my questionnaires were the current users of social media and distance learning in the higher education sector. Moreover, their replies will act as my primary data. This method of gathering information will help achieve the research objectives outlined in this study. A survey was conducted in this study.

4.4.2. Survey Design

Qualtrics software, a tool provided by the University of Strathclyde, was utilised to design the survey and collect responses. The developing procedure required careful consideration when choosing the questions. The survey questions were developed through the integration of knowledge from relevant literature, specifically studies conducted by Korlat et al. (2021), Yu (2021), Hong et al. (2021), Novakovich et al. (2017), and Abduh (2021), which examined gender perceptions and attitudes towards males versus females in online COVID-19 contexts. The effectiveness of social media in distance

learning and gender experiences was explored by considering insights from studies conducted by Sahakiants & Dorner (2021), Sobaih et al. (2022), Rizun and Strzelecki (2020), Stella (2020), Veletsianos et al. (2021), Mirkholikovna (2020), and Al-Ansi et al. (2021). Snyder (2019) argues that the foundation of all academic research activities, regardless of the field, is based on constructing and connecting one's research with existing knowledge. This process was conducted with a keen focus on aligning the survey questions with the study's objectives. Within the Qualtrics software, the database includes organised blocks representing questions and their corresponding categories. Additionally, the software facilitates ranking selected questions within these blocks, providing a structured framework for an effective survey design. The thoughtful selection of survey questions was guided by the research objectives, ensuring that each question contributed to the overall study goals.

The survey was designed to address the study's research questions by collecting detailed, structured, and gender-aware data. Questions were grouped into areas: gendered perceptions of online learning, effectiveness of social media in education, and student experiences and challenges. This structure supported thematic categorisation and statistical cross-analysis aligned with the mixed-methods design. A high level of granularity was intentionally built into the survey to examine aspects such as the platforms used (e.g., Twitter, WhatsApp, Facebook), their usage (e.g., communication, collaboration, file-sharing), and the frequency and duration of their use during the COVID-19 pandemic. All items were presented using Likert scale formats, which allowed participants to respond with varying degrees of agreement, frequency, or satisfaction. This structure also helped reduce bias, as questions are phrased neutrally and non-leading. Sensitive demographic items, such as gender, included inclusive options like "Prefer not to answer." The instrument was refined through a pilot study, ensuring the final questions were clear and ethically appropriate for diverse respondents.

4.4.2.1. Data Tool

The questionnaire was developed using a systematic process consisting of five phases, which were undertaken for both a test pilot study and the final version. These phases are outlined below. Phase one involves identifying items, elements, and scales derived from existing literature, relevant theories, and consultations with the supervisor. The researcher created the initial questionnaire by writing it in a Word document. Phase Two: The supervisor received a copy of this draft and was requested to evaluate it and

provide her feedback and suggestions. Phase three: The researcher created the questionnaire using the online survey platform Qualtrics.com. The supervisor collaborated on the account, offering final adjustments and recommending a pilot study. Phase four: A pilot test with eight University of Strathclyde students from various faculties, levels of study, and genders helped to reduce the ambiguity of the survey items. These students were asked to evaluate the survey. This covers the duration, clarity, relevance, and length of the survey questions, which provide relevant comments.

Furthermore, further comments were given regarding the content and structure of the questionnaire. After considering the provided ideas, some questions were changed and improved. Phase five: Following the pilot study, the researcher presented the completed questionnaire design to their supervisor, who approved its implementation. Subsequently, the questionnaire was activated and sent to current students at the University of Strathclyde by the administration of the university's main schools and faculties. Refer to Appendix B.1 for the last version of the questionnaire.

The questionnaire was divided into four sections. Section one included student demographic data, such as (a) gender, age, faculty, gender, and study level. Section two analysed gendered perceptions and beliefs regarding whether males outperformed females in COVID-19 online learning settings. Section three of the survey focused on the perceptions and beliefs about gender and the effectiveness of social media in distance learning. Section four: Gender experiences and challenges in distance learning using social media.

The respondents were asked to evaluate their use of social media in their study and distance learning using a Likert scale, specifically designed with five or more points. Likert scales, a widely employed tool in research, provide a structured measurement approach where participants express their opinions or attitudes by selecting a response on a scale. The Likert scale used in this study ranged from 1 to 5, providing a broader range of options for participants to express their views. The scale included descriptors such as Strongly Disagree (1), Somewhat Disagree (2), Neither Agree nor Disagree (3), Somewhat Agree (4), and Strongly Agree (5), or additional points as applicable. This method enables an accurate and detailed assessment of participants' perceptions, offering a standardised yet flexible approach to measuring the intensity of attitudes or opinions related to the use of social media and distance learning within the study context. Likert scales are a commonly employed method for measuring instruments, with the

Likert scale being a foundational and extensively utilised statistical tool in various study areas. In contrast, open-ended questions often obtain complex responses (Taherdoost, 2019).

4.4.2.2. Data Collection

The questionnaire was conducted on Qualtrics.com for four months, specifically from November 1, 2021, to March 1, 2022, as stated in the earlier sub-section. Online surveys offer numerous benefits compared to traditional survey techniques. Their capabilities include incorporating dichotomous questions, multiple-choice questions, scales, and questions presented in a multimedia format. This includes single-response, multiple-response, and open-ended questions (Latkovikj & Popovska, 2019; Ball, 2019). Participants could add to the closed-ended questions by selecting from identified response options based on their experiences. In addition, the survey inquired about demographic information, including gender, age, preferred social media platforms, study level, student status, and the difficulties and distractions observed during the COVID-19 pandemic. Participants had the opportunity to enter a drawing after completing the questionnaire. A £35 Amazon gift card was offered as a prize. The recipient was selected through a random draw. Participants' email addresses, which they had voluntarily submitted for the draw, were printed and placed into a cup. To ensure fairness, the researcher asked one PhD candidate from the Department of Computer and Information Sciences to conduct the draw by randomly selecting one of the printed email entries. The researcher contacted the administrators via email from the relevant departments, enlisting their assistance in distributing the information to all current university students. The email provided concise information about the researcher and their study, and an online link to access the questionnaire. A total of 173 participants completed the questionnaire. The participants in question were representatives from the four primary faculties of the University of Strathclyde.

4.4.2.3. Data Analysis

Quantitative analysis involves systematically interpreting numerical data, relying on statistical methods to draw inferences (Creswell, 2017; Field, 2013). My study employed standard techniques, such as describing data (e.g., frequency distribution, cross-tabulation), chi-square tests, and multivariate analysis with multiple variables (MANOVA).

The importance of statistical methods in data collection and analysis is underlined by Yilmaz (2013) and Eyisi (2016), who emphasise their foundational role in various methodological approaches and their ability to generalise findings. According to Mishra et al. (2019), descriptive statistics are used to summarise and describe the features of a dataset. Moreover, descriptive statistics can clearly understand the data's central tendency, variability, and distribution. Testing for normality is important for data, as it determines the central tendency, dispersion, and the choice of parametric or nonparametric test. While there are several ways to test for normality, the most common and extensively used approach is the Shapiro-Wilk test, which should be used for small sample sizes ($n < 50$) because it has higher power to identify non-normality. Any additional techniques (Kolmogorov-Smirnov test, skewness, kurtosis, z-value of the skewness and kurtosis, and histogram) will only be effective if our sample size (n) is at least 50 (Mishra et al., 2019). The analysis in my study centred on correlation and differences between groups; as a result, descriptive statistics were not a suitable analysis technique. I employed it only to examine demographic and general data, including gender, student status, faculty, level of study, social media platforms, challenges, and distractions to using social media for distance learning. IBM SPSS Statistics 28 was used to examine the data gathered at this stage. In light of this, I used Pearson's Chi-square test, along with tests based on independent samples. The Chi-square statistic is the most popular test, a non-parametric (distribution-free) method for analysing group differences when the dependent variable has nominal measurements. The Chi-square is robust to the data's distribution, much like all other non-parametric statistics. It enables the assessment of numerous group studies and dichotomous independent variables.

In contrast to numerous other non-parametric and specific parametric statistics, the computations required to determine the Chi-square offer significant insights into the performance of every group within the research and are rarely covered in journals that focus on new statistical techniques. (McHugh, 2013; Sharpe, 2015). The Chi-square test was used to determine if there is a significant association between two categorical variables, namely males and females. It compares the frequencies in a contingency table that would be expected if there were no association between the variables. To compare the perceptions and actual usage of the genders in depth, I used the Canonical Correlation Analysis (CCA) test. CCA is a common technique in multi-view learning used to explore and understand the relationships and associations between these sets of variables. It is possible to treat the representations from several distinct viewpoints.

Additionally, multi-view learning aims to maximise complementary and consensual information between many points of view to improve learning outcomes (Guo and Wu, 2019). Moreover, CCA is a model family of methods that helps find connections between variable sets from various modalities. Significantly, CCA works well for relationship descriptions between multiple data sets (Wang et al., 2020). In addition, Variant Analysis with Multiple Variables (Manova) is a multivariate statistical method used to analyse the relationship between two sets of continuous variables or to use an interval or ratio scale to analyse data from several variables, where the independent variable is made up of two or more groups and all these variables are analysed jointly or concurrently (Saleh et al., 2019). The following figure displays the canonical correlation, determining the relationship between variable sets from two measurement domains (see Appendix C for the variable sets used in this study). Chapter 5 presents the results, and I will further explore and present these relationships between the two sets in Section 5.3

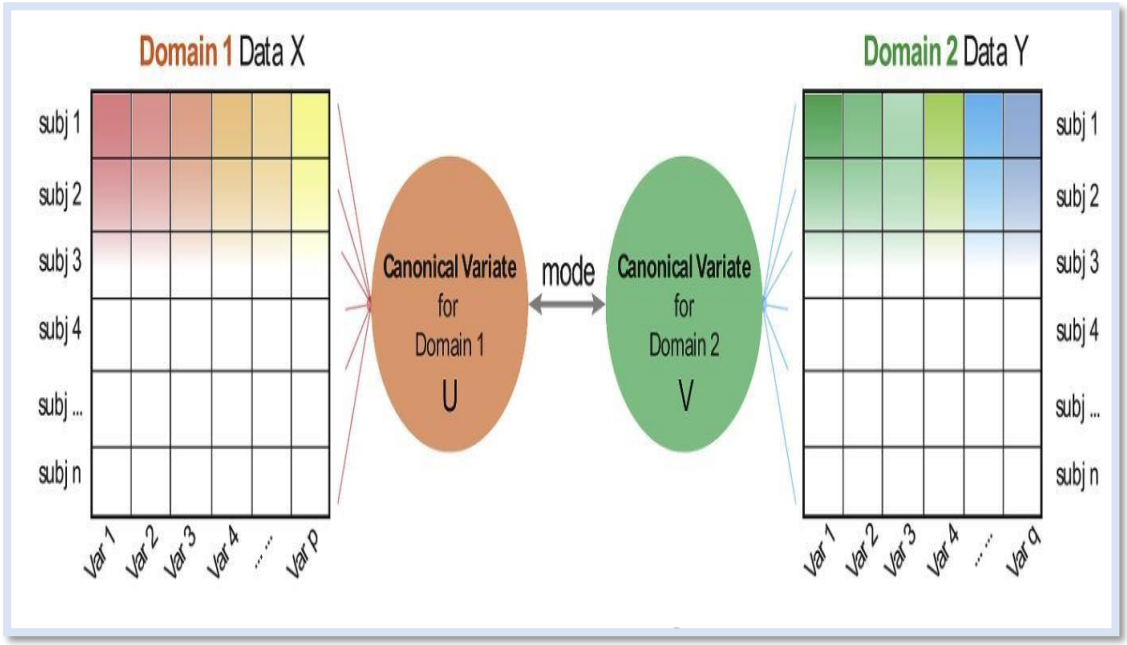

Figure 4.2: Overview of Canonical Correlation Analysis (CCA) Schematic (Wang et al., 2020)

To strengthen the validity of the findings and cancel false associations, the analysis included key demographic variables, faculty integration, nationality (UK vs. international), and student status (e.g., full-time or part-time) as potential confounding factors. These variables were cross-tabulated and examined with gender-based

groupings using Chi-square tests and MANOVA. This allowed me to assess whether observed gender differences in social media use, perceived support, and learning behaviours remained statistically significant across subgroups. Although a Bonferroni correction or alpha adjustment was not applied, the study actively mitigated the risk of p-hacking by using only pre-defined research questions to guide statistical testing, limiting the number of exploratory tests conducted.

While the results presented in Chapter 5 focus on statistically significant findings to maintain clarity, all tests were conducted based on the research questions and analysis plan developed during the design stage. This approach helped me reduce selective reporting and avoid the risk of p-hacking, even without formal hypothesis testing. Additionally, the findings were interpreted using qualitative results, not based on statistical outcomes alone. The study reduced false positive results by integrating safeguards and a mixed-methods design approach. The study implemented measures to confirm that detected gender-based differences were actual and not caused by random associations or excessive statistical testing.

4.5. Interviews

As discussed earlier, this study employed a sequential explanatory mixed-methods design. The first phase used a quantitative survey to investigate the research questions, while the second phase, the qualitative component, was developed based on themes that emerged from the survey results. Qualitative research proves to be highly effective when investigating new areas of research or gaining a deep understanding of complex phenomena. This study used semi-structured interviews to explore participants' experiences with social media and distance learning during the COVID-19 pandemic (see Appendix E for interview questions). Eldh et al. (2020) noted that qualitative studies often present findings using direct participant quotations to highlight themes.

Participants for the qualitative interviews were recruited via purposive sampling. A call for participation was distributed through a recruitment poster and shared across various online platforms, including the Researcher Development Programme (RDP) newsletter, the Students' Union, library spaces, and relevant departments. The poster was also shared with student groups and virtual noticeboards to reach a diverse participant base. It included a study summary, eligibility criteria, and contact information to ensure informed and voluntary participation.

4.5.1. Interviews Design

This qualitative study was conducted in January 2024 through semi-structured, open-ended interviews to explore participants' experiences with online courses, challenges, and presence in virtual learning environments. Through random sampling, 14 students were included in this study, comprising seven males and seven females, aged 18 to 40 years or older. For the inclusion criteria of these interviews, please refer to Appendix F.1. This design was selected due to its suitability for exploring the differences in attitudes and experiences during the distance learning investigation, which was based on survey results. Semi-structured interviews offer an adaptable and targeted framework, allowing in-depth exploration of participants' perceptions while maintaining some standardisation in the data collection process. Although other data collection methods have their place in qualitative research, one of the primary advantages of the semi-structured interview is that it allows for focused interviews while still providing the investigator with the autonomy to explore pertinent ideas that may arise during the interview (Adeoye-Olatunde and Olenik, 2021). This can further improve understanding with the assessment of distance learning.

4.5.2. Data Collection

In this study, a semi-structured interview guide was developed based on an initial analysis of the survey results. Themes that emerged most frequently and appeared most relevant to the research questions were prioritised for further exploration. These included patterns related to gendered engagement with social media, perceptions of teacher support, and digital learning experiences during the COVID-19 pandemic. Participants were recruited through purposive sampling, and a digital recruitment poster was shared via the RDP newsletter, the Students' Union, and departmental noticeboards to invite volunteers, as shown in Appendix F.2. The poster included a link to my personal university SharePoint page, which presented the Participant Information Sheet, researcher contact details, and the Consent Form, all accessible before participation. Preliminary interviews were first conducted with three students. Based on the outcomes of these interviews, the interview questions were subsequently modified; however, the data collection and analysis did not include this pilot interview. Each interview lasted between 20 and 40 minutes and was conducted in person or online. In a study by Meurer et al. (2007), qualitative data collection and analysis methods were

emphasised. They highlighted that interviews, a popular qualitative, one-on-one method of gathering data, allow for the targeted investigation of personal perspectives on subjects or themes. These interviews have a set format and include open-ended questions.

4.5.3. Data Analysis

The data analysis phase involved systematically examining the interview transcripts using thematic analysis. According to Clarke and Braun (2017), thematic analysis is a technique for detecting, analysing, and interpreting patterns of meaning (referred to as 'themes') within qualitative data. It is distinguished from other qualitative analytical techniques in that it provides a method, which is a tool or technique that is not constrained by theoretical commitments, as opposed to a methodology, which is a theoretically informed and constrained framework for study.

4.5.3.1. Familiarisation with the Data

The participants were interviewed through semi-structured interviews, and qualitative data were elicited from the 14 individuals. The actual audio content was transcribed by Convert to Text, although using Microsoft Word allowed me to get my first exposure to the dataset. Following Braun and Clarke's (2022) and Byrne's (2022) six-phase framework for thematic analysis, the data were systematically reviewed to understand participants' perceptions. The initial phase involved reading the transcriptions multiple times to gain an in-depth understanding.

4.5.3.2. Generating Initial Codes

The categorisation process was first done to segment meaningful segments in the transcribed texts. They could identify regular key phrases and thoughts with the help of Microsoft Word, particularly the comment and search functions. These codes came from the predetermined themes in the survey and other themes that emerged while the data was being analysed; as Byrne (2022) stated, the coding procedure is conducted to generate concise, brief descriptive or interpretive labels for information relevant to the research question(s).

4.5.3.3. Identifying Themes

Finally, in the case of coding, the next stage was sorting the similar or related codes into subthemes clustered into general themes. This step allowed the researcher to develop

specific items that suited the themes in line with the research objectives and objectives and, simultaneously, based on the participants' responses. These themes were analysed in relation to the study's research objectives, ensuring they obtained essential perspectives on online learning, gender differences, and support systems.

4.5.3.4. Reviewing Themes

Analysing identified themes and subthemes also ensured internal consistency and clear differentiation. Some themes were specified and grouped into two distinct parts, and some subthemes were modified to increase minimal differences. At this stage, the correlation between the identified themes was also made. At this stage, the identified themes were also correlated (Braun and Clarke, 2017).

4.5.3.5. Defining and Naming Themes

It was possible to identify terminal themes clearly and contain labels that describe them concisely. Each of the themes synthesised represented a part of the interviews' analysis.

4.5.3.6. Intermediate and Final Themes

After coding was completed, related codes were grouped into intermediate themes. These were refined and integrated into final themes, ensuring a match with the research objectives and participants' experiences. The table below presents the progression from initial codes to final themes, illustrating how themes were systematically developed from participant responses.

Initial Codes	Intermediate Themes	Final Themes
Freedom, especially for working students, the ability to learn at one's own pace, the availability of class-recorded lectures, and ease.	Benefits of Online Learning	Attitudes Toward Distance Learning
Absenteeism, inattentiveness, and distractions within the home environment	Challenges of Online Learning	Attitudes Toward Distance Learning
Interaction, personal connection, and classroom participation	Preference for In-Person Learning	Attitudes Toward Distance Learning
Internet issues, technical barriers, lack of teacher support	Barriers to Effective Online Learning	Experiences and Factors Influencing Opinions About Online Learning
Work-life balance, effective time management, self-discipline, and flexibility to accept the new reality of remote learning.	Adaptation to Online Learning	Experiences and Factors Influencing Opinions About Online Learning
Practical subjects, STEM vs. Humanities, hands-on learning	Suitability of Distance Learning	Suitability of Distance Learning: Specific Situations
Teacher responsiveness, peer support, lack of feedback	Role of Support in Online Learning	Suitability of Distance Learning and Teacher Support
Differences in communication styles, confidence in online settings	Gender Differences in Online Learning	Gender Perceptions and Experiences in Distance Learning
Discrimination in STEM, societal expectations, cultural factors	Gender Bias and Discrimination	Gender Perceptions and Experiences in Distance Learning
Platform usability, engagement, student preferences	Online Learning Platforms	Influence of Gender on Learning
Gender inclusivity, teacher approaches, engagement strategies	Improving Online Learning Environments	Improving the Online Learning Experience

Table 4.2: The Progression from Initial Codes to Final Themes

The identified themes served as a guideline for organising the findings and providing an in-depth analysis of the qualitative data on online learning preferences, gender concerns, and students' experiences regarding support systems. This approach made it possible to obtain findings consistent with the participants' discussions, thus increasing the coverage of distance learning dynamics. The following examples illustrate how participant responses were coded into themes using NVivo. These coded extracts demonstrate the transition from raw interview data to structured themes, clearly representing the thematic analysis process.

4.5.3.7. Examples of Coding Interviews

Tables 4.3 and 4.4 show examples of coding interview data for attitudes and gender perceptions toward distance learning (respectively).

Extract from Transcript	Assigned Code in NVivo
"I'm busy on weekdays, so I prefer online learning because it allows me to study at my own pace."	Flexibility, Self-Paced Learning
"The recorded lectures help a lot because I can revisit them anytime."	Recorded Lectures, Convenience
"I miss face-to-face interactions, but overall, online learning works for me."	Preference for Online Learning

Table 4.3: Examples of Coding for *Attitudes Toward Distance Learning [Participant MP-1]*

Extract from Transcript	Assigned Code in NVivo
"I think women might have an advantage in online learning, especially for those with children or during certain times of the month."	Gender-Based Learning Preferences
"Cultural expectations sometimes make it harder for women to engage in class discussions, but online platforms can reduce that pressure."	Cultural Influence on Gendered Learning
"I prefer online learning, but I do miss the social interaction of traditional classrooms."	Mixed Learning Preferences

Table 4.4: Examples of Coding for Gender Perceptions and Experiences in Distance Learning [Participant FP-12]

4.6. Ethical Considerations

Modern research involves legal and ethical considerations related to the subject and the researcher (Yip et al., 2016). Research methodology should generally be conducted in accordance with certain ethical norms. Additionally, these guidelines are seen to be essential for verifying that research findings are legal and that the integrity of the technique used to arrive at these conclusions is not in any way dubious (Abed, 2015). Ethics approval for this study was obtained from the Computer and Information Sciences Departmental Ethics Committee at the University of Strathclyde. Application IDs 1601 and 2428 for Studies One and Two, respectively, can be used to review the materials.

An online Qualtrics survey was used to gather data for Study One (see Section 4.4.2 for more details). Following revisions requested by the Departmental Ethics Committee, the application was resubmitted for a period of approximately three weeks. As stated by Gelling (2016), a requirement shared by all studies involving human subjects is obtaining approval from the research ethics committee. This approval must be received before contacting research participants or starting data collection. Participants were clearly informed that participation in the study was entirely voluntary and that they had the right to withdraw at any stage without providing any reason. This information was outlined alongside a consent form (See Appendix B.2 for the Participant Information Sheet). In this study, participants were further motivated to join the survey through the opportunity to enter a £35 Amazon gift card prize draw. The motivation probably increased response rates, but it also created response bias because students who valued the reward more participated in the survey. Potential bias was reduced by implementing voluntary participation, conducting a random prize draw, and keeping survey responses separate from prize entries.

For Study Two, data were collected through face-to-face interviews with students at university buildings such as Livingston Tower, St Paul's Building (Muslim Students Association), Andersonian Library, and the Students' Union. Additionally, remote interviews were conducted via Zoom, either from home or within university facilities. As this phase focused on exploring gender perceptions and online learning, establishing a strong ethical foundation for the data collection and analysis process was prioritised. Qualitative research requires direct interaction with participants, and as Creswell (2014) notes, this level of involvement can raise ethical concerns due to the nature of human engagement. In this study, participants were approached and recruited in

accordance with ethical research standards, and potential risks were addressed and reduced. The ethics application was reviewed by my PhD supervisor and approved by the Departmental Ethics Committee in Computer and Information Sciences (see Appendix G).

As previously noted in Section 4.5.2, a recruitment poster was used to inform potential participants about the study and their rights, including the principles of anonymity, voluntariness, and informed consent. This ensured transparency before any direct contact or consent was given. The poster was submitted as part of the ethics review process.

4.7. Chapter Summary

This chapter outlined the methodological approach adopted in this study, including the sequential explanatory mixed-methods design, data collection instruments, sampling strategy, and ethical considerations. The survey design and interview protocol were linked directly to the research questions and objectives. Confounding variables were considered during analysis to ensure validity, and the risks, such as p-hacking, were moderated through planned testing procedures. Thematic analysis was used to analyse the qualitative interview data, following Braun and Clarke's approach, and a coding framework was developed and applied consistently.

The next chapter will present the quantitative and qualitative findings, structured according to the research sub-questions.

Chapter 5: Survey Phase Results

5.1. Introduction

The results of this study present an analysis through a mixed-methods research approach. The research design integrated quantitative survey data and qualitative interviews to investigate the complex interplay of variables related to the research topic. In this chapter, the study will provide a detailed account of the findings, organised into distinct sections for the quantitative components of the study. The quantitative phase explores establishing statistical relationships, patterns, and trends among the variables of interest. In contrast, the next chapter's qualitative phase aimed to delve into the participants' detailed experiences, perceptions, and motivations, thereby adding depth to the quantitative findings. The chapter presents the quantitative findings, including analysing statistically significant relationships and patterns. The quantitative analysis sheds light on the extent to which it highlights. These findings are complemented by the subsequent qualitative analysis, which explores the lived experiences and narratives of the study participants. The qualitative component delves into the details of key qualitative themes. Integrating quantitative and qualitative data is a hallmark of this mixed-methods study. The triangulation of findings from both data sources enhances the results' credibility, depth, and validity. Through this multi-faceted approach, I aim to address the research questions and provide insights beyond the scope of quantitative or qualitative methods alone.

5.2. Quantitative Results

5.2.1. Section 1: Demographic Data

There were a total of 287 responses, with 173 completed responses and 114 incomplete responses. It was observed that the majority of the incomplete responses occurred at the questionnaire's multiple-choice questions, such as sections two and three, where respondents encountered similar answer options on the 5-point Likert scale. This issue could potentially be attributed to respondents using their phones.

For the analysis, incomplete responses were not included, resulting in a final usable sample of 173 participants. The participants were current students at Strathclyde University, with 73 males (42.2%) and 100 females (57.8%) (refer to Table 5.1).

Demographic questions were included to understand, explore, and compare gender-related opinions, attitudes, and beliefs across variables such as faculty, age, and education level. They also captured participants' thoughts, preferences, and experiences, enabling a deeper understanding of their perspectives.

Participants			
		Frequency	Percent
Gender	Male	73	42.2
	Female	100	57.8
	Total	173	100.0

Table 5.1: Participants' Gender

Based on demographic data for age, ages varied from 17 to 46, with a mean of 25. The bulk of respondents, 65% of females and 53.42% of males, were undergraduates, followed by master's students (21% of females and 20.55% of males). Ph.D. students are 26.03% male and 14% female, based on the rate for males (42.2%) and females (57.8%). Table 5.2 shows participant distribution by age range.

Gender * Age Crosstabulation							
		Age					Total
		17-21	22-25	26-35	36-45	46+	
Gender	Male	19	24	18	10	2	73
	Female	46	22	20	9	3	100
Total		65	46	38	19	5	173

Table 5.2: Ages of Gender

Master's and Ph.D. students may have different distant learning demands than undergraduates, who comprise most higher education students. By acknowledging this imbalance in the participant demographics, the study recognizes that the findings and implications may have a greater impact on undergraduate education. Undergraduates'

experiences and priorities may primarily revolve around coursework and specific tasks, while master's and Ph.D. students may have different focuses, such as in-depth study and dissertation writing (refer to Table 5.3).

Gender * What is your level of study? - Crosstabulation									
		Year 1	Year 2	Year 3	Year 4	Year 5	Master	PhD	Total
Gender	Male	10	6	11	11	1	15	19	73
	Female	27	20	6	11	1	21	14	100
Total		37	26	17	22	2	36	33	173

Table 5.3: Level of Study by Gender

This study included Strathclyde University students. Thus, their distance learning encounters may vary by faculty and field. Different faculties' remote learning readiness and resources may affect participants' experiences and views. This study's demographic data included participants' faculties, too. The responses represented the University's four main faculties: Humanities and Social Sciences, Engineering, Business School, and Science. Based on responses from females (100) and males (73), Humanities and Social Sciences received the highest number of responses from females, accounting for 53% of the total. This was followed by Engineering (20%), Business School (22%), and Science (5%). Among males, Engineering received the highest number of responses, representing 45.2% of the total. This was followed by Business School (24.7%), while Humanities and Social Sciences and Science received an equal percentage of responses at 15.1% each. Please refer to Table 5.4 for the distribution of faculties.

Gender * What is your Faculty? Crosstabulation						
		Engineering	Humanities & Social Sciences	Science	Business School	Total
Gender	Male	33	11	11	18	73
	Female	22	53	5	20	100
Total		55	64	16	38	173

Table 5.4: Participants' Faculties

The survey data indicates that the participants in the study represented both local and international students. Amongst the female participants, 70% were identified as British citizens, while the remaining 30% were classified as international students. In contrast, the distribution of male participants showed differences, with 43% being international students and 30% being UK citizens. This suggests that the study's sample was not limited to a specific demographic but instead included individuals from diverse cultural backgrounds (see Table 5.5).

It is noteworthy that including data on nationality in demographic information is important for several reasons. Firstly, it helps capture cultural diversity within the participant pool and acknowledges the varied perspectives and experiences brought by participants from different countries. Secondly, the nationality data explores cross-cultural differences that may influence the research outcomes.

Gender * How would you describe yourself? Crosstabulation				
		UK Citizen	International Student	Total
Gender	Male	30	43	73
	Female	70	30	100
Total		100	73	173

Table 5.5: Participants' Nationality

In terms of the student status of the participants, 95% of females were full-time students, 5% were part-time students, and 1% of females were distance learners. On the other hand, 93.2% of males were full-time students, and 6.8% were part-time students (refer to Table 5.6). This indicates that the majority of the study subjects were primarily focused on their studies and were not working full-time.

Including student status in demographic information is important because it provides valuable insights into the participants' educational engagement. It allows researchers to understand the proportion of full-time and part-time students, as well as the presence of distance learners. This information helps in assessing their availability for academic pursuits, and identifying potential variations in study outcomes based on their student status. It also aids in tailoring interventions and support services to address the specific needs and challenges faced by different student populations.

Gender * What best describes your student status? Crosstabulation					
		Full-time student	Part-time student	Other	Total
Gender	Male	68	5	0	73
	Female	95	4	1	100
Total		163	9	1	173

Table 5.6: Participants' Status

The study examined gender by device preference for accessing digital learning resources, such as MyPlace (which is the virtual learning environment utilized by the University of Strathclyde) or lecture videos, during the COVID-19 pandemic, with a focus on gender differences. Among male participants, a substantial number (26 individuals) reported using a laptop as their primary device for accessing digital learning resources. Among all students, including both undergraduates and postgraduates, most males (48 out of 73) primarily used laptops for accessing digital learning resources during the COVID-19 pandemic. In contrast, females in the same group showed a similar preference for laptops (85 out of 100). A notable difference emerges in the usage of desktop computers, with 12 males opting for desktops compared to only 6 females.

Undergraduate Students by Device Preference during the COVID-19 Pandemic. Within the undergraduate student category, both males and females demonstrated a preference for laptops as their primary device for accessing digital learning resources. Specifically, 55 out of 65 female undergraduates and 26 out of 39 male undergraduates reported using laptops as their main device. A smaller proportion of undergraduate students used desktop computers, with 7 females and 7 males opting for this device. Postgraduate Students by Device Preference through the COVID-19 Pandemic. Among postgraduate students, a similar pattern emerged, with laptops being the favored device among both males (22 out of 34) and females (30 out of 35). Interestingly, no postgraduate females reported using tablets, while 3 postgraduate males did not use tablets or desktops for accessing digital learning resources. These findings point to a clear preference for laptops, regardless of gender or student level, during the COVID-19 pandemic for accessing digital learning resources. Additionally, desktop computers were more commonly used by males, while females showed a higher preference for laptops across all categories. (see Table 5.7).

Gender * Which device do you mostly use to access digital learning resources, such as MyPlace or lecture videos, through the COVID-19 pandemic? - Crosstabulation						
		Desktop	Laptop	Mobile phone	Tablet (such as an iPad)	Total
Gender (All Students)	Male	12	48	11	2	73
	Female	6	85	4	5	100
Total		18	133	15	7	173
Undergraduate Students						
Gender	Male	7	26	5	1	39
	Female	4	55	1	5	65
	Total	11	81	6	6	104
Postgraduate Students						
Gender	Male	5	22	7	0	34
	Female	2	30	3	0	35
	Total	7	52	10	0	69

Table 5.7: Preferred Device for Accessing Digital Learning Resources During COVID-19

The study explored at gender by Lecturer's Choice of social media for Communication. Among all students, during the COVID-19 pandemic, a considerable number of males (22 out of 73) reported that lecturers mostly used Twitter for communication and collaboration in distance education. In contrast, females in the same group expressed a preference for Facebook, with 17 out of 100 females reporting its use. These findings indicate some gender-based differences in the lecturer's choice of social media platforms for communication during the COVID-19 pandemic. Notably, Twitter appears to be more

commonly used among males, while females often mention Facebook as their preferred platform. However, it's essential to consider that in these results, a high number of respondents agreed with selecting an "other" choice and reported using video conferences like Zoom, referee to next Table 5.8.

Gender * Which social media sites do lecturers mostly use to communicating and collaborate with you in distance education through the COVID-19 pandemic? - Crosstabulation									
		Twitter	Facebook	Instagram	WhatsApp	LinkedIn	Snapchat	Others	Total
Gender (All Students)	Male	9	8	3	15	4	4	30	73
	Female	22	5	1	10	5	2	55	100
Total		31	13	4	25	9	6	85	173
Undergraduate Students									
Gender	Male	3	2	2	8	1	4	19	39
	Female	17	5	1	2	4	1	35	65
	Total	20	7	3	10	5	5	54	104
Postgraduate Students									
Gender	Male	6	6	1	7	3	0	11	34
	Female	5	0	0	8	1	1	20	35
	Total	11	6	1	15	4	1	31	69

Table 5.8: Lecturers' Preferred Social Media for Distance Education During COVID-19

The study examined in the next table the frequency of social media usage as part of students' studies during the COVID-19 pandemic. Among male participants, there were varying levels of social media usage reported, ranging from never to always. For female participants, there were also varying levels of social media usage reported, ranging from never to always (Please refer to Table 5.9). As well as the study found that both male and female participants used social media to different extents as part of their studies during the COVID-19 pandemic. While most participants reported using social media at least occasionally, there were some differences in the frequency of usage between genders.

Gender * During the COVID-19 pandemic, how frequently have you used social media as part of your studies? Crosstabulation							
		Never	Rarely	Sometimes	Often	Always	Total
Gender (All Students)	Male	14	16	25	14	2	73
	Female	27	33	24	11	5	100
Total		41	49	49	25	7	173
Undergraduate Students							
Gender	Male	10	11	12	6	0	39
	Female	13	23	20	8	1	65
	Total	23	34	32	14	1	104
Postgraduate Students							
Gender	Male	4	5	13	8	2	34
	Female	14	10	4	3	4	35
	Total	19	16	17	11	6	69

Table 5.9: Frequency of Social Media Use in Studies During COVID-19

The study also explored the common distractions reported by students during their remote learning experiences during COVID-19. Among male students, the most typical distractions reported were surfing the internet, people at home, and video games. Other distractions mentioned included pets, sleep, and other unidentified factors. For female students, the distractions were more diverse. The top distractions reported by female students were people at home, surfing the internet, and sleep. Additionally, distractions such as pets, video games, and other factors were also mentioned (see Table 5.10).

All Students (Male and Female). For male students, prominent distractions included surfing the internet (58 out of 73), people at home (32 out of 73), and video games (22 out of 73). Other distractions, such as pets, sleep, and unspecified factors, were also mentioned. Female students reported a broader range of distractions. The most common distractions for females were people at home (66 out of 100), surfing the internet (83 out of 100), and sleep (51 out of 100). Additionally, female students mentioned distractions like pets, video games, and other factors.

Among male students, distractions included various factors such as Attention-Deficit Hyperactivity Disorder (ADHD), care responsibilities, mental health challenges (e.g.,

depression), errands, time management difficulties, household chores, interruptions from family members or visitors, and mental health issues exacerbated by the pandemic. Additional distractions related to music, sports, social media, outside noise, surrounding noise, hardware problems, and the lack of a dedicated learning environment. Female students also reported diverse distractions.

Gender * Distractions Crosstabulation								
		My Pet	Video games	People at home	Surfing the internet	Sleep	Other	Total
Gender (All Students)	Male	8	22	32	58	29	11	73
	Female	33	16	66	83	51	20	100
Total		41	38	98	141	80	21	173
Undergraduate Students								
Gender	Male	6	14	14	32	12	7	39
	Female	23	12	46	55	38	12	65
	Total	29	26	60	87	50	19	104
Postgraduate Students								
Gender	Male	2	8	18	26	17	4	34
	Female	10	4	20	28	13	8	35
	Total	12	12	38	54	30	12	69

Table 5.10: Distractions Reported During COVID-19

They mentioned distractions related to Attention-Deficit Hyperactivity Disorder, care responsibilities, mental health issues, errands, food, household chores, interruptions from family members or young relatives, mental health challenges worsened by the pandemic, music, sports, social media, outside noise, surrounding noise, hardware problems, and the absence of a conducive learning environment.

The results explored in the next table are the top three most significant challenges faced by students in distance learning at home, as reported by the participants. The results indicate the challenges experienced by both male and female students, shedding light on the key areas of difficulty during distance education.

Among male students, the top three most significant challenges reported were maintaining a regular schedule, collaborating with fellow students, and social isolation. These challenges reflect the importance of establishing a structured routine, effective communication channels, and productive teamwork for successful distance learning. Other notable challenges mentioned by male students included communicating with faculty and management, slow internet coverage, an inconducive study environment, and anxiety about the impact of the coronavirus on their careers. For female students, the top three most significant challenges were also maintaining a regular schedule, communicating with faculty and management. collaborating with fellow students. These challenges align with the ones faced by male students differently with social isolation. and underscore the universal nature of these difficulties in remote learning. Female students also mentioned challenges related to slow internet coverage, an inconducive study environment, social isolation, and anxiety about the impact of the pandemic on their career prospects (see Table 5.11).

Gender * What are the top three most significant challenges you face in distance learning at home? Crosstabulation												
		Maintaining a regular schedule	Communicating with the faculty and the management	Slow internet coverage	Collaborating with fellow students	I don't have access to all the prescribed tools needed to study	Inconducive study environment	No suitable device to study using distance learning	Social Isolation	Anxiety about the impact of the coronavirus on my career	Other	Total
Gender All Students	Male	49	23	20	43	6	24	7	31	15	6	73
	Female	76	25	24	63	5	35	0	48	24	7	100
Total		125	48	44	106	11	59	7	79	49	13	173
Undergraduate Students												
Gender	Male	26	10	11	23	1	11	2	15	8	4	39
	Female	51	19	16	42	3	28	0	32	14	1	65
Total		77	29	27	65	4	39	2	47	22	5	104
Postgraduate Students												
Gender	Male	23	13	9	20	5	13	5	16	7	2	34
	Female	25	6	8	21	2	7	0	16	9	6	35
Total		48	19	17	41	7	20	5	32	16	8	69

Table 5.11: Top Three Challenges in Home Distance Learning

The analysis examined the students' overall experience of learning at home. The results demonstrate diverse perceptions among the respondents. Male students reported a range of experiences, with some indicating their experience as somewhat worse or much worse, while others found it somewhat better or much better. Similarly, female students presented a variety of experiences, including some who felt it was somewhat worse or much worse and others who perceived it as somewhat better or much better (see Table 5.12).

Gender * How was your overall experience learning from home? Crosstabulation							
		Much worse	Somewhat worse	About the same	Somewhat better	Much better	Total
Gender (All Students)	Male	14	21	20	10	8	73
	Female	12	39	18	23	8	100
Total		26	60	38	33	16	173
Undergraduate Students							
Gender	Male	6	8	11	7	7	39
	Female	6	28	10	13	8	65
	Total	12	36	21	20	15	104
Postgraduate Students							
Gender	Male	8	13	9	3	1	34
	Female	6	11	8	10	0	35
	Total	14	24	17	13	1	69

Table 5.12: Overall Home Learning Experience

5.2.2. Section 2: Gender Perceptions of Males Better Than Females in Online Settings During the COVID-19 Pandemic

In this section, the statistically significant findings will be presented only to narrow our focus. The rationale behind this selection is to confirm results that carry the most substantial implications for my study. By prioritising statistically significant findings, I aim to underline the outcomes that provide strong and credible evidence, supporting my choice to highlight correlations between gender and participants' perceptions, particularly within the context of Section 2 of my research. These results pertain to all students, followed by postgraduate and undergraduate results, including nationalities and faculties (**please see Tables 5.17, 5.25 and 5.26).**

Q3- Males have better an online mode of education in comparison to females.

Table 13 demonstrates participants' responses to the statement '**Males have better an online mode of education in comparison to females**'. Most men were neutral on the topic (36 out of 73 neither agreeing or disagreeing) with a significant minority strongly disagreeing. Most women were either neutral or in disagreement (36% neutral, 50% disagreeing). When we compare the distributions, we find that there is a significant difference ($p = 0.006$), suggesting that, although few men agreed with the statement, women are more likely to disagree with the statement. We see similar patterns when comparing examining undergraduate and postgraduate results: men are usually neutral and tending to disagree, women most often neutral or in stronger disagreement. When comparing the two groups there is no statistically significant result for undergraduate ($p = 0.098$) and postgraduate ($p = 0.099$) students. This suggests that the significant result for all students comes from the higher numbers and is not a strong indicator of differences in beliefs towards this statement.

Gender * Males have better an online mode of education in comparison to females. Crosstabulation							
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Gender (All Students)	Male	19	8	36	6	4	73
	Female	34	26	36	4	0	100
Total		53	34	72	10	4	173
Undergraduate *Students*							
Gender	Male	9	5	19	4	2	39
	Female	23	15	24	3	0	65
	Total	32	20	43	7	2	104
Postgraduate *Students*							
Gender	Male	10	3	17	2	2	34
	Female	11	11	12	1	0	35
	Total	21	14	29	3	2	69

Table 5.13: Male Preference for Online Education

Q4- Females have higher competence in communication and social skills in using social media. The next cross-tabulation illustrates the results of gender and the belief that females have higher competence in communication and social skills when using social media. Among males, there is a range of opinions regarding the statement. This indicates a diversity of perspectives among male participants. Likewise, within the female population, a variety of perspectives exist but with a stronger level of agreement from female students (see next Table 5.14). The result of the test indicates that there is no statistically significant difference between gender and the belief about females' competence in communication and social skills on social media ($p = 0.139$). This suggests that gender does not have a significant impact on perceptions of competence in this context for all students.

The results revealed that among the Undergraduate Students, also showed a variety of opinions with female students more likely to agree with the statement. The results of the test indicate that there is a statistically significant difference between gender and the belief that females have higher competence in communication and social skills when it comes to the use of social media ($p = 0.030$). This suggests that gender does play a role in influencing the perception of this belief among undergraduate students.

Gender * Females have higher competence in communication and social skills when it comes to the use of social media. Crosstabulation							
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Gender (All Students)	Male	15	10	22	16	10	73
	Female	15	13	32	35	5	100
Total		30	23	54	51	15	173
Undergraduate Students							
Gender	Male	8	7	13	5	6	39
	Female	10	6	21	25	3	65
	Total	18	13	34	30	9	104
Postgraduate Students							
Gender	Male	7	3	9	11	4	34
	Female	5	7	11	10	2	35
	Total	12	10	20	21	6	69

Table 5.14: Female Competence in Social Media Communication

Among Postgraduate Students, men agreed more with the statement, but there was no statistically significant difference between gender and the belief that females are preferred in distance education (p =0.099).

Q9- Due to COVID-19 pandemic, there is a need to promote gender equity in distance learning in higher education.

When examining the responses to the statement 'Due to the COVID-19 pandemic, there is a need to promote gender equity in distance learning in higher education,' in Table 3, we see that men showed a wide distribution of responses, but women were far more in agreement. The tests' results show a statistically significant difference between gender and the perception of the need to promote gender equity in distance learning in higher

education due to the COVID-19 pandemic (p = 0.007). The data indicates that gender is a contributing factor in influencing the perception of all respondents.

Gender * Due to COVID-19 pandemic, there is a need to promote gender equity in distance learning in higher education. Crosstabulation							
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Gender (All Students)	Male	10	10	25	19	9	73
	Female	5	4	28	39	24	100
Total		15	14	53	58	33	173
Undergraduate Students							
Gender	Male	8	6	11	7	7	39
	Female	3	3	14	27	18	65
	Total	11	9	25	34	25	104
Postgraduate Students							
Gender	Male	2	4	14	12	2	34
	Female	2	1	14	12	6	35
	Total	4	5	28	24	8	69

Table 5.15: Promoting Gender Equity in Distance Learning Amid COVID-19

We see a similar pattern for undergraduate students, with more women agreeing with this statement, backed up by a statistically significant difference between gender and this perception (p = 0.005). The results indicate a significant difference in beliefs between males and females regarding the need to promote gender equity in distance learning during the COVID-19 pandemic. Among postgraduate students, both males and females showed similar levels of uncertainty regarding the need for gender equity, with no statistically significant gender-related differences (p =0.436).

Q12- The digital gap between genders in distance learning only exists in higher education.

Examining the cross-tabulation Table (5.16), it is possible to make observations of the distribution of responses among males and females, which sheds light on the level of belief in a digital gap between genders in distance learning. It is clear that the majority of male students do not agree or disagree with the statement, and a larger percentage of female students have a similar viewpoint. On the other hand, a higher number of females expressed some disagreement with the statement compared to males. Notably, no woman strongly agreed with the statement. Furthermore, the statistical analyses reveal a significant difference between gender and the belief that the digital gap between genders in distance learning only exists in higher education ($p = 0.034$).

Gender * The digital gap between genders in distance learning only exists in higher education. Crosstabulation							
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Gender (All Students)	Male	14	13	36	5	5	73
	Female	29	25	41	5	0	100
Total		43	38	77	10	5	173
Undergraduate Students							
Gender	Male	7	4	24	2	2	39
	Female	22	16	23	4	0	65
	Total	29	20	47	6	2	104
Postgraduate Students							
Gender	Male	7	9	12	3	3	34
	Female	7	9	18	1	0	35
	Total	14	18	30	4	3	69

Table 5.16: The Gender Digital Gap in Higher Education Distance Learning

Within the cohort of male undergraduate participants, a small number strongly disagree or somewhat disagree with the existence of a digital gap. Most males neither agree nor disagree, indicating a level of neutrality or uncertainty. Likewise, within the group of female undergraduate participants, a significant number strongly disagree or somewhat disagree with the notion of a digital gap. However, it is important to note that a higher proportion of females express neither agreement nor disagreement. Only a few females somewhat agree with the presence of a digital gap. Notably, no female strongly agrees with the statement. The significance value of 0.018 of the results from the test in this question indicates that there is a statistically significant difference between gender and the perception of the digital gap in distance learning, specifically in higher education among participants at this level. In terms of postgraduate students, among the male participants, a portion strongly disagree or somewhat disagree with the notion of a digital gap, while a larger proportion express neither agreement nor disagreement. Conversely, among the female participants, an equal number strongly disagree or somewhat disagree, but a higher number neither agree nor disagree. There are only a few females who somewhat agree with the existence of a digital gap, and no female strongly agrees. Also, there is no statistically significant difference between gender and that belief among postgraduate students ($p = 0.296$).

5.2.2.1. Summary of Section 2 Based on All Students, Undergraduates, and Postgraduates

In this section, the analysis focused exclusively on statistically significant findings related to gender perceptions in distance learning. Among all students, key differences were observed in the belief that males perform better in online education, with women more likely to disagree with this perception. Additionally, female participants strongly supported promoting gender equity in distance learning. They were more likely to reject that the digital gender gap exists solely in higher education. Within the undergraduate group, two significant patterns emerged: female students were more likely to perceive women as having stronger communication and social media skills, and they also disagreed more with the idea that the digital gap is limited to higher education. In contrast, no statistically significant differences were found among postgraduate students, proposing a more balanced perspective between genders in this subgroup. These findings are supported and summarised in Table 5.17, which outlines the statistically significant results and corresponding values for each item examined in this section.

Qs	All Students (M & F)		Undergraduate (M & F)		Postgraduate (M & F)	
	P-value	**Statistical (Sig)**	**P-value**	**Statistical (Sig)**	**P-value**	**Statistical (Sig)**
Q1- Males are more confident than females when it comes to using social media for distance learning.	**0.410**	No	**0.563**	No	**0.499**	No
Q2- Males used computers for education and entertainment purposes more than females.	**0.278**	No	**0.405**	No	**0.468**	No
Q3- Males have better an online mode of education in comparison to females.	**0.006**	**Yes**	**0.098**	No	**0.099**	No
Q4- Females have higher competence in communication and social skills in using social media.	**0.139**	No	**0.030**	**Yes**	**0.099**	No
Q5- Females are favored over males in distance education in the COVID-19 pandemic.	**0.256**	No	**0.526**	No	**0.289**	No
Q6- Females often face discrimination and barriers in distance learning courses especially in the COVID-19 pandemic.	**0.080**	No	**0.090**	No	**0.589**	No
Q7- Higher levels of perceived teacher effective support among females in distance learning upon the COVID-19 pandemic.	**0.276**	No	**0.118**	No	**0.281**	No
Q8- In the COVID-19 pandemic, males have an advantage over females in the online classroom using social media solely based on their higher perceived ability, comfort, and engagement with computer	**0.509**	No	**0.352**	No	**0.171**	No
Q9- Due to COVID-19 pandemic, there is a need to promote gender equity in distance learning in higher education.	**0.007**	**Yes**	**0.005**	**Yes**	**0.436**	No
Q10- During the COVID-19 pandemic, increasing a gender role socialisation on social media with reference to distance education in higher education.	**0.275**	No	**0.085**	No	**0.809**	No
Q11- During COVID-19 pandemic, show it the level of digital literacy and competency of faculty still requires some improvement and more systematic approach to the student-teacher education and level of computer literacy	**0.910**	No	**0.926**	No	**0.723**	No
Q12- The digital gap between genders in distance learning only exists in higher education.	**0.034**	**Yes**	**0.018**	**Yes**	**0.296**	No

Table 5.17: The summary of Results in Section 2

5.2.2.2. Section 2: Gender Perceptions on Males Better Than Females in Online Settings During the COVID-19 Pandemic Based on Nationalities and Faculties

Q2- Males have better an online of education in comparison to females.

As mentioned earlier, a Pearson Chi-square test revealed significant differences in perceptions regarding whether males were better suited for online education ($p = 0.006$). When confounding variables such as nationality and faculty were included, gender differences became more evident. For example, international students showed a stronger gender divide in responses than UK students ($p = 0.052$) and UK students ($p = 0.402$), suggesting there are cultural criteria for how they perceive online learning.

Table 5.18 analysis explores the differences in beliefs on online education between genders for both nationalities (UK citizens vs. International students). Among UK citizens, a greater proportion of female students strongly disagreed (24 out of 70) or somewhat disagreed (17 out of 70) with the statement that males have better online education, compared to male students (9 and 4 out of 30, respectively). Additionally, 26 female respondents neither agreed nor disagreed, compared to 14 male respondents.

The distribution was different for international students. Male students were more likely to be neutral (22 out of 43) or to strongly agree (4 out of 43) with the statement, while female students had a more balanced distribution, with 10 students strongly disagreeing, 9 somewhat disagreeing, and 10 remaining neutral. This suggests that international male students were more likely to believe that males perform better in online education than their female peers.

Gender * Males have better an online of education in comparison to females. Crosstabulation							
Gender by Nationalities							
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
UK Citizen	Male	9	4	14	3	0	30
	Female	24	17	26	3	0	70
	Total	33	21	40	6	0	100
International Student	Male	10	4	22	3	4	43
	Female	10	9	10	1	0	30
	Total	20	13	32	4	4	73
Total	Male	19	8	36	6	4	73
	Female	34	26	36	4	0	100
	Total	53	34	72	10	4	173

Table 5.18: Males' Male Preference for Online Education by Nationalities

Overall, the results revealed a significant difference (p = 0.052) between gender and the perception that males have better online education than females, with nationality playing a role in shaping these views. It is possible that students' cultural or educational backgrounds can comprise the reasons behind their beliefs about gender differences in online education.

Additionally, students in the Business and Social Science faculties showed a statistically significant gender difference in perceptions of males being better suited for online education (p = 0.015). In contrast, Engineering and Science students did not exhibit a significant gender difference in their responses (p = 0.562); this refers to **Table 5.26**. According to Table 5.19, in the Engineering & Science faculties, gender differences were less obvious. Male and female responses were relatively balanced across categories, and very few students strongly agreed with the statement. On the other hand, in the Humanities/Social Science & Business School, a larger gender divide was observed. A

significantly higher number of female students strongly disagreed with the statement compared to 7 male students. More male students neither agreed nor disagreed.

Perceptions of males being better suited for online education varied by faculty. The Business and Social Science faculties showed a significant gender divide ($p = 0.015$), whereas the Engineering and Science faculties did not ($p = 0.562$). This indicates that gender bias in online education may be discipline-specific, with non-STEM faculties exhibiting stronger gender differences.

Gender * Males have better an online of education in comparison to females. Crosstabulation							
Gender by Faculties							
		Strongly disagree	Somewhat disagree	Neither agree nor disagree.	Somewhat agree	Strongly agree	Total
Engineering & Science	Male	12	6	20	4	2	44
	Female	8	7	10	2	0	27
	Total	20	13	30	6	2	71
Humanities/ Social Science & Business School	Male	7	2	16	2	2	29
	Female	26	19	26	2	0	73
	Total	33	21	42	4	2	102
Total	Male	19	8	36	6	4	73
	Female	34	26	36	4	0	100
	Total	53	34	72	10	4	173

Table 5.19: Males' Male Preference for Online Education by Faculties

Q4- Females have higher competence in communication and social skills when it comes to the use of social media.

Table 5.20 shows that females use social media better because of their communication and social skills among the nationalities.

Based on the findings, UK Citizens ($p = 0.003$) showed a significant gender difference in perceptions of female competence in communication and social skills when using social media. Female students were more likely to "somewhat agree" than males. Males had a higher percentage of strong disagreement compared to females. The results indicate a stronger perception among UK females that they excel in communication skills on social media compared to males.

Significant statistical differences could not be found for international students ($p = 0.154$), but international males and females responded "Neither agree nor disagree" more evenly. Furthermore, International female students had a higher rate of strong agreement than UK females, but this difference was not statistically significant. These results reference that perceptions based on social media competence in communication and social skills seem to differ with UK citizens, while these factors stay constant for international students. These perceptions may be more influenced by societal expectations in a UK context than in an international context.

Gender * Females have higher competence in communication and social skills when it comes to the use of social media. Crosstabulation							
Gender by Nationalities							
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
UK Citizen	Male	11	6	5	4	4	30
	Female	11	5	26	25	3	70
	Total	22	11	31	29	7	100
International Student	Male	4	4	17	12	2	43
	Female	4	8	6	10	8	30
	Total	8	12	23	22	10	73
Overall Total	Male	15	10	22	16	10	73
	Female	15	13	32	35	5	100
	Total	30	23	54	51	15	173

Table 5.20: Females' Higher Social Media Use Due to Communication and Social Skills Across Nationalities

The analysis revealed no statistically significant difference in the perception that females use social media better due to their communication and social skills across different faculties. The results indicate that gender did not play a significant role in shaping these perceptions. Specifically, Engineering & Science students showed $p = 0.516$, while Humanities/Social Science & Business School students reported $p = 0.256$, both skipping the standard significance effect ($p < 0.05$). These findings suggest that faculty affiliation does not strongly influence gender-based differences in social media usage perceptions. For a detailed breakdown of the results, refer to Table 26.

Q5- Females are favoured over males in distance education in the COVID-19 pandemic.

Table 5.21 presents responses on whether females were favoured over males in distance education during the COVID-19 pandemic, categorised by nationality and gender. Among UK citizens, there was no statistically significant difference (p = 0.837) between male and female responses. Both genders showed varied opinions, with no strong consensus supporting the statement. In contrast, among international students, the results were statistically significant (p = 0.019), indicating that gender influenced perceptions. Male and female responses differed more noticeably, with some agreement that females were favoured in distance education. Also, nationality matters for opinions about gender advantages in distance learning, and international students were more inclined to gender division in their opinions.

Gender *Females are favoured over males in distance education in the COVID-19 pandemic. Crosstabulation							
Gender by Nationalities							
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
UK Citizen	Male	13	5	9	3	0	30
	Female	26	12	27	5	0	70
	Total	39	17	36	8	0	100
International Student	Male	4	7	25	6	1	43
	Female	10	8	8	2	2	30
	Total	14	15	33	8	3	73
Overall Total	Male	17	12	34	9	1	73
	Female	36	20	35	7	2	100
	Total	53	32	69	16	3	173

Table 5.21: Perceptions of Female Preference in Distance Education Across Nationalities

In the analysis based on faculties, there was no statistically significant difference between the perceptions of females being favoured by distance education during the COVID-19 pandemic across faculties. Gender was not a strong differentiator, with responses from male and female students being reasonably evenly distributed. Engineering & Science students reported $p = 0.617$, and Humanities/Social Science & Business School students reported $p = 0.378$, both above the significance level ($p < 0.05$). There are no differences in these perceptions based on gender-based faculty associations.

Q9- Due to COVID-19 pandemic, there is a need to promote gender equity in distance learning in higher education.

Table 5.22 presents the distribution of responses on the need to promote gender equity in distance learning during the COVID-19 pandemic, analysed by nationality and gender.

Among UK citizens ($p = 0.036$), a higher proportion of female students agreed with the statement, selecting “Somewhat agree” and “Strongly agree.” Male students had a more balanced distribution. This showed that more UK female students than male UK students perceived a gender-based advantage for women in distance education. In contrast, among international students

($p = 0.208$). The responses were more evenly distributed across both genders, with no strong trends in agreement or disagreement. Male and female international students had similar proportions in the “Neither agree nor disagree” and “Somewhat agree” categories. This means that in the case of students in the UK, gender-based advantages with distance education may be clearer than for international students.

Gender *Due to COVID-19 pandemic, there is a need to promote gender equity in distance learning in higher education. Crosstabulation							
Gender by Nationalities							
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
UK Citizen	Male	7	3	8	6	6	30
	Female	4	2	20	26	18	70
	Total	11	5	28	32	24	100
International Student	Male	3	7	17	13	3	43
	Female	1	2	8	13	6	30
	Total	4	9	25	26	9	73
Overall Total	Male	10	10	25	19	9	73
	Female	5	4	28	39	24	100
	Total	15	14	53	58	33	173

Table 5.22: Support for Gender Equity in Distance Learning Between Nationalities

Results show that UK students (particularly females) were more inclined to believe that women were advantaged over men in distance education, while there was no statistically significant difference among international students. Table 5.23 also presents the distribution of responses on the need to promote gender equity in distance learning during the COVID-19 pandemic, analysed by faculty and gender. The analysis examined perceptions of the belief across different faculties. No statistically significant difference was found in Engineering & Science ($p = 0.911$), indicating that gender did not influence responses in these disciplines. However, in Humanities/Social Science & Business School ($p = 0.001$), a significant difference was observed, with female students showing stronger agreement with the need for gender equity compared to their male counterparts. These findings suggest that support for gender equity in distance learning varies by faculty, with non-STEM disciplines displaying more obvious gender-based differences in perceptions.

Gender * Due to COVID-19 pandemic, there is a need to promote gender equity in distance learning in higher education. Crosstabulation							
Gender by Faculties							
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Engineering & Science	Male	3	6	15	12	8	44
	Female	1	3	8	10	5	27
	Total	4	9	23	22	13	71
Humanities/ Social Science & Business School	Male	7	4	10	7	1	29
	Female	4	1	20	29	19	73
	Total	11	5	30	36	20	102
Total	Male	10	10	25	19	9	73
	Female	5	4	28	39	24	100
	Total	15	14	53	58	33	173

Table 5.23: Support for Gender Equity in Distance Learning Among Faculties

Q10- During the COVID-19 pandemic, increasing a gender role socialisation on social media with reference to distance education in higher education.

The analysis explored whether the COVID-19 pandemic led to increased gender role socialisation on social media within the context of distance education in higher education, analysed by faculty and nationality. Faculty-based results revealed no statistically significant difference in Engineering & Science ($p = 0.650$), indicating that gender did not play a major role in shaping perceptions within STEM fields. Regarding the positions of the male and female students toward gender roles in distance education, they were mostly equal, as both either selected “Neither agree nor disagree” or “Somewhat Agree” suggesting that generally, the impact of social media does not

strongly possess these principles in society as a whole or concerning the faculties and genders. However, in Humanities/Social Science & Business School (p = 0.010), female students were more likely to perceive increased gender role socialisation during the pandemic. One comparison that stood out is how many selections of "Neither agree nor disagree" the female students made, unlike the male students, who selected "Somewhat Agree" and "Strongly Agree" significantly less (see Table 5.24).

Gender * During the COVID-19 pandemic, increasing a gender role socialisation on social media with reference to distance education in higher education. Crosstabulation							
Gender by Faculties							
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Engineering & Science	Male	1	4	24	13	2	44
	Female	2	2	16	7	0	27
	Total	3	6	40	20	2	71
Humanities/ Social Science & Business School	Male	3	5	16	5	0	29
	Female	1	2	45	22	3	73
	Total	4	7	61	27	3	102
Total	Male	4	9	40	18	2	73
	Female	3	4	61	29	3	100
	Total	7	13	101	47	5	173

Table 5.24: Increase gender role socialisation on social media for distance education in higher education during the COVID-19 epidemic

When analysed by nationality, neither UK citizens (p = 0.398) nor international students (p = 0.651) showed statistically significant differences, meaning that nationality did not influence perceptions of gender role socialisation on social media during distance education. The relatively even distribution of responses mentions that students across different cultural backgrounds did not strongly associate the pandemic with a shift in gender roles in online learning. The next two tables (5.25 & 5.26) show that the statistical

analysis revealed where gender played a significant role in specific aspects. At the same time, in other areas, no substantial differences were observed in the nationality and faculties, respectively.

5.2.2.3. Summary of Section 2 Statistical Results Based on Gender's Nationalities and Faculties

In Section 2, further analysis explored gender-based perceptions in online education across different nationalities and faculties. Regarding nationality, statistically significant differences were observed among international students, particularly in their belief that males perform better in online education and that females were favoured in distance learning during the COVID-19 pandemic. On the other hand, UK students showed significant gender differences in perceptions of female competence in communication and social skills on social media, the need to promote gender equity in distance learning, and the experience of discrimination and barriers faced by females. These nationality-based variations show that cultural and educational contexts may influence gender-related beliefs in online learning environments. A detailed overview of these results is provided in **Table 5.25**: Gender, Nationality Statistics Summary Section 2. Similarly, when analysed by faculty, notable gender-based differences appeared primarily among students from Humanities, Social Science, and Business disciplines. Female students in these faculties were more likely to reject the idea that males are better suited to online education and more strongly supported the promotion of gender equity and the idea that the pandemic increased gender role socialisation on social media. In contrast, students from the Engineering and Science faculties showed no statistically significant gender-based differences in these areas. These findings highlight the role of academic disciplines in shaping gender perceptions in digital education contexts. For a full breakdown of these patterns, see Table 5.26: Gender's Faculty Statistics Summary Section 2.

Qs	Gender by Nationalities(M&F)			
	A UK Citizen P-value	**Statistical (Sig)**	**An international Student P-value**	**Statistical (Sig)**
Q1- Males are more confident than females when it comes to using social media for distance learning.	0.861	No	0.642	No
Q2- Males have better an online of education in comparison to females.	0.402	No	0.052	**Yes**
Q3- Males used computers for education and entertainment purposes more than females.	0.766	No	0.298	No
Q4- Females have higher competence in communication and social skills when it comes to the use of social media.	0.003	**Yes**	0.154	No
Q5- Females are favored over males in distance education in the COVID-19 pandemic	0.837	No	0.019	**Yes**
Q6- Females often face discrimination and barriers in distance learning courses especially in the COVID-19 pandemic.	0.008	Yes	0.080	No
Q7- Higher levels of perceived teacher effective support among females in distance learning upon the COVID-19 pandemic.	0.510	No	0.306	No
Q8- In the COVID-19 pandemic, males have an advantage over females in the online classroom using social media solely based on their higher perceived ability, comfort, and engagement with computer.	0.829	No	0.428	No
Q9- Due to COVID-19 pandemic, there is a need to promote gender equity in distance learning in higher education.	0.036	**Yes**	0.208	No
Q10- During the COVID-19 pandemic, increasing a gender role socialisation on social media with reference to distance education in higher education.	0.398	No	0.651	No
Q11- During COVID-19 pandemic, show it the level of digital literacy and competency of faculty still requires some improvement and more systematic approach to the student-teacher education and level of computer literacy.	0.886	No	0.578	No
Q12- The digital gap between genders in distance learning only exists in higher education	0.164	No	0.295	No

Table 5.25: Gender, Nationality Statistics Summary Section 2

Qs	Gender by Faculties (M&F)			
	Engineering and Science		Humanities/Social Science And Business School	
	P-value	Statistical (Sig)	P-value	Statistical (Sig)
Q1- Males are more confident than females when it comes to using social media for distance learning.	0.156	No	0.392	No
Q2- Males have better an online of education in comparison to females.	0.562	No	0.015	**Yes**
Q3- Males used computers for education and entertainment purposes more than females.	0.861	No	0.638	No
Q4- Females have higher competence in communication and social skills when it comes to the use of social media.	0.516	No	0.256	No
Q5- Females are favored over males in distance education in the COVID-19 pandemic	0.617	No	0.378	No
Q6- Females often face discrimination and barriers in distance learning courses especially in the COVID-19 pandemic.	0.194	No	0.138	No
Q7- Higher levels of perceived teacher effective support among females in distance learning upon the COVID-19 pandemic.	0.594	No	0.224	No
Q8- In the COVID-19 pandemic, males have an advantage over females in the online classroom using social media solely based on their higher perceived ability, comfort, and engagement with computer.	0.834	No	0.110	No
Q9- Due to COVID-19 pandemic, there is a need to promote gender equity in distance learning in higher education.	0.911	No	0.001	**Yes**
Q10- During the COVID-19 pandemic, increasing a gender role socialisation on social media with reference to distance education in higher education.	0.650	No	0.010	**Yes**
Q11- During COVID-19 pandemic, show it the level of digital literacy and competency of faculty still requires some improvement and more systematic approach to the student-teacher education and level of computer literacy.	0.488	No	0.679	No
Q12- The digital gap between genders in distance learning only exists in higher education	0.523	No	0.060	No

T*able 5.26: Gender Faculty Statistics Summary Section 2*

5.2.3. Section 3: Effectiveness of Social Media in Distance Learning

In this section, the research presents the statistically significant findings related to the effectiveness of social media in distance learning and the association of these beliefs with gender. As previously described in Section 2, the study includes only statistically significant findings to focus attention on results with the strongest study implications **(please refer to Tables 5.29, 5.32 and 5.36)**.

Q1- During the COVID-19, the use of social media for distance learning are more welcoming for shy and quiet students.

This study observed how both genders of students perceive using social media for distance learning during the COVID-19 pandemic, particularly whether it is more welcoming for shy and quiet students. Results based on all students, both males and females had different opinions ($p = 0.033$). More females (49) somewhat agreed that social media is welcoming for shy and quiet students, while more males (21) somewhat disagreed. Looking at just undergraduate students, there's a similar pattern. More females (31) somewhat agreed, and fewer males, while more males (12) neither agreed nor disagreed.

Gender * During COVID-19, the use of social media for distance learning are more welcoming for shy and quiet students. Crosstabulation							
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Gender (All Students)	Male	6	8	23	21	15	73
	Female	8	11	14	49	18	100
Total		14	19	37	70	33	173
Undergraduate Students							
Gender	Male	5	6	12	9	7	39
	Female	5	7	8	31	14	65
	Total	10	13	20	40	21	104
Postgraduate Students							
Gender	Male	1	2	11	12	8	34
	Female	3	4	6	18	4	35
	Total	4	6	17	30	12	69

Table 5.27: Shy Students' Social Media Usage

For postgraduate students, more females, once more (18) somewhat agreed, and more males (12) somewhat disagreed with the idea that social media is more welcoming for shy and quiet students. Overall, Table 5.27 points out that more females tend to think that using social media for distance learning is welcoming for shy and quiet students during the pandemic, while more males have some reservations about this perception.

Q3- Perceived teacher support is even more important in digital learning setting including social media.

In this Table 5.28, at the perceptions of students about the importance of teacher support in digital learning settings, including social media. A significant number strongly agree that teacher support is crucial in this context for all students combined, both male and female. Females are notably more in the 'strongly agree' category than males. On the other hand, a larger number of males are in the 'somewhat agree' category. When specifically examining undergraduate students, it is clear that they have similar patterns. Females tend to strongly agree more, while males are more evenly distributed between 'somewhat agree' and 'strongly agree.'

The trend continues for postgraduate students; there is no clear pattern, but both genders express a stronger 'strongly agree' sentiment.

Gender * Perceived teacher support is even more important in digital learning setting including social media. Crosstabulation							
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Gender (All Students)	Male	5	6	17	35	10	73
	Female	5	3	23	29	40	100
Total		10	9	40	64	50	173
Undergraduate Students							
Gender	Male	2	3	11	20	3	39
	Female	2	1	14	19	29	65
	Total	4	4	25	39	32	104
Postgraduate Students							
Gender	Male	3	3	6	15	7	34
	Female	3	2	9	10	11	35
	Total	6	5	15	25	18	69

Table 5.28: Importance of Teacher Support in Digital Learning

Overall, this inquiry showed that teacher support is seen as very important in digital learning settings, with females generally expressing a higher degree of agreement

compared to males across undergraduate levels, but in the postgraduate levels, demonstrating the closeness between them. Furthermore, there is a significant difference between gender and the belief that males have a better online mode of education compared to females (p = 0.002). These are for all students and undergraduates. However, gender and belief are not significantly different at the postgraduate level.

5.2.3.1. Section 3 Statistical Summary Results – All Students

In this Section, the analysis focused on students' perceptions of the effectiveness of social media in distance learning, highlighting only statistically significant results. Among all students, gender differences were notable in two key areas. First, female students were more likely to perceive social media as a welcoming tool for shy and quiet learners, whereas male students expressed more mixed or reserved views. Second, both male and female students agreed on the importance of teacher support in digital learning, but female respondents demonstrated a stronger attention to its significance. These gender differences were also evident among undergraduate students, where females consistently showed higher levels of agreement in both cases. However, among postgraduate students, no statistically significant gender differences were found in perceptions across these items, representing a more balanced viewpoint in this group. These findings are clearly summarised in Table 5.29: Summary of Statistical Results. Section 3 outlines where gender-based differences were statistically significant across student levels.

	All Students (M & F)		Undergraduate (M & F)		Postgraduate (M & F)	
	P-value	**Sig.**	**P-value**	**Sig.**	**P-value**	**Sig.**
Q1- During the COVID-19, the use of social media for distance learning are more welcoming for shy and quiet students.	**0.033**	**Yes**	**0.052**	**Yes**	**0.226**	No
Q2- I think distance learning is suitable for all types of courses and all students.	**0.565**	No	**0.101**	No	**0.133**	No
Q3- Perceived teacher support is even more important in digital learning setting including social media.	**0.002**	**Yes**	**0.002**	**Yes**	**0.610**	No
Q4- I believe that the effectiveness of online learning using social media varies amongst age groups, major, and experience.	**0.056**	No	**0.164**	No	**0.417**	No
Q5- Social media is the most effectiveness of online learning and distance learning among digital platforms.	**0.315**	No	**0.130**	No	**0.738**	No
Q6- Do you feel that using social media as distance Learning in pandemic is more effective than face-to-face teaching.	**0.713**	No	**0.762**	No	**0.882**	No
Q7- Lecturers were not willing to communicate via social media	**0.530**	No	**0.153**	No	**0.259**	No
Q8- I think in distance learning via social media has been increased my retention of information and take less time.	**0.063**	No	**0.067**	No	**0.296**	No
Q9- I think in distance learning via social media, I always seek help from peers, colleagues and tutors more than in face-to-face teaching.	**0.377**	No	**0.453**	No	**0.226**	No
Q10- I think that good learning is good learning, whether it is face-to-face or in a distance learning environment.	**0.717**	No	**0.969**	No	**0.526**	No
Q11- I believe that social media can enhance my learning experience	**0.226**	No	**0.099**	No	**0.845**	No

Table 5.29: Summary of Statistical Results: Section 3

5.2.3.2. Section 3: Effectiveness of Social Media in Distance Learning Based on Nationalities and Faculties

Q2- I think distance learning is suitable for all types of courses and all students.

Table 5.30 examines students' perceptions of whether distance learning is suitable for all types of courses and students, focusing on gender and nationality. The results indicate a clear trend among UK Citizen students, who were more likely to strongly disagree with the statement compared to international students. A higher number of UK Citizen students (52 out of 100) selected "Strongly Disagree," whereas international students had a more distributed response pattern.

Statistical analysis shows that UK Citizen responses were not statistically significant ($p = 0.671$), meaning gender did not influence their views. However, for international students, a significant difference was observed ($p = 0.038$), and as a result, gender played a role in shaping their perceptions. These findings indicate that nationality may influence how students perceive the applicability of distance learning across different courses, with international students showing more variation in their responses compared to UK Citizens.

Gender * I think distance learning is suitable for all types of courses and all students. Crosstabulation.							
Gender by Nationalities							
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
UK Citizen	Male	16	10	1	3	0	30
	Female	36	18	3	9	4	70
	Total	52	28	4	12	4	100
International Student	Male	23	8	9	2	1	43
	Female	11	11	2	6	0	30
	Total	34	19	11	8	1	73
Overall Total	Male	39	18	10	5	1	73
	Female	47	29	5	15	4	100
	Total	86	47	15	20	5	173

Table 5.30: The suitability of online learning by Nationalities

Q3- Perceived teacher support is even more important in digital learning setting including social media.

Table 5.31 explores students' perceptions of the importance of teacher support in digital learning settings, including social media, analysed by gender and nationality. The results indicate that UK Citizen students did not show a statistically significant difference ($p = 0.161$), meaning gender did not play a crucial role in shaping their views. Both male and female UK Citizen students largely agreed or strongly agreed on the importance of teacher support, with 34 out of 100 students selecting "Strongly Agree."

The difference was more pronounced for international students ($p = 0.052$), approaching statistical significance. Male international students had a more evenly distributed response pattern, while female international students were more likely to strongly agree than male students. This suggests that among international students, female students placed a slightly higher highlighting on the need for teacher support in digital learning environments.

Gender * Perceived teacher support is even more important in digital learning setting including social media. Crosstabulation							
Gender by Nationalities							
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
UK Citizen	Male	2	1	7	15	5	30
	Female	2	2	15	22	29	70
	Total	4	3	22	37	34	100
International Student	Male	3	5	10	20	5	43
	Female	3	1	8	7	11	30
	Total	6	6	18	27	16	73
Overall Total	Male	5	6	17	35	10	73
	Female	5	3	23	29	40	100
	Total	10	9	40	64	50	173

Table 5.31: Teachers support in digital learning setting by Nationalities

The analysis revealed that gender played a significant role in specific areas of digital learning perceptions by nationalities. However, Table 5.32 further analyses where gender played a role and where no significant differences were observed.

5.2.3.3. Summary of Section 3 Statistical Results Based on Gender's Nationalities

Section 3 provided additional analysis of gender-based perceptions regarding social media effectiveness for distance learning across various nationalities. Most comparisons showed no significant gender differences, yet two specific areas emerged as exceptions when international student data were examined. First, international students showed a statistically significant difference in their views on whether distance learning is suitable for all types of courses and students, with female students expressing slightly more reserved opinions than males. Second, the importance of teacher support in digital learning settings approached statistical significance, with international female students more likely to strongly agree with its importance than their male peers. In contrast, UK Citizen students demonstrated no significant gender-based differences across items in this section, indicating a more uniform perception regardless of gender. These findings are summarised in Table 5.32: Summary of Statistical Results by Gender's Nationality (Section 3), which outlines where statistically significant gender differences resulted based on students' nationalities.

	Gender by Nationalities(M&F)			
	UK		**International Student**	
	P-value	**Sig.**	**P-value**	**Sig.**
Q1- During the COVID-19, the use of social media for distance learning are more welcoming for shy and quiet students.	0.095	No	0.121	No
Q2- I think distance learning is suitable for all types of courses and all students.	0.671	No	0.038	**Yes**
Q3- Perceived teacher support is even more important in digital learning setting including social media.	0.161	No	0.052	**Yes**
Q4- I believe that the effectiveness of online learning using social media varies amongst age groups, major, and experience.	0.308	No	0.436	No
Q5- Social media is the most effectiveness of online learning and distance learning among digital platforms.	0.432	No	0.485	No
Q6- Do you feel that using social media as distance Learning in pandemic is more effective than face-to-face teaching.	0.157	No	0.885	No
Q7- Lecturers were not willing to communicate via social media.	0.418	No	0.628	No
Q8- I think in distance learning via social media has been increased my retention of information and take less time.	0.139	No	0.280	No
Q9- I think in distance learning via social media, I always seek help from peers, colleagues and tutors more than in face-to-face teaching.	0.414	No	0.162	No
Q10- I think that good learning is good learning, whether it is face-to-face or in a distance learning environment.	0.399	No	0.556	No
Q11- I believe that social media can enhance my learning experience	0.377	No	0.794	No

Table 5.32: Summary of Statistical Results by Gender's Nationality (Section 3)

Q1- During the COVID-19, the use of social media for distance learning are more welcoming for shy and quiet students (Gender's Faculties).

The study examined in Table 5.33 whether social media in distance learning was perceived as more welcoming for shy and quiet students across different faculties. Among Engineering & Science students, responses were balanced between males and females, with most selecting "Neither agree nor disagree" or "Somewhat agree." This lack of strong variation resulted in no statistically significant difference ($p = 0.750$), indicating that gender did not influence perceptions in STEM-related disciplines. In contrast, Humanities, Social Science, and Business School students showed a significant difference ($p = 0.018$). A notable trend emerged, with a higher proportion of female students strongly agreeing or somewhat agreeing that social media created a more welcoming environment for quieter students. Male students in this faculty had a more even spread across response categories, with fewer strongly agreeing. The results on the lists show that students in the technical fields of Engineering and Science were neutral toward the position of social network role for quieter students, while Humanities/Social Sciences students, as well as specific Business School students, especially female students, believe that social media is a supportive field for shy learners in distance education.

Gender * During the COVID-19, the use of social media for distance learning are more welcoming for shy and quiet students. Crosstabulation							
Gender by Faculties							
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Engineering & Science	Male	4	5	12	14	9	44
	Female	1	2	6	12	6	27
	Total	5	7	18	26	15	71
Humanities/ Social Science & Business School	Male	2	3	11	7	6	29
	Female	7	9	8	37	12	73
	Total	9	12	19	44	18	102
Total	Male	6	8	23	21	15	73
	Female	8	11	14	49	18	100
	Total	14	19	37	70	33	173

Table 5.33: Social Media in Distance Learning as a Supportive Space for Shy Students

Q8- I think in distance learning via social media has been increased my retention of information and take less time.

Gender also did not strongly influence perceptions among Engineering & Science students (p = 0.213). The responses were well stable, with male and female students representing pretty much equal numbers overall, with the most selected response being "Neither agree nor Disagree," followed closely by "Somewhat Disagree." This means that among STEM-related fields, students did not agree using social media with better retention or efficiency while learning (see Table 5.34). However, gender differences were significant among students in Humanities, Social Science, and Business School (p = 0.036). More female students than males were dubious that social media had enhanced retention and efficiency, with the female students strongly disagreeing. Among male students in this faculty, though, the responses were more equally distributed, and there

were fewer males strongly disagreeing. These findings showed that while Engineering & Science students had neutral views, female students in Humanities and Social Sciences were more likely to feel that social media did not significantly improve their ability to retain information or reduce study time.

Gender * I think in distance learning via social media has been increased my retention of information and take less time. Crosstabulation							
Gender by Faculties							
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Engineering & Science	Male	4	11	14	12	3	44
	Female	5	7	12	3	0	27
	Total	9	18	26	15	3	71
Humanities/ Social Science & Business School	Male	4	3	16	4	2	29
	Female	19	21	18	11	4	73
	Total	23	24	34	15	6	102
Total	Male	8	14	30	16	5	73
	Female	24	28	30	14	4	100
	Total	32	42	60	30	9	173

Table 5.34: Impact of Social Media in Distance Learning on Information Retention

Q11- I believe that social media can enhance my learning experience

This study examines in Table 5.35 whether students from various faculties perceive social media as a tool that enhances their learning experience. Among students in the Engineering & Science disciplines ($p = 0.762$), gender did not significantly influence their perceptions. Responses were relatively equally spread among categories, with both male and female students expressing various opinions, from agreement to disagreement. This indicates that, in STEM fields, students generally held neutral to moderately positive

views on the role of social media in learning, irrespective of gender. In contrast, among students in the Humanities, Social Sciences, and Business School ($p = 0.028$), gender differences were more apparent. A significantly higher proportion of female students somewhat agreed that social media enhances their learning, compared to only some male students. Furthermore, more female students strongly agreed, showing that women in these faculties were more inclined to view social media as a beneficial tool for their educational experience. These findings highlight that while Engineering & Science students had mixed opinions on the educational value of social media, female students in the Humanities and Social Sciences were more likely to regard social media as a valuable resource for enhancing their learning. Furthermore, Table 5.36 on the next page summarises Section 3, highlighting where gender played a statistically significant role in perceptions across faculties and where no significant differences were found.

Gender *I believe that social media can enhance my learning experience. Crosstabulation							
Gender by Faculties							
		Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Engineering & Science	Male	3	10	8	18	5	44
	Female	3	5	6	12	1	27
	Total	6	15	14	30	6	71
Humanities/ Social Science & Business School	Male	3	3	9	11	3	29
	Female	2	11	7	44	9	73
	Total	5	14	16	55	12	102
Total	Male	6	13	17	29	8	73
	Female	5	16	13	56	10	100
	Total	11	29	30	85	18	173

Table 5.35: Social Media's Role in Enhancing Learning

5.2.3.4. Summary of Section 3 Statistical Results Based on Gender's Faculties

This analysis explored how students from different genders and academic departments perceived the role of social media in distance learning. Gender differences are more apparent within Humanities, Social Sciences, and Business School faculties than within Engineering and Science disciplines. Female students in non-STEM disciplines showed greater belief that social media promotes a welcoming space for shy students and improves information retention and learning efficiency. These gender-based distinctions were statistically significant within their respective contexts. In contrast, responses were more balanced across genders among students in the Engineering and Science disciplines, and no statistically significant differences were observed. Gender responses among Engineering and Science students demonstrated balanced representation across genders with no statistically significant differences detected. Faculty gender disparities appeared stronger in Humanities, Social Sciences, and Business Schools than in Engineering and Science disciplines. Female students studying non-STEM subjects were more inclined to agree that social media provides a more welcoming space for introverted learners while boosting information retention and learning efficiency. The results indicate that female students in non-technical fields experience stronger perceived educational benefits from social media platforms. The detailed examination of these results is provided in Table 5.36, which presents statistical findings that reveal gender influence across faculties, which shaped students' perspectives.

	Gender by Faculties (M&F)			
	Engineering & Science		Humanities/Social Science & Business School	
	P-value	Sig.	P-value	Sig.
Q1- During the COVID-19, the use of social media for distance learning are more welcoming for shy and quiet students.	0.758	No	0.018	**Yes**
Q2- I think distance learning is suitable for all types of courses and all students.	0.179	No	0.121	No
Q3- Perceived teacher support is even more important in digital learning setting including social media.	0.899	No	0.002	**Yes**
Q4- I believe that the effectiveness of online learning using social media varies amongst age groups, major, and experience.	0.576	No	0.065	No
Q5- Social media is the most effectiveness of online learning and distance learning among digital platforms.	0.646	No	0.200	No
Q6- Do you feel that using social media as distance Learning in pandemic is more effective than face-to-face teaching.	0.601	No	0.802	No
Q7- Lecturers were not willing to communicate via social media.	0.230	No	0.649	No
Q8- I think in distance learning via social media has been increased my retention of information and take less time.	0.213	No	0.036	**Yes**
Q9- I think in distance learning via social media, I always seek help from peers, colleagues and tutors more than in face-to-face teaching.	0.576	No	0.406	No
Q10- I think that good learning is good learning, whether it is face-to-face or in a distance learning environment.	0.767	No	0.642	No
Q11- I believe that social media can enhance my learning experience	0.762	No	0.028	**Yes**

Table 5.36: Summary of Statistical Results by Gender's Faculty

5.2.4. Section 4: Effectiveness of Teaching Using Social Media

In this section, which tests the effectiveness of teaching using social media, it's important to note that the study did not yield any statistical results indicating significant differences in beliefs. Generally, gender does not appear to be a strong determinant of these perceptions. This applies when considering all students, both undergraduate and postgraduate, as well as when examining differences by nationality or faculty. The findings from Tables 5.37 and 5.38 fully present the results for all the questions explored within this section.

	All Students (M & F)		**Undergraduate** (M & F)		**Postgraduate** (M & F)	
	P-value	**Sig.**	**P-value**	**Sig**	**P-value**	**Sig.**
Q-1- As part of your studies, how effective is the teaching within your major using social media in a distance learning environment at the university?	**0.669**	No	**0.699**	No	**0.426**	No
Q2- As part of your studies, how satisfied or dissatisfied were you with the teaching effectiveness of distance learning using social media with the COVID-19 pandemic?	**0.084**	No	**0.705**	No	**0.090**	No
Q3- How was your overall experience learning from home?	**0.232**	No	**0.138**	No	**0.261**	No
Q4- How likely are you to continue learning in distance learning environment using social media next year as part of your studies?	**0.579**	No	**0.510**	No	**0.123**	No

Table 5.37: Summary of Statistical Results by all students Section 4

	Gender by Nationalities				Gender by Faculties			
	UK		International Student		Engineering & Science		Humanities/Social Science & Business School	
	P-value	Sig.	P-value	Sig.	P-value	Sig.	P-value	Sig.
Q-1- As part of your studies, how effective is the teaching within your major using social media in a distance learning environment at the university?	**0.565**	No	**0.601**	No	**0.501**	No	0.490	No
Q2- As part of your studies, how satisfied or dissatisfied were you with the teaching effectiveness of distance learning using social media with the COVID-19 pandemic?	**0.759**	No	**0.354**	No	**0.090**	No	0.617	No
Q3- How was your overall experience learning from home?	**0.378**	No	**0. 292**	No	**0.501**	No	0.259	No
Q4- How likely are you to continue learning in distance learning environment using social media next year as part of your studies?	**0.499**	No	**0.248**	No	**0.123**	No	0.238	No

Table 5.38: Summary of Statistical Results by Gender by Nationalities and Faculties Section 4

5.3. Canonical Correlation Analysis

5.3.1. Overview

After examining various factors influencing perceptions and beliefs in the previous sections, this study now employs Canonical Correlation Analysis (CCA) to explore further the relationships and associations between multiple sets of variables. CCA is a multivariate statistical technique that allows us to uncover meaningful patterns and connections between two or more variables (as described in Section 4.4.2.3). In the context of this study, using CCA will help to understand how different variables, such as gender, nationality, faculty, and various perceptions, interact with and influence each other. As shown in Table 5.39, the canonical correlation analysis revealed meaningful patterns of association between gender perception variables and social media experience in distance learning. The first two canonical functions demonstrated statistically significant shared variance, highlighting key relationships such as the perception of male advantage in online classes and the belief in female discrimination or competence related to experiences with social media use.

1- Analysis Variance - Design between Gender Perceptions and Social Media Experience

Functions 1				Functions 2			
Variable	Coef	r_s	r2s (%)	Coef	r_s	r^2_s (%)	r2 (%)
male_more_confident	.498	-.232	5.38	-.478	-.494	24.40	29.78
male_better_online	-.206	-.405	16.40	.253	-.249	6.20	22.6
male_use_computers	.039	-492	24.20	.033	-.190	3.61	27.81
female_higher_competence	-.044	-464	21.52	-.510	-.586	34.33	55.85
female_are_favored	-.192	-.640	40.96	.555	.232	5.38	46.34
female_face_discrimination	.138	-.324	10.49	-.591	-.719	51.69	62.18
teacher_support_female	-.421	-.653	42.64	.072	-.192	3.68	46.32
male_advantage_onlineclass	-.816	-.829	68.72	.020	-.293	8.58	77.3
R2c							
welcoming_shy_students	-.534	-.717	51.44	-.620	-.551	30.36	81.8
sm_most_effectiveness_platforms	-.720	-.855	73.10	.517	.418	17.47	90.57
lecturers_not_communicate	-.009	.005	.002	-.610	-.722	52.20	52.205

Table 5.39: Gender Perceptions vs Social Media Experience

To visually illustrate the structure of these associations, particularly the first canonical function, Figure 5.1 presents a simple model highlighting the interaction between three key predictor variables and two primary criterion variables. This figure illustrates an example of the Canonical Correlation Analysis (CCA) analysis of two sets of variables (Gender Perceptions vs. Social Media Experience) as an analysis of variance. Moreover, in the Canonical Correlation Analysis (CCA) context, the predictor variables are the independent variables used to predict or explain the variation in the dependent variables (criterion variables). Functions refer to linear combinations of the original variables that maximise the correlation between two sets of variables. These functions are created from the canonical variates, which are weighted combinations of the original variables. As a result, each function in CCA represents a different pattern of association between the two sets of variables. The first function takes the strongest correlation between the two sets, the second function takes the next strongest correlation, etc. (see Appendix D for analysis of variance results between sets of variables).

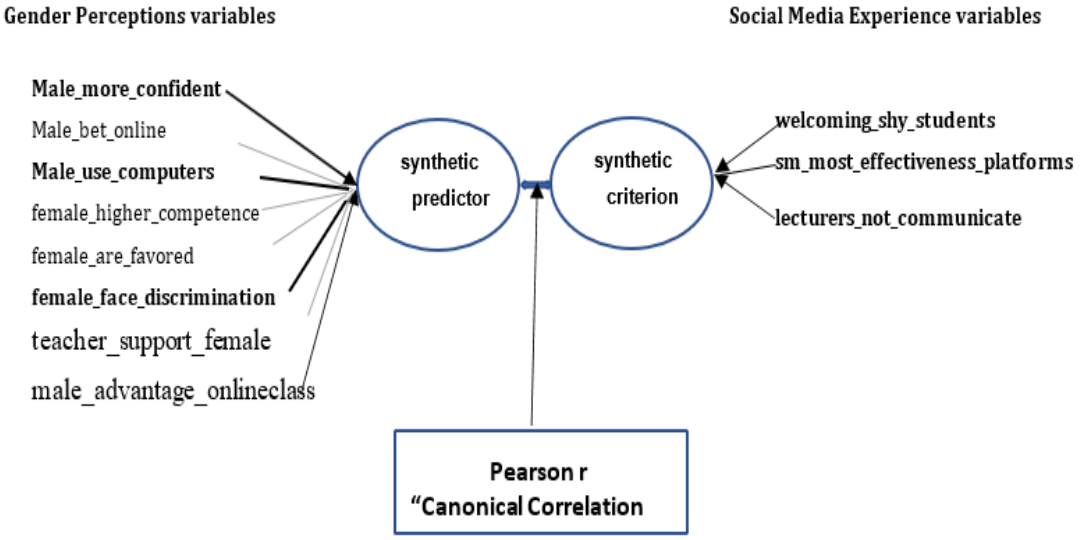

Figure 5.1 Canonical Correlation Analysis with Three Predictors and Two Criterion Variables, Showing First Function

Canonical Solution for Attachment Predicting Relationship for Functions 1 and 2, A canonical correlation analysis was conducted using the three attachment variables as predictors of the 8 perceptions variables to evaluate the multivariate shared relationship between the two variable sets (i.e., Gender Perceptions, and Social Media Learning experience). The analysis yielded three functions with squared canonical correlations (R2c) of .284, .151, and .017 for each successive function. Collectively, the full model across all functions was statistically significant using the Wilks's λ = .627 criterion, F (24, 470.45) = 3.42130, p <.001. Because Wilks's λ represents the variance unexplained by the model, 1 – λ (1 – .627 = .373 = Rc2) yields the full model effect size in an r2 metric. Thus, for the set of three canonical functions, the r2 type effect size was .373, which indicates that the full model explained a moderate portion, about 37%, of the variance shared between the variable sets. As mentioned earlier, the complete model comprising Functions 1 through 3 showed statistical significance. This indicates a relationship between the predictor variables and the criterion variables. Additionally, specific group comparisons within the model, such as Functions 1 to 3 and 2 to 3, also demonstrated statistical significance. For instance, the comparison of Functions 1 to 3 created a statistically significant result, as evidenced by an F statistic of (24, 470.45) = 3.421, p < .001. Similarly, the comparison of Functions 2 to 3 showed statistical significance, with an F statistic of (14, 326) = 2.211, p = .007. Function 3, which was the only function examined independently, did not account for a statistically significant level of shared

variance between the sets of variables, F (6, 164) = .696, p = .826. Considering the outcomes for each function, the study found that only the first two functions were deemed significant within this research context (24.8% and 15.1% of shared variance, respectively). The final function accounted for only 1.7% of the remaining variance in the variables after the previous functions were considered.

Table 5.39 shows the standardised functions and presents canonical function coefficients and structure coefficients for Functions 1 & 2.

5.3.2. Summary of the Analysis between Gender Perceptions and Social Media Experience

To better understand the relationship between gender perceptions and students' experiences with social media in distance learning, a canonical correlation analysis was conducted. This analysis explored how three key predictors were connected to eight aspects of students' social media learning experiences. The results showed three main patterns (functions), but only the first two revealed significant insights. The first function explained around 28% of the shared connection between the two sets of variables, and the second explained about 15%. Both these two functions showed that gender-related beliefs are linked to how students experience social media in online education. The third function, however, explained very little and was not considered significant. Overall, the analysis highlighted a moderate and significant relationship between the two groups of factors, with the most relevant details summarised in Table 5.39.

For Function 1, the results showed that students who viewed males as more confident with technology, believed that females experienced discrimination, and recognised males as skilled computer users tended to report more positive experiences with social media in learning. On the other hand, students who believed that females were more competent, received more support from teachers, were favoured in online learning, or that males had an advantage in online classrooms were linked to less positive experiences with social media. How students view gender roles in education appears to be strongly connected to their social media use and experiences during distance learning.

Moving on to Function 2, additional aspects of students' social media experiences were brought into the analysis, helping to explain the connection with gender perceptions. As shown in Table 5.39, the key factors influencing this function included the belief that males perform better in online learning, the idea that females are favoured, the

perception of support from female teachers, and the recognition of males' computer skills and their advantage in online classrooms. These views significantly shaped how students related to their experiences with social media in education.

An interesting observation is that feeling more confident for males and facing discrimination for females were positively associated with Function 1 but negatively associated with Function 2.

Moreover, a strange trend emerges upon examining the structure coefficients for the whole function. The effectiveness of social media platforms appears to have a negative correlation with Function 1 but a positive one with Function 2. These squared canonical correlations, indicating how much shared variance each function explains between the two sets of variables, underscore the importance of considering both Gender Perceptions and Social Media Experience in understanding their relationship. This canonical analysis sheds light on multiple aspects of the relationship between Gender Perceptions and Social Media Experience. While some aspects align positively, others exhibit negative associations.

2- Analysis Variance - Design between Gender Perceptions and Attitudes Toward Distance Learning

Functions 1				Functions 2			
Variable	Coef	r_s	r2s (%)	Coef	r_s	r^2_s (%)	r2 (%)
distance_learning_suitable	-.150	-.140	1.96	.315	.452	20.43	22.39
effectiveness_online_learning	-.058	.293	8.58	-.260	-.105	1.10	9.68
felling_using_sm	-.159	.027	.007	-.131	.402	16.16	16.167
increased_retention_information	.358	.330	10.89	.584	.784	61.46	72.35
seek_help_in_distance	.069	.302	9.12	.075	.503	25.30	34.42
good_learning_good	.266	.235	5.52	-.224	.140	1.96	7.48
sm_enhance_learning_experience	-.016	.358	12.81	.566	.621	38.56	51.37
perceived_teacher_support	.907	.886	78.33	-.272	-.239	57.12	135.45
R2c							
male_more_confident	-.234	.288	8.29	-.203	.251	6.30	14.59
male_better_online	-.168	.308	9.48	.295	.370	13.69	23.17
male_use_computers	.386	.576	33.17	-.334	.246	60.50	93.67
female_higher_competence	364	.760	57.76	-.143	.146	2.13	59.89
female_are_favored	-.307	.186	3.45	.436	.661	43.75	47.2
female_face_discrimination	.581	.793	62.88	-.558	-.090	.81	63.69
teacher_support_female	.234	.562	31.66	.305	.432	18.66	50.32
male_advantage_onlineclass	.548	.584	34.10	.835	.687	47.19	81.29

Table 5.40: Gender Perceptions vs Attitudes Toward Distance Learning Canonical Solution for Attachment Predicting Relationship for Functions 1 and 2

The results of canonical correlation analysis show the relationship between the two variable sets of gender perceptions and attitudes toward distance learning. The examination resulted in the identification of eight functions, each displaying squared canonical correlations (R2c) of .229, .197, .086, .057, .041, .023, and .006 sequentially. When examining the entire model across all functions, statistical significance emerged, as evidenced by the Wilks's λ = .495 criterion and an associated F statistic of F (64, 912.05) = 1.842, with a p-value less than .001. By calculating 1 – λ (1 –.495 =.245 = Rc2), we obtain the complete model's effect size in terms of r2. Consequently, for this set of

eight canonical functions, the r2 effect size equated to .245, signifying that the complete model elucidated a moderate proportion, approximately 24.5%, of the shared variance among the variable sets.

Functions 1 to 8 and 2 to 8 were also statistically significant, $F(64, 912) = 1.842$, $p < .001$, and $F(49, 806) = 1.491$, $p = .018$, respectively. Furthermore, other functions did not account for a statistically significant level of shared variance between the sets of variables, $F(1, 164) = .000$, $p = .979$ Considering the outcomes for each function, the study found that only the first two functions were considered significant within this research context (22.9% and 19.7% of shared variance, respectively). The final functions accounted for only 8.6%, 5.7%, 4.1%, 2.3%, and 0.6% of the remaining variance in the variables after the previous functions were considered.

Table 40, which displays standardised and structure coefficients for Functions 1 and 2, provides the canonical function coefficients.

The analysis explores how different gender perception variables relate to attitudes toward distance learning. For Function 1, reveals that distance_learning_suitable, effectiveness_online_learning, and increased_retention_information contributes positively to attitudes toward distance learning, with coefficients of 0.315, 0.293, and 0.358, respectively. In contrast, felling_using_sm, seek_help_in_distance, and good_learning_good display relatively weaker negative associations with attitudes toward distance learning, as shown by coefficients of -0.159, 0.069, and 0.266. Perceived_teacher_support appears as the most influential variable in Function 1, with a high coefficient of 0.907, signifying a strong positive relationship with favourable attitudes toward distance learning. Regarding function 2, it presents a set of gender perception variables. Among these, male_more_confident, male_better_online, and female_are_favored contribute negatively to attitudes toward distance learning, with coefficients of 0.288 and 0.308, respectively. When compared, male_use_computers, female_higher_competence, and female_face_discrimination show positive associations with attitudes toward distance learning in Function 2. In addition, teacher_support_female and male_advantage_onlineclass also display positive associations, with coefficients of 0.562 and 0.584, respectively. Function 1 primarily underlines the influence of variables related to attitudes toward distance learning, while Function 2 explores the impact of gender perceptions.

5.3.3. Summary of the Analysis between Gender Perceptions and Attitudes Toward Distance Learning

This part of the analysis examined how students' gender perceptions relate to their attitudes toward distance learning. Eight functions were identified using canonical correlation analysis, but only the first two revealed significant perceptions. Function 1 explained about 23% of the shared variance between the two sets of variables, while Function 2 explained roughly 20%. Combined, they represented a moderate portion, around 24.5%, of the correlation between gender-related beliefs and attitudes towards online education. Function 1 highlighted that students who believed distance learning is suitable for various courses, effective for learning, and helpful for retaining information were more likely to have positive attitudes toward it. The influence of teacher support demonstrated a strong connection with positive perceptions of distance learning. Function 2, in contrast, focused on gender perceptions. Students who believed males were more confident, performed better online, or that females were favoured tended to have more negative attitudes toward distance learning. On the other hand, positive associations were found among those who recognised females' competence, the discrimination they may face, and the support they received from teachers. This function reveals that beliefs about gender roles and treatment can shape how students perceive their online learning experience.

5.4. Chapter Summary

This chapter has discussed the statistically significant findings of data gathered by a questionnaire administered to 173 learners at the University of Strathclyde in Glasgow, United Kingdom, from different backgrounds and levels of study. It shows gender differences in perceptions and experiences regarding online learning environments, demonstrating the various factors influencing these experiences. The most statistically significant findings concern gender perceptions vs. attitudes towards distance learning and other relevant elements. As a result, four themes were developed in this study from this quantitative analysis, including attitudes towards distance learning, gender perceptions and experiences in distance learning, the influence of gender on learning, and improving the online learning experience. The following chapter discusses the second (interview) phase, conducted to confirm and enhance our understanding of these themes in more detail with the support of qualitative insights.

Chapter 6: Interview Phase Results

6.1. Introduction

Data collection and subsequent analysis sought to provide a foundation for understanding online education's advantages and disadvantages. The interview phase revealed that the long-term effectiveness of online learning and teaching needs to be evaluated continuously, and that pedagogical solutions are seen and utilised by different genders. This chapter expands on the ideas from the first phase of concerning COVID-19, social media, and online learning dimensions. It examines the expected results of this use and improves post-COVID understanding of the examined phenomena. The qualitative second-phase results are presented in this chapter. Table 6.1 shows the characteristics of 14 University of Strathclyde students interviewed in a semi-structured interview.

Gender	Participants	Faculty	Position
Male	MP-1	Humanities & Social Sciences	Master
Male	MP-2	Engineering	Master
Male	MP-3	Engineering	Master
Male	MP-4	Engineering	Year 2
Male	MP-5	Science	Master
Female	FP-6	Science	Year 3
Male	MP-7	Business School	Year 3
Female	FP-8	Science	Year 1
Female	FP-9	Engineering	PhD Student Year 2
Male	MP-10	Engineering	PhD Student Year 1
Female	FP-11	Business School	PhD Student Year 1
Female	FP-12	Humanities & Social Sciences	PhD Student Year 2
Female	FP-13	Humanities & Social Sciences	Master of Philosophy
Female	FP-14	Engineering	Master

Table 6.1: Participant Characteristics

6.2. Identified Themes

The analysis of interview data identified four primary themes that reveal how students experienced and perceived their transition to distance learning. As described in Section 4.5.3, the data analysis involved thematic analysis to systematically code and categorise participant responses, resulting in the identification of final themes. Following the sequential explanatory design of this study, the initial survey results guided the development of preliminary themes, which in turn directed the focus of the qualitative phase. Through inductive coding of the interview data, additional sub-themes were identified, offering deeper, real-life insights that extended beyond the scope of the quantitative findings. The four final themes are presented and discussed below.

6.2.1. Attitudes Toward Distance Learning

This theme explores students' preferences, challenges, and experiences with online and offline learning platforms. It is divided into the subthemes adumbrated in the following subsections.

6.2.1.1. Student Preferences for Online Learning Platforms

The preference for offline versus online learning platforms was a significant point of discussion among participants, with gender-based differences emerging. Most male participants, such as MP-1, MP-4, and MP-10, preferred online learning due to its flexibility. For example, MP-1 stated, "I'm busy on weekdays," while MP-10 noted, "I studied on my own time." These participants appreciated the ability to access recorded lectures at their convenience. MP-4 highlighted this advantage: "I can do it whenever you want." The detailed content provided in online recordings was also seen as beneficial. Some males prefer offline learning, including MP-2, MP-3, MP-5, and MP-7.

> "I like offline learning because it is more interactive, I can pay attention better, and I can miss classes and stay current." [MP-7]

Such excerpts underline the direct interaction it facilitates with the course lecturer and fellow students. Additionally, participants found offline learning to be less cumbersome, requiring no internet or system dependencies. There were divergent views on the impact of online learning on exam performance. While MP3 considered that it had resulted in a significant decline, other participants did not explicitly attribute exam performance to the mode of learning. In contrast, female participants, notably FP-6, expressed a

preference for a blended approach that combines both online and offline elements. The users value the integration of video-based training followed by workshops, as it offers a thorough and inclusive learning opportunity. Females, such as FP-8 and FP-9, favour offline learning and make a point of its benefits for communication and human interaction.

> "You can ask questions of the teacher more easily in person." [FP-8]

> "For communication and human interaction, especially in teaching and education." [FP-9]

The ability to pause lectures, meet instructors after class, and engage in extensive discussions is highlighted. Views on online learning among females vary. Some, including FP-11 and FP-14, preferred offline learning for its interactive nature, while others, such as FP-12 and FP-13, acknowledged doing well with online learning, but expressed a preference for in-person interactions

6.2.1.2. Experiences and Factors Influencing Opinions About Online Learning

Various aspects of learners' educational journeys were examined to explore their experiences and the factors shaping their views on online learning. Below, detailed explanations of these findings are provided, with particular focus on the insights shared by both male and female participants. Male participants expressed varied perspectives on online learning, reflecting its advantages and disadvantages. For instance, MP-1 stated clearly and accurately his preference for online learning due to its flexibility, stating:

> "As I mentioned before, [I prefer] online learning, because I am taking the course before it is actually started, is just like face-to-face learning." [MP1]

On the other hand, MP2 highlighted challenges related to internet connectivity, suggesting that offline learning may be more suitable given his circumstances. In addition, MP-3 emphasised time management issues associated with online classes, showing a preference for offline learning. Similarly, female participants shared their experiences and insights into online versus offline learning. For instance, FP-6 described her preference for a blended approach, combining aspects of both online and offline learning methods. FP-8 reflected on "the difficulties" she faced with online learning

during her first year of university, underscoring the adjustment required for this mode of instruction. In contrast, FP-9 confirmed the connectedness and focus fostered by offline learning experiences.

These narratives confirm the varied experiences and perceptions that participants bring to their learning preferences, and different preferred learning modalities for males and females.

6.2.1.3. Suitability of Distance Learning: Specific Situations

Inquiries were conducted with participants from different academic disciplines to assess the suitability of distance learning in various scenarios, providing opportunities to explore diverse distance learning contexts. Their responses specified situations and insights into their experiences, as well as perspectives on distance learning. Their views, as described below, emphasised the benefits and difficulties encountered.

Male participants shared nuanced perspectives on the suitability of distance learning based on their individual circumstances. For example, MP-1 noted its suitability for theoretical lectures but highlighted its limitations for practical topics such as coding, where face-to-face learning is preferred. MP-2 echoed similar sentiments, citing network failures and system issues as barriers to effective engagement in online lectures. MP-3 reflected on the sudden transition to distance learning during the COVID-19 pandemic, underscoring the necessity of adapting to new modes of instruction.

In a similar manner, female participants reported their experiences with distance learning, explaining its benefits and challenges. FP-8 mentioned difficulties in seeking assistance from lecturers during online lectures, highlighting delays in responses due to high demand. FP-9 pointed out the significance of practical learning in design fields, where practical experience is of paramount significance. FP-12 discussed the challenges of balancing learning at home and remote work during the COVID-19 lockdown, interpreting the complexities of learning in a remote environment:

> "When I was a little bit better, COVID happened, and so it was just something like [online learning] that I had to adapt to anyway." [FP-12]

FP-14 reflected on the convenience of distance learning, which allowed her to attend classes from any location in the world, but she also acknowledged the challenges of staying focused during online sessions.

6.2.1.4. Suitability of Distance Learning and Teacher Support

Distance learners frequently find themselves in a distinctive predicament whereby they lack the physical presence of teachers or peers to seek clarification, engage in discussions, or receive feedback. There were wide differences in participants' opinions about the suitability of distance learning and the assistance given by teachers. Male participants, as shown by MP-1, highlighted the importance of effective teaching in determining the success of distance learning. MP-4 preferred offline learning, due to the ease of direct interaction with instructors, while MP-7 expressed concern about the lack of personal connection in online settings.

In contrast, MP-10 noted differences in interaction opportunities between online and offline environments. Among female participants, FP-6 relied on recorded sessions for learning but valued offline workshops for interactive experiences. FP-9 perceived increased support for distance learning, but acknowledged the extraordinary pressure placed on the educational structure. FP-11 reflected on challenges faced by instructors during the transition to online teaching, while FP-14 struggled with obtaining comprehensive feedback in online classes.

These diverse perspectives underscore the need for customised approaches to address the varied needs of learners in distance education.

6.2.1.5. Expectations of Support in Online Classes

In discussions exploring expectations of support in online classes, participants offered a range of perspectives and experiences on the adequacy of teacher and peer support in the context of distance learning. Among males, MP-1 expressed expectation for comprehensive online teaching methods with pre-prepared slide presentations and guidance on platform usage. Conversely, MP-2 underscored the importance of quick responses from instructors and highlighted the role of peers in navigating technical challenges.

> "I expect the teacher will give, let us say, proper online learning. Maybe they can brief us on how to use the platform. About peers, I think a few of my peers do not know how to use computers, so it is a big problem to download and upload." [MP-1]

In the context of complexity, MP-3 delved into the complexities of online examinations and argued for flexibility in assessment timelines to accommodate potential connectivity issues. MP-4 emphasised the importance of clear communication and peer support in understanding course material:

> "I just expect them. If I have a question, I do not expect an answer straight away, because I know they're busy. From peers, if I am stuck, you can explain it to me in a better way." [MP-4]

Conversely, MP-7 declared the limitations of online interactions for building meaningful connections with peers. MP-10 reflected on the challenges of obtaining timely assistance in online settings, contrasting it with the ease of seeking clarification in traditional classrooms. Among female participants, teacher and peer support expectations varied, with some, like FP-8, seeking immediate responses and interactive learning experiences. FP-9 highlighted the need for detailed explanations from instructors and the potential for peer sharing to enhance understanding. Others, such as FP-11, observed experiences of limited technical support and expressed a desire for clearer guidance in navigating online platforms. FP-13 repeated the sentiment, noting the lack of engagement on online discussion boards.

> "I guess if it is online, I would have liked to have had more support either from my teachers or the university about how to do things online." [FP-13]

FP-14 encouraged more interactive sessions and study groups in online classes to foster engagement and preparedness among students.

6.2.1.6. Providing and Receiving Support in Online Learning Environments

In the context of the complexities of providing and receiving support in online education, emphasise the significance of peer interactions and the challenges inherent in virtual collaboration. A conversation was held with participants, reflecting on their experiences of providing and receiving support in online learning environments. Participants shared varied perspectives. Within the group of male participants, MP1 stated instances of assisting friends by reviewing documents and providing feedback on presentations, noting the simplicity of such interactions.

In contrast, MP-7 admitted the difficulty of making friends and connections in online settings ("It is harder to make friends online"), highlighting many students' challenges. MP10 described the availability of online forums for seeking assistance but noted limitations on collaborative discussions due to university restrictions. They preferred in-person collaboration, reflecting the ease of direct involvement in academic problems.

Pertaining to interpersonal face-to-face communication, MP-12 recalled frequently classmates guiding each other and displaying coursework, exhibiting practicality and improved collaboration. FP-13 noted a lack of fellow student interaction. Similarly, FP-14 had technical issues and depended on a classmate via Zoom, highlighting the need for peer support in virtual learning environments.

> "I expect more interactive sessions from teachers and peers in online classes, such as study groups, which tend to be less popular in online learning environments, whereas when it is in person, students usually feel that they have the commitment to come prepared with something." [FP-14]

6.2.1.7. The Effectiveness of Online Learning vs Traditional Classroom Settings

Although distance learning offers flexibility, accessibility, and personalisation. While traditional learning encourages engagement and structure. The choice between traditional and online education is contingent upon individual preferences, preferred modes of learning, and contextual factors in classroom settings. Male and female participants' perspectives on the effectiveness of online learning versus traditional classroom settings varied based on their experiences and preferences. For male participants, MP-1 highlighted the convenience of online learning, particularly for individuals residing far from urban centres, acknowledging its benefits for postgraduate students and working professionals. Similarly, MP-2 emphasised the efficacy of online learning in well-supported environments, though they noted the superiority of offline learning in settings with deficiencies.

> "Online learning is preferred when all factors, the Internet, systems, and lecturers, are considered; however, in situations with factor deficits. I think offline learning. Training is better for implementation, but for now, I think online learning in advanced and standard institutions is preferable for students." [MP-2]

MP-4 repeated the same feeling that effective online learning requires comprehensive explanations and accessible resources from instructors. Moreover, MP-5 added that flexibility in online classes, especially during non-traditional hours, contributed to its perceived effectiveness.

> "Online learning is more helpful to me because classes are available at night." [MP-5]

In contrast, MP-7 emphasised the personalised and interactive nature of traditional learning ("I think traditional learning is probably still better"), and presented a hybrid approach that combines in-person classes with online resources.

> "I think a good compromise is having the classes and everything recorded and having access to your teachers online, but still having the classes in person." [MP-7]

MP-10 acknowledged the benefits of online learning in fostering self-discipline and time management skills, but recognised the value of interpersonal collaboration in traditional settings, among female participants. FP-6 preferred personal connections with instructors, while FP-8 highlighted the flexibility of online learning but noted its limitations in interaction and hands-on experiences. FP-12 valued the independence of online learning but included the importance of peer discussions facilitated by in-person interactions. On the other hand, FP-14 argued for the superiority of traditional classroom settings, referring to their interactive nature and direct supervision by teachers.

6.2.2. Gender Perceptions and Experiences in Distance Learning

This theme examines how gender influences students' experiences in online learning environments. It explores differences in confidence, participation, and communication styles between male and female students. Additionally, it investigates whether students have faced or observed gender-based discrimination in online learning settings. It is divided into the subthemes adumbrated below.

6.2.2.1. Gender Differences in Online Learning Experiences

Both genders participating in this study offered varied perspectives on gender differences in online learning experiences, regarding male participants. MP-1 presented a perception that females may be more suitable for online learning due to their commitment levels, while acknowledging potential biases in confidence levels favouring

males. MP-2 highlighted the confidence and comfort females may feel in expressing themselves through written communication in online settings:

> "For online learning, females have confidence and are comfortable writing their questions." [MP-2]

In contrast, MP-3 believed that both genders experience online learning similarly: "I think both get the same" MP-3, without significant differences in pros and cons. MP-5 pointed out cultural perceptions influencing gender-specific behaviours, displaying that male students might engage in non-academic activities during online learning more than females. MP-7 recommended that while men may exhibit more confidence offline, online platforms provide opportunities for women to voice their opinions without pressure.

> "I feel like the females might be more able to attend classes regularly when it comes online." [MP-7]

Similarly, MP-10 observed gender differences in university experiences but believed online learning treated genders equally with consideration for female participants. FP-6 disagreed with gender-based differences in online learning, providing confidence levels based on individual characteristics rather than gender. FP-8 and FP-13 shared the same sentiment, stating that males and females do not have much difference in learning online, and FP-9 mentioned cultural factors influencing female communication preferences, reflecting that online platforms might offer advantages for shy or introverted individuals

> "I do not believe that males and females have much of a difference in learning online." [FP-8]

> "In some cultures, females do not like to communicate; maybe it is easier to communicate online, not to show themselves." [FP-9]

FP-11 highlighted societal expectations impacting female responsibilities, potentially affecting online learning behaviours. FP-12 and FP-14 also emphasised individual traits, pointing out that women might have advantages in online learning in specific scenarios, such as during pregnancy or menstrual cycles.

> "Think of women who are experiencing, for example, their monthly period, or women who might be learning and have children to look after. It is good that online learning is an option." [FP-12]

> "It is more difficult for them to attend classes at the university. Online learning makes it more suitable for them since they can stay at home and attend the classes virtually." [FP-14]

6.2.2.2. Gender Bias and Discrimination

It should be noted that the responses varied when examining discrimination based on gender in online learning. Most male participants denied that there was any gender discrimination, emphasising gender equality in the context of online learning (MP-1, MP-2, MP-3, MP-4, and MP-7). However, MP-10 did acknowledge discrimination against female STEM students and argued that this was related to societal attitudes and performance pressure on females to perform.

> "I have witnessed it. I have definitely witnessed discrimination against females in the science, technology, engineering, and math fields." [MP-10]

Female participants mostly settled with male participants who had neither experienced nor witnessed gender discrimination in online learning environments (FP-8, FP-9, FP-11, FP-12, FP-13, FP-14). Some participants attributed this to the dominance of females in specific fields, such as marketing FP-11, while others emphasised the importance of inclusivity and fair treatment for all learners (FP-8, FP-14). Moreover, one participant recognised the potential for discrimination based on visible identifiers like names on online platforms.

> "Some people might do so since their names appear on the screen (e.g., Zoom), so people might judge them and discriminate against them. However, in a class, people don't know their names, so they can't tell exactly people's backgrounds unless they physically look from a specific region." [FP-14]

While most participants acknowledged the presence of discrimination, particularly towards females in specific fields, others expressed confidence in the fairness and inclusivity of online learning environments, emphasising equal treatment for all learners regardless of gender.

6.2.3. Influence of Gender on Learning

This theme explores how biases and gender roles affect students' performance and participation in online learning settings. It investigates how gender affects platform preferences and user experiences, as well as whether some online platforms are thought to be better suited for men or women. It is separated into the subsequent subsections.

6.2.3.1. Suitability of Online Platforms for Males and Females

Participants offered varied perspectives on the suitability of online platforms for males and females. In addition, which is the preferred platform? Some male participants perceived online platforms as suitable for both genders, highlighting the common use of platforms like Microsoft Teams in academic and professional settings, MP-1, MP-3, MP-4, MP-5, MP-7. However, one participant noted potential differences in comfort levels with video coverage, recommending that females might be less comfortable showing their videos online MP-2. The pressure on females might be to present themselves physically differently than males on platforms with video features like Zoom.

> "Regarding platforms such as Microsoft Teams and maybe Zoom. I think there is a big difference in maybe something like Discord" [MP-10]

Female participants (FP-6, FP-8, FP-9, FP-12, FP-13, and FP-14) strongly agreed with this viewpoint, believing that online platforms are equally appropriate for both genders. They noted that Zoom, Google Meet, and Microsoft Teams usability should be based on personal preferences, not gender. Some participants said online platform issues were more related to technology skills and experience than gender FP-6, FP-13.

6.2.3.2. Preferred Online Learning Platforms

Male participants generally favoured Microsoft Teams, citing its comprehensive features tailored for educational purposes, MP-1, MP-2, and MP-3. Some participants also mentioned Zoom as a viable option for online learning, appreciating its versatility.

> "I think the way that Microsoft Teams was created is purposely for education, so there's an extra component there compared to Zoom." [MP-1]

> "I think Zoom is more variable for online learning." [MP-5]

> "I think Zoom was quite useful to have as a resource." [MP-7]

One male participant expressed a preference for Discord due to its voice-only chat feature (MP-10). Female participants also showed a range of preferences for online learning platforms. Some preferred Google Meet for its perceived lack of limits (FP-6), while others favoured Zoom for its ease of communication across different entities and universities FP-8, FP-9, FP-12, FP-13. One participant mentioned using Google Meet but showed a preference for Zoom FP-11. Another participant highlighted the convenience of Microsoft Teams, especially when integrated with university accounts.

> "I believe that the most suitable platforms for online learning are Microsoft Teams, which are automatically connected to the university account, making it easier to transfer information." [FP-14]

6.2.3.3. Opinions on MyPlace Online Classes

In exploring MyPlace online classes, participants of both genders shared their opinions on the university's MyPlace online classes, with varying perspectives. Male respondents were generally positive, highlighting the convenience and accessibility of MyPlace. They appreciated features such as pre-recorded lectures and tutorials, which allowed them to access course materials from anywhere and at any time (MP-2, MP-3, MP-4, MP-5, MP-7, and MP-10).

> "University online courses are of a very high standard and are good for all students." [MP-2]

> "I had an exam on software, so I was unaware of some lectures, so I found pre-recorded lectures on MyPlace." [MP-3]

In contrast, female participants had unclear patterns. Some found the online classes beneficial and effective, FP-8, FP-14, while others expressed difficulties or dissatisfaction with the platform. One participant found MyPlace tricky to use, particularly for undergraduate-level courses FP-6. Some female participants felt that the online classes were boring and not engaging. Other participants mentioned not attending any online courses, FP-11, while others expressed frustration with MyPlace's outdated user interface.

> "I do not like them. Because all of them seem more like just information and screens, and it is a little bit boring for me." [FP-9]

> "MyPlace was like something from the 1980s. It just seemed really outdated and very old-school." [FP-13]

However, despite these criticisms, FP-14 acknowledged the effectiveness of MyPlace in organising and managing future classes.

6.2.4. Improving the Online Learning Experience

This theme highlights students' suggestions for enhancing the quality of distance learning. It focuses on strategies to create more inclusive, engaging, and effective online learning environments, particularly those that address gender inclusivity and support strategies. Participants offered recommendations for creating gender-inclusive online learning environments when examining how to improve the online learning experience, addressing the importance of equal treatment and opportunities for all genders.

Male participants highlighted the need for inclusivity without bias and recommended that learning should be equal for each gender, MP-1. The importance also of designing online systems and portals in a way that does not differentiate between genders, ensuring that questions and answers are treated equally regardless of the gender of the student

> "It should not be a discrete need for males and females." [MP-2]

Some participants mentioned the absence of gender discrimination in their university experiences and included the importance of tackling any instances of discrimination promptly MP-3, MP-4. In the same pattern, female participants stated that universities should use diverse examples, encourage respectful communication, and ensure equal opportunities for everyone FP-8.

> "Universities should use diverse examples, encourage respectful communication, and ensure equal opportunities for everyone." [FP-8]

For inclusive activity creation and evaluation, they advised teachers to focus on the subject matter without bias

> "When you give topics, you should be very careful with not only focusing on, for example, the history of females or the history of males within the topics." [FP-9]

Some participants referred to the significance of teachers treating everyone equally and being understanding of gender-related statements.

> "Just treating everyone the same way, no matter their gender, just awareness of how comments about and examples that relate to gender that are given in a class are appropriate and not offensive." [FP-12]

Participants generally highlighted that equality, respect, and fairness in creating gender-inclusive online learning environments varied. Table 6.2 summarises the main thematic findings arising from the analysis presented in this chapter.

6.3. Summary of Key Thematic Findings

Theme	Key Findings
1- Attitudes Toward Distance Learning	- Male participants expressed a preference for online learning due to flexibility and convenience, referring to advantages such as access to recorded lectures and effective schedule management. - Female participants preferred a blended approach that combines online and offline elements, valuing the benefits of interactive in-person sessions and the flexibility of online learning. - Views on online learning varied among females. Some preferred offline learning for its interactive nature, while others acknowledged doing well with online learning but expressed a preference for in-person interactions.
2- Gender Perceptions and Experiences in Distance Learning	- Some male participants perceived gender differences in online learning experiences, particularly confidence levels and personality traits. One female participant further highlighted physiological and emotional factors, such as pregnancy or menstrual cycles, as additional influences on women's learning experiences. Societal expectations regarding communication standards and gender roles, along with performance pressure, influence students' participation in online learning. - Most participants, regardless of gender, denied experiencing or witnessing gender discrimination in online learning environments. - Female participants generally agreed with male participants that gender discrimination is not common in online learning, and that it offers inclusivity and fair treatment for all learners
3- The Influence of Gender on Learning	- Both genders offer varied perspectives on the suitability of online platforms, with some males noting potential differences in comfort levels with video features. - Participants from both genders generally agree that online platforms should be chosen based on personal preferences and experience rather than gender. - Female participants expressed mixed opinions on the effectiveness of MyPlace online classes at the university. Some found them useful, while others expressed dissatisfaction with the platform's usability and engagement.

4- Improving the Online Learning Experience	- Participants recommend creating gender-inclusive online learning environments by promoting equal treatment, providing various examples, and ensuring respectful communication. - Both male and female participants emphasise the importance of equality, respect, and fairness in creating gender-inclusive online learning environments.
5- Social Media and Online Learning	- Students indicated that WhatsApp and Discord were effective platforms for communication and peer-group discussions outside of scheduled class times. - YouTube was widely used to clarify academic concepts and explore examples beyond textbooks and classroom materials. - Students also reported that platforms such as WhatsApp, YouTube, and LinkedIn Learning supported learning by helping with material sharing, managing assignments, and improving understanding of course content. - Students recognised social media benefits for communication and resource access, but observed that the online learning environment and social media presented distractions. Some learners found it difficult to stay focused during online sessions, citing interruptions from notifications, multitasking, or the absence of a structured physical space for study. These challenges aligned with earlier responses regarding distractions and the home learning environment

Table 6.2: Summary of Main Findings

6.4. Integration of Social Media in Online Learning

This section addresses Table 6.2 by identifying ways in which social media can be integrated more successfully into online learning. Analysis identified that social media enhanced learning experiences due to three primary functions: peer interaction, student engagement, and knowledge acquisition. These platforms created avenues through which learners could share information regarding notes, pending works, discussions among students, and interaction with instructors. One participant noted:

> "We also employed the Blackberry WhatsApp groups in sharing notes as well as in discussing assignments." [MP-7]

Continuing with engagement improvement, more students have turned to various platforms such as YouTube and LinkedIn to supplement traditional university lessons. These two resources provided extra information that proved helpful in alphabetical terms and were examples that helped students understand what was required. This was supported by one participant, who stated:

> "Honestly, in some cases, it is easier for me to understand the same thing when it is explained in the YouTube video than in the recorded lecture." [FP-8]

Interestingly, some participants noted gender differences in using social media for learning. For instance, MP-1 observed:

> "Women are more inclined to social media-type things." [MP-1]

The perception reflects a stereotypical view that female students are more engaged with social networking platforms. However, this observation referred to general social media use, rather than specific educational applications. Social media gained recognition for its collaborative and knowledge-sharing abilities, but faced criticism as a distraction. Some students discussed its potential to support learning but also noted that the blend of academic and non-academic content in the same digital space could affect concentration. The dual nature of social media, as both a resource and a distraction, was acknowledged by one participant:

> "Social media is good for learning, but it's an issue too." [MP-10]

Considering all the above points, learning with social media was considered to be very productive in terms of learning and collaboration; however, one major drawback common to all learners was the diminished ability to focus they experienced when using social media.

6.4.1. Gender-Based Differences in Social Media Engagement

The interview data provided more thoughtful insights into how gender differences influenced social media usage for learning. Some participants indicated that male and female students engaged differently with social media for academic purposes, with variations in confidence levels and interaction styles.

One participant, MP-4, argued that male students were likelier to explore digital tools independently, whereas female students tended to seek collaborative and structured interactions when engaging with online resources. Some female students highlighted a preference for structured interactions, while some male students expressed confidence in self-directed learning through social media platforms. Additionally, participants raised concerns about equitable access to social media for academic purposes, citing bias in participation, unequal resource availability, and gendered differences in engagement patterns. Some female students preferred structured online discussions, whereas some male students were more comfortable engaging in informal learning spaces.

6.4.2. Disciplinary Differences in Social Media Learning

Although the interviews did not explicitly compare disciplines, differences emerged in students' information-seeking behaviours across academic fields. STEM students often depended on organised platforms and recorded materials for self-directed study. MP-4 highlighted the accessibility and flexibility of online learning, stating that:

> "online learning is more accessible, works around your schedule, and is great because you can do it whenever you want." [MP-4]

Additionally, female participants FP-9 stated that they often felt more independent when using recorded materials with online learning, which required greater self-motivation but helped structure study time effectively.

Two participants from Humanities disciplines preferred discussion-based learning and peer interactions facilitated through social media. They stated that the importance of

peer interactions and collaborative discussions helped them refine their critical thinking and arguments:

> "Engaging in discussions with my peers enhances my awareness of the content by providing me with various perspectives." [FP-12]

FP-13 highlighted the role of social media in facilitating peer engagement, particularly in Humanities subjects, where debate and discussion are key intrinsic elements of learning:

> "We use group chats a lot to share ideas and discuss readings. It helps keep the conversation going outside of class." [FP-13]

The survey results demonstrated that male students were more inclined to use forums and recorded lectures, while female students preferred collaborative study groups. These observations demonstrate that gender differences in social media learning may connect with disciplinary learning norms, affecting student engagement with online content.

6.5. Summary of the Results of the Survey and Interview Phases

The analysis of survey results compared to interview data shows multiple points of agreement and differences (Table 6.3). Both data sources consistently highlighted gendered differences in attitudes toward distance learning: Male students typically preferred online learning formats because of the flexibility they provided. Female students preferred blended learning formats incorporating communication opportunities and organised frameworks. Survey results and interview findings both demonstrated how gender affects students' platform choices and their views on teacher support and highlighted students' calls for respectful and inclusive digital learning spaces. Survey and interview data established that WhatsApp and YouTube platforms provided essential support for collaboration and resource-sharing but also produced distractions. However, a notable difference emerged around gender perceptions and experiences: Statistical analysis showed meaningful variations in gender equity perceptions and discrimination, but interviewees mostly did not report direct discriminatory encounters. Quantitative data demonstrates perceived disparities, but qualitative stories disclose indirect and complex gender dynamics in distance learning.

Theme	Survey Findings	Interview Findings
Attitudes Toward Distance Learning	Quantitative data showed gendered preferences, with males leaning toward online learning for flexibility and females preferring blended learning for interaction.	Males highlighted flexibility and self-paced learning; females preferred blended formats combining interaction and structure.
Gender Perceptions and Experiences	Significant differences in perceptions of gender equity and discrimination in distance education were found.	Participants generally denied experiencing gender discrimination, though some acknowledged societal expectations and physiological influences.
Influence of Gender on Learning	Survey results indicated differences in platform preferences and perceptions of teacher support, with gender influencing attitudes toward MyPlace and online tools.	Both genders agreed platforms should suit personal preferences, with some males noting discomfort with video use and females commenting on MyPlace's limitations.
Improving the Online Learning Experience	Students expressed a need for equitable and inclusive digital environments, with females placing higher value on teacher support.	Recommendations included inclusive practices, equal treatment, and awareness of gendered language; teachers were advised to create respectful environments.
Social Media and Online Learning	Social media was widely used for communication and learning, with gender differences in frequency and perceived usefulness.	WhatsApp, Discord, and YouTube were favoured for collaboration and resources; students noted both benefits and distractions of social media.

6.3: Comparison of Survey and Interview Findings

6.6. Chapter Summary

This section highlights and analyses findings from the second phase. The initial phase's results on the pandemic's impact on social media and distance learning were organised around key themes: attitudes toward distance learning, gender perceptions and experiences in online learning, the influence of gender on learning, and improving the online learning experience. These thematic areas correspond to the structure presented in Section 6.2. Participants of both genders shared their thoughts on these topics, highlighting how they significantly shaped the development of online education.

Gender trends show diverse opinions on whether males and females benefit from or face challenges in online learning. Some participants claimed that gender did not affect attendance or communication approaches, while others observed differences. Most male and female participants reported no gender-based discrimination in online learning. Despite this, documented examples of discrimination, especially in STEM disciplines, indicate that women might face further obstacles. Participants expressed varying views regarding the impact of online learning on men and women, with some recognising gender disparities in engagement, confidence, and participation, while others observed no significant differences.

Regarding learning experiences, both males and females expressed overall satisfaction with distance learning platforms, frequently citing Zoom and Microsoft Teams as the most effective tools for online education. Additionally, peer support and collaboration were key factors in successful learning experiences. Some female participants raised concerns about confidence levels in new learning environments, mainly offline settings, offering that institutions should consider such factors in designing inclusive and supportive educational strategies.

The findings also highlighted the role of social media in learning (6.4), with participants acknowledging its benefits for peer interactions, discussion-based learning, and resource sharing. However, social media was also identified as a source of distraction, reinforcing the need for well-structured online learning environments. The trends indicate a diverse range of experiences and perspectives among participants, highlighting the need for customised strategies for designing and improving online learning environments. The following section will discuss these and the study's first-phase findings, comparing them with other research on the post-COVID-19 online learning milieu and future pedagogical contexts.

Chapter 7: Discussion

7.1. Introduction

This chapter presents the research analysis on the factors influencing the use of social media and distance learning by male and female higher-education students. It builds on the results obtained from the survey and interview phases, as discussed in Chapters Five and Six. Where appropriate, information science concepts, including sense-making theory, are used to interpret how students' access, evaluate, and share information in online environments. These frameworks help explain the strategies students use across digital learning contexts. The discussion also clarifies where findings were consistent or differed between the quantitative and qualitative phases, highlighting implications for digital practice and gender equity in higher education. The chapter analyses the study's main results through the research questions outlined in Chapter One and Section 4.3.

7.2. Understanding Gender Differences in Social Media Utilisation and Distance Learning in Higher Education)

This section examines the effects of gender-based perceptions and preferences on how students use social media and distance learning platforms within higher education settings. The research demonstrates significant gender-based differences in social media usage during distance learning sessions. The ensuing discussion focuses on key themes that connect social media usage patterns with gender differences and the broader impacts of distance learning.

7.2.1. Social Media Behaviours and Gender Differences

Social media platforms have become powerful tools in higher education, providing communication, collaboration, and learning. However, the effectiveness, efficiency, or inefficiency of utilising social media in education is influenced by various key factors. Gender differences can affect the use and effectiveness of distance learning platforms. Therefore, understanding these differences is one of the keys to creating inclusive and effective educational programmes. This finding corroborates the studies on the differences in the usage of the segment based on gender representatives by Haferkamp et al. (2012) and Alhabash and Ma (2017) who discovered that more often than not, the female students are using social media particularly for collaboration, networking, and academic discussions, while male students use social media as a tool in searching for

information and accomplishing assignments. The findings also indicated that male students were interrupted by games on social media platforms while female students experienced interruptions by social expectations and multitasking (see Table 5.10). Such differences indicate that gender shapes learners' behaviour toward digital learning environments in a way that calls for differentiated approaches in delivering content to the two groups. These findings support the principles of sense-making theory, which help explain how students approach digital platforms differently based on context, needs, and perceived learning value. These concepts can help better understand these behavioural patterns. Sense-making theory adds further insight by showing how learners interpret complexity, manage interruptions, and construct meaning within digital learning environments (Weber et al., 2019). These frameworks provide a valuable foundation for interpreting the gendered digital learning patterns identified in this study.

7.2.2. Gender-Specific Implications for Distance Learning

The study further established a significant difference in the perception of distance learning between male and female students ($p = 0.001$), as shown in Table 5.15. Regarding gender equity in this educational modality, female students had a positive attitude; they were generally in favour, while male students expressed mixed feelings, neither strongly opposed nor fully supportive. The study also discovered that female students were more interested in online discussions and group learning. In contrast, male students focused more on accomplishing tasks and preferred individual learning (see Section 6.4.1). These findings highlight the need to screen learners effectively to determine which instructional approaches best suit their preferences. Further analysis of information-seeking behaviours and sense-making concepts in higher education could enhance the study's gender-specific findings on distance learning. Research demonstrates that female students frequently use collaborative and interactive methods, such as online discussions and group learning, which align with their preference for social learning settings (Weber et al., 2019; Feng et al., 2023). In contrast, male students demonstrate an individualistic methodology by concentrating on completing tasks through self-directed study. These differences highlight the importance of offering multiple information-seeking options in distance education systems to accommodate varying student preferences.

Moreover, students require sense-making strategies to interpret their learning experiences effectively. Through social interactions and shared narratives, female

students construct meaning collaboratively, making sense-making more effective (Kezar, 2013). On the other hand, male students may prefer structured and goal-oriented approaches to sense-making, which provide clear paths to understanding (Marshall, 2016). These gender-specific sense-making strategies contribute to a more inclusive and supportive learning environment, enhancing the educational experience. Implementing gender-sensitive sense-making strategies helps create more supportive learning spaces that benefit all students. This aligns with the perspectives of Sengupta et al. (2019) and Salend (2016), whose research shows that educational outcomes improve when learning environments are responsive to students' diverse needs.

7.2.3. Impact on Distance Learning

Research from the survey and interviews demonstrates that gendered perceptions affect student engagement patterns in distance learning. Survey results (see Table 5.10) revealed that male students were more frequently distracted by people at home and online games, while female students were more likely to report being interrupted by social expectations and multitasking. In this context, social expectations referred to responsibilities such as caregiving or emotional support within the home environment, while multitasking involved balancing academic activities with household duties and managing frequent digital interruptions, such as personal messages or social notifications (see Section 6.2.2.1). Interview participants supported these findings, with several female students highlighting the importance of structured peer interaction and instructor support. In contrast, male students often described independent and task-focused platform use (see Section 6.4.1). These observations reflect broader patterns in digital engagement and highlight the need to consider gender-specific learning preferences in designing inclusive distance learning systems.

Gendered use of social media also appears to influence how students interact with digital learning environments. For example, female students demonstrate more significant activity on social networking services for group interactions and assignment contributions, and they ask questions and seek instructor and peer support. Research shows male students tend to access online platforms primarily for academic tasks and personal research needs (Zheng, Khan, & Hussain, 2020; Yu, 2021; Santos et al., 2022; Iqbal et al., 2022). However, these patterns also intersect with broader barriers to digital participation. Prior research has found that female students may report lower levels of digital confidence or literacy than their male peers and are more likely to perceive barriers when navigating online environments (Wladis et al., 2017; Ahmad, 2019;

Siongers & Spruyt, 2024). Such disparities can affect students' sense of agency and participation in distance learning and should be carefully considered in developing equitable and accessible online education systems. Moreover, social media platforms, including wikis and media-sharing sites, are becoming students' primary information resources, demonstrating the necessity for information literacy training to help students evaluate these evolving and unfamiliar sources. The link between individual personality characteristics like extraversion and openness creates different patterns of information-seeking behaviour on social media platforms (Kim et al., 2014).

7.3. Exploring Gender Perspectives on Social Media Utilisation and Distance Learning

In this section, the student's opinion on gender parity concerning online learning and its enhancement, gender split among students and gender variance in student enrolment and engagement interest will be outlined.

7.3.1. Gender Perceptions on Males Better Than Females in Online Settings During The COVID-19 Pandemic

7.3.1.1. Males Have Better an Online Mode of Education in Comparison to Females

Analysing participants' results for "Males have a better position in online type of education than females" examines males' and females' attitudes towards online learning (Tables 5.13, 5.18, and 5.19). These results align with research conducted in the past on the subject of gender affecting the attitudes to online education (Yin, 2022; Greier et al., 2022). As stated in other similar studies (Harvey et al., 2017), the majority of the male participants chose the option of disapproval for the given statement, and there were a few respondents who strongly disagreed. Greier et al. (2022) pointed out that male students are less confident with online learning platforms than female students. On the other hand, the study's female participants have a neutral or even disagreeing attitude towards this statement, which supports the findings of Behera and Seth (2023) concerning the gender differences in the perception of online education. As other authors have noted (Sukumaran et al., 2023), the difference in how the genders approach such matters MUST be followed by further exploring possible reasons.

Also, the study does not reveal any disparity of beliefs between the undergraduate and postgraduate students, and this is in line with the findings of Robinson et al. (2022) that there is no difference in beliefs across the academic year level. At all the academic levels,

male students are more inclined towards neutral or negative responses, while female students are more inclined towards negative responses. In Mohamad et al.'s (2020) study of gender dynamics in higher education, this consistency shows that gender differences in online education perspectives transcend academic levels.

The lack of statistically significant differences between undergraduate and postgraduate groups further supports the notion that the observed gender-based difference in perceptions is widespread within the study population. This means that larger numbers, rather than academic levels, drive significant variance in the dataset. Shared beliefs regarding gender among undergraduate and postgraduate students show that the population agrees with the statement. However, future studies should investigate gender perceptions across various demographic and cultural contexts.

7.3.1.2. Communication and Social Skills in Social Media Usage

This study investigated the correlations between gender and digital skills when using social media (see chapter 5, Section 2, Q4). While the study found no significant overall difference among all students, female participants reported being more competent in communication and social skills when using social media than males ($p = 0.030$). One notable finding is the significant difference in gender perceptions regarding communication and social skills in undergraduate social media usage. This finding is consistent with previous research highlighting gender disparities, which shows that females have higher communication and social skills competence when using social media than males (Correa, 2016; Korkut, Owen, and Demirbaş Çelik, 2018). Further research has shown a complex situation where there is no significant difference in skills between men and women. There is limited evidence to show that communication skills vary between males and females (Salikhova et al., 2023). The analysis highlights the need for an effective educational approach that emphasises both equally important technical and communication skills. In their work, Ashfaque Ahmad Shah et al. (2020) noted that practical communication skills are essential prerequisites for enhancing our students' academic performance during a study program.

Female undergraduates who feel highly skilled in social media communication tend to use collaborative sense-making methods, such as peer validation and information context, more frequently than their male peers, underscoring that gendered behaviours are not innate but shaped by socio-cultural frameworks, including education and socialisation. This preference for collaborative sense-making aligns with research indicating that female students often engage in social interactions to construct meaning

(Qazi et al., 2022). These methods enable them to effectively utilise complex information environments through peer support and contextual understanding.

In contrast, male students may prefer the most apparent and goal-oriented approaches to sense-making, which can assist them in making decisions that consistently result in favourable consequences (Wojtowicz et al., 2022).

7.3.1.3. Need for Gender Equity Promotion in Distance Learning

Addressing gender parity in distance learning is essential, as the necessity for gender equality in education has been acknowledged. This research found that there is a high awareness of the increased focus on gender equity in distance learning in the course of the pandemic across all groups of students, except for the postgraduate students. It was also carried out after the emergence of COVID-19: ''Education should be the same regardless of one's gender" (MP-1). It is disappointing that people often differentiate between males and females in learning. ''I do not believe that there is a need for them" (MP-5). ''They already are" (FP-6). When such things as biased language or stereotyping happen in this institution, it is very important to ensure that everyone feels valued, as they work for that organisation. ''Just treat everyone the same way, no matter what their gender is.'' (FP-12).

This finding corroborates the conceptual framework of Cerna et al. (2021), which has emphasised the role of institutions and educators in creating supportive and equitable learning environments that assist the diverse needs of all students. It also aligns with previous studies by Sengupta et al. (2019) and Salend (2016), which consider all students' skills and obstacles in modern, diverse, inclusive classrooms.

It was also revealed that gender equity in distance learning was perceived to be necessary, especially for the female students (see Table 5.15). Some of the impairment-related issues mentioned by students included gender-related concerns in the presence of biases that hinder students from participating equally in an online learning activity, and difficulty accessing computerised learning materials.

This conforms with UNESCO (2021) and the British Council (2018), who argue that structural development must be made for equity in distance learning. Key recommendations include:

- Carrying out a gender-sensitive approach, particularly in developing and organising curriculum materials.
- Promoting proficiency in faculty training in addressing gender issues in the online learning environment.

- Ensuring all students have a safe learning environment when using digital devices and that marginalised groups are included.

However, others opined that gender equity has already been attained with the belief that education, in general, especially online education, is not biased by sex (MP-5, FP-6). This perception indicates that gender equity is an intricate issue, implies structural imbalances in the market, and that gender bias differs in cross-disciplinary fields, cultures, and organisational settings.

7.3.1.4. Existence of a Digital Gap between Genders

The results of this study highlight gender-based perceptions of a digital gap in distance learning, particularly within higher education. Survey data (see Table 5.16) show that while most male students responded neutrally to the statement about a digital gap between genders, a notable proportion of female students disagreed or expressed uncertainty. No female participants strongly agreed with the statement, whereas male responses were more distributed across the scale. This perception gap supports earlier research showing gendered experiences in technology use and access to educational resources (Kebritchi et al., 2017).

Further statistical analysis reveals a significant correlation between gender and belief in the existence of a digital gap (see Table 5.17), with the difference particularly evident among undergraduate students. Among this group, both male and female students tended to disagree with the existence of a digital gap. However, female students expressed neutrality more frequently, proposing a more detailed or uncertain perception. These results align with previous findings highlighting ongoing disparities in digital literacy and resource access (Wickens & Miller, 2020; Nierenberg & Dahl, 2023), even if students may not always explicitly recognise or report them. Disparities in digital literacy and access to resources among higher education students significantly impact their capacity to navigate and interpret complex digital learning environments.

Dervin's Sense-Making Methodology (SMM), based on sense-making theory, demonstrates how people's contexts and experiences help them create meaning from information gaps while showing that students from different backgrounds face various challenges when using digital environments (Al-Suqri and Al-Aufi, 2015).

According to Zhao et al. (2025), the digital learning power of students from rural or low socioeconomic backgrounds shows lower performance levels than urban students. Students' ability to understand course materials becomes divided when they face barriers to digital content engagement, resulting from existing gaps. Higher education

institutions need to develop specific programs that improve students' digital skills and understanding while supporting varied sense-making processes to provide equal digital learning opportunities to all students.

7.3.2. Gender Perception based on Nationalities and Faculties

7.3.2.1. Computer Usage for Education and Entertainment

The survey found complex gender variations in student computer use by nationality and faculty. The responses of male and female UK and international students were mixed. Both genders disagreed that men use computers more. A similar share of both nationalities was neutral on the statement (see Chapter 5, Section 2, [Nationalities and Faculties]. Gender was statistically associated with national perceptions of computer use. These findings show that, while most people disagree with the stereotype, gender and nationality affect perception.

In contrast, a similar pattern of mixed responses was observed when examining responses among students from different faculties. Students from all faculties expressed diverse opinions, with some expressing strong disagreement and others choosing not to commit to a firm position. Few students agreed with the statement overall. The results indicate no statistically significant relationship between gender and faculty beliefs about computer usage habits. It shows that gender does not significantly affect computer usage habits across academic faculties.

Comparing these findings with previous studies, there appears to be a divergence in results. For instance, while some earlier research might have highlighted significant gender disparities in computer usage habits (Son et al., 2020), the current study suggests a deeper understanding. The lack of a significant relationship between gender and beliefs about computer usage habits among faculty contrasts with findings documenting gender-based differences in technology adoption and usage (Qazi et al., 2022). This gap emphasises the need for context-specific research and demographic considerations when studying technology use perceptions and behaviours.

7.3.2.2. Favouritism in Distance Education during COVID-19

The examination was conducted based on nationality backgrounds (UK Citizen vs. International Student) and academic faculties (Engineering & Science vs. Humanities/Social Science & Business School). These refer to survey results (Table 5.21). The results showcased diverse responses among male and female students from both nationalities. During the pandemic, distance education students of different nationalities had mixed attitudes about female favouritism. Some strongly opposed it, while others partly did. Few strongly agreed, but many were neutral. The level of agreement or disagreement was similar across both nations. However, statistical analysis showed a significant association between gender and the perception of female favouritism in remote education during the COVID-19 epidemic. However, this finding indicates that faculty background does not significantly influence students' perceptions of gender favouritism in online education. Unlike the more consistent patterns observed across nationality groups, the data showed no statistically significant differences in perceptions between male and female students within the Engineering & Science and Humanities/Social Sciences & Business School faculties (see Table 5.26). A statistical investigation also revealed that gender may not influence this perception within faculty contexts. The variation in responses among students from diverse academic backgrounds is consistent with previous studies. However, the significant association between gender and beliefs about favouritism toward females in distance education during the pandemic indicates that gender shapes perceptions more broadly. This supports previous findings on gender-based educational variance (Wladis et al., 2015). The lack of a significant gender effect within faculty groups highlights the need for further research into how gendered attitudes are shaped across academic disciplines in higher education (Saadat et al., 2022).

7.3.2.3. Gender Role Socialisation on Social Media and Distance Education During COVID-19 in Higher Education

The COVID-19 pandemic rapidly shifted to distance education, reshaping social interactions and promoting traditional gender roles through social media platforms. In higher education, particularly within the Humanities/Social Sciences and Business Schools, statistical evidence shows that gendered socialisation patterns increased gender differences in online engagement and academic performance (see Chapter 5; Section 2 [Q10]). Studies indicate that female students in these faculties were more likely to take on caregiving responsibilities while studying remotely, which impacted their

participation in synchronous online classes and collaborative social media discussions (Thébaud et al., 2024). FP-11 noted that "*females may take more responsibility [for childcare], and therefore they are at a disadvantage*". This sentiment reflects broader trends, even outside caregiving-intensive disciplines.

Social media platforms, often used as additional learning tools, increased these patterns by promoting gendered expectations that women were more frequently engaged in peer support and emotional labour in academic conferences, while men dominated technical and leadership-oriented discussions (Payne, 2019; Newcomb, 2021; Jarvis et al., 2022). For instance, MP-1 argued that *"women can perform [better] in online learning due to their commitment,"* supporting stereotypes about gendered labour. In addition, FP-9 observed that "*females might be more active in online classes*," highlighting how interactivity could be better than strong expectations of emotional labour. Significantly, our results (see Table 5.24, Chapter 5) show that female students in Humanities/Social Sciences and Business School were more likely than males to agree that gender roles intensified during the pandemic, underscoring the disciplinary specificity of these pressures. This aligns with broader societal trends where women, exhausted by multitasking domestic and academic duties, experienced higher stress levels, while men utilised social media for career networking (Craig & Churchill, 2021).

Gendered online behaviour was further policed, with women expected to adopt encouraging communication styles (e.g., active participation in Facebook study groups) and men encouraged toward positive, career-focused interactions (e.g., LinkedIn and Twitter discussions), replicating offline inequalities in digital spaces (Dixon et al., 2014; Alshaye et al., 2023). Moreover, the lack of institutional support for gendered challenges in distance learning, such as flexible childcare deadlines, further marginalised women in these faculties. While some universities introduced gender-sensitive policies, their implementation was inconsistent, leaving social media as both a tool for academic collaboration and a space where gender inequalities were repeated (Toraman and Ozen 2019; Crimmins and Barnard, 2022). Participant insights also revealed platform-specific dynamics. For example, MP-10 argued that voice-only platforms such as Discord reduced pressure on women to "present themselves physically." FP-13 reviewed MyPlace for being "outdated" and less conducive to inclusive engagement. These observations underscore the need to examine educational technologies for biases. Future research should explore how algorithmic biases in educational technology and social media platforms perpetuate disparities and how institutions can design equitable digital learning environments. Future research should explore how algorithmic biases in

educational technology and social media platforms improve these disparities, and how higher education institutions can design more equitable digital learning environments. These gendered experiences can also be understood through sense-making theory, which focuses on how individuals interpret their social environments and adapt their behaviour based on contextual pressures and identity expectations (Wibeck & Linnér, 2021; Urquhart et al., 2025). In this context, female students' increased emotional labour and platform-based self-presentation reflect a need to navigate overlapping academic and social identities in complex digital settings.

7.3.3. Effectiveness of Social Media in Distance Learning

7.3.3.1. Social Media as a Tool for Inclusivity

The study also agreed that social media platforms ensured participation regarding the timid and reserved learners during distance learning (Park & Kim, 2020). While the social media was generally acknowledged to be a less formal learning environment than the structured discussion forums which the experiment was designed to employ, female students found the social media format to be less threatening and more supportive as an environment for engaging academically with their peers than did their male counterparts. This implies that social media could achieve social inclusion, particularly for students with preferred learning styles.

7.3.3.2. Teacher Support in Digital Learning Setting

Male students reported feeling more confident using digital platforms, as reflected in survey and interview responses (see Chapter 5, Table 5.9, and Chapter 6, Section 6.2.1). In contrast, female students valued the emotional and instructional support they received through their engagement with lecturers and other students. These gendered perceptions of learning support reflect different engagement strategies within distance learning environments. Survey results demonstrate that female students reported higher levels of perceived faculty support compared to male students, with the most significant difference observed at the undergraduate level. According to the information presented in Table 5.9, the nature and frequency of interactions between students and instructors shaped these differences. Interview findings further support this pattern, with several female participants underscoring the value of continuous guidance and feedback from teaching staff. According to previous studies, such as Kebritchi et al. (2017), women demonstrated higher participation in instructor-led discussions, while men displayed a stronger preference for independent learning methods. The present

study adds to this by showing that while both genders value teacher support, females consistently report a stronger need for it, particularly in socially interactive formats. While postgraduate students generally agreed strongly with the importance of teacher support, gender-specific trends were less evident at that level. These findings show that teacher support is viewed as essential across student groups, but gender-related expectations may differ, especially in undergraduate contexts. The findings provide a more detailed understanding of gender differences in teacher support perception within digital learning platforms utilising social media for educational purposes. This research adds new findings to previous work by Alenezi (2023) and Wladis et al. (2024), which examine the role of gender in influencing views about instructional support and demonstrate the necessity for digital teaching strategies that address inclusivity. Sense-making theory provides insight into gendered views of teacher support by highlighting how personal context and emotional framing shape interpretations of instructional support. Sense-making theory explains how male and female students perceive teacher support differently in higher education. Female students often engage in collaborative sense-making, relying on peer validation and contextual information to interpret instructional support (Weick, 1995). This approach helps them construct meaning through social interactions and academic narratives, which align with their higher competence in communication and social skills (Chen et al., 2025). Conversely, male students may prefer more structured and goal-directed sense-making strategies, focusing on clear pathways to understanding and task completion (Heinström, 2005). These differences highlight the need for teaching strategies that adopt multiple ways of understanding within digital learning environments. Through sense-making integration, institutions can create a supportive and inclusive educational environment, improving every student's learning experience.

7.3.3.3. Perceptions of Online Learning Effectiveness

This study explored students' perceptions of online learning effectiveness through survey and interview data, focusing on how academic discipline and gender shaped their experiences. The survey results (see Table 5.35) showed that students from Humanities/Social Sciences and Business School were significantly more likely than those in Engineering and Science to perceive online learning via social media as effective for retention, emotional support, and peer collaboration. The interviews also reflected these patterns (see Chapter 6, Section 6.4.2), where students from theoretical disciplines such as Humanities described a preference for discussion-based learning and group

chats to extend classroom conversations. These findings support the survey results, highlighting how perceptions of social media's learning value differ significantly across academic disciplines. Although previous studies (Cavanaugh et al., 2023; Behera et al., 2023) have explored how national and academic backgrounds influence online learning experiences, fewer have considered the role of gender in shaping these perceptions. Participant reflections in this study propose that gendered expectations intersect with other demographic factors, such as digital adaptability, discipline-specific learning needs, and prior online learning experience, potentially influencing how students evaluate the effectiveness of online education.

7.3.4. Gender Differences in Distance Learning Usage Patterns

As detailed in Sections 6.2.1 to 6.2.4, qualitative interview findings revealed gender-based differences in how students approached distance learning following the COVID-19 pandemic. These perspectives were supported by quantitative results from the CCA analysis in Chapter 5, which identified patterns of association between gender and various distance learning variables.

Males preferred online learning because it allowed flexible and independent study methods, while females tended to choose blended learning formats due to their structured interaction and communication benefits. Gender-specific learning preferences reveal variations in student interactions with educational technology and demonstrate the necessity for digital learning platforms to accommodate diverse educational requirements.

Male and female distance learners experienced similar difficulties in online education through internet disconnections and limited personal interaction while struggling to complete hands-on lab activities virtually. This study confirms results from Sharma & Alvi (2021) and Guppy et al. (2022) and principles from sense-making theory, which describes how learners interpret and handle complex learning settings through contextual understanding and perceived support (Dervin, 1992; Evans, 2013). While some participants preferred face-to-face learning, particularly for practice-based disciplines, others appreciated online delivery's time efficiency and flexibility. These mixed responses suggest that future digital learning strategies should incorporate differentiated models, offering flexibility, accessibility, and alignment with subject-specific needs. This matches with Alzahrani et al. (2023), who found that online learning was perceived as satisfying and comfortable for many students. However, Tashtoush et al. (2023) reported that distance learning increases teacher workload, especially in

environments with unreliable internet connectivity. According to Martin and Bolliger (2023), the necessity of technical support for online instructors to address platform barriers and enhance instructor responsiveness emerges as a key point in the literature. It reflects student complaints about these same issues. The study results describe participants' views on the advantages and disadvantages of online learning and how platform connections impact learning results and the delivery method. Certain participants felt face-to-face learning creates better engagement for practical and interactive activities, while others favoured distance learning for theoretical subjects and managing time. These results highlight the need for adaptive learning models that balance the strengths of both traditional and online education. As noted by Khasawneh (2023), the effectiveness of each approach depends not only on technology but also on learners' preferences, the nature of the course, and the learning environment. Educators who understand both systems' advantages and drawbacks can develop instructional designs that use inclusive strategies to meet students' various needs.

7.4. Chapter Summary

This discussion contributes to understanding social media participation, gender equality, digital literacy, and gender across learning contexts. From the information science point of view, this study discusses sense-making by revealing the gender factor in digital learning. However, future studies should be conducted on how gender relates to online education in the long run and perhaps identify possible policy interventions to improve the delivery of online instruction for all genders.

Chapter 8: Conclusion

8.1. Chapter Overview

This chapter summarises the study's primary findings, reviews the research questions and objectives, and analyses how it reached its aim. It then outlines the contributions to knowledge with specific focus areas, explores the implications for technology and information science, and reviews the study's limitations and generalisability. The chapter concludes with final reflections on the significance of the research.

8.2. Summary of Key Findings

The study investigated how male and female students at the University of Strathclyde engaged with social media and other digital platforms for distance learning within higher education, particularly during the disruptions caused by the COVID-19 pandemic. A sequential explanatory mixed-methods approach drove the research, which started with quantitative survey data collection and then proceeded with qualitative interviews. The study demonstrated that male and female students faced online learning benefits and difficulties equally, but experienced variations in engagement levels and learning strategies based on gender-specific perceptions of support. Key findings include:

- **Social media as a learning tool:** While social media platforms were widely used for communication and collaboration in distance learning, male and female students perceived their effectiveness differently. Male students generally felt more confident using these tools and viewed them as more effective for independent learning. In contrast, female students tended to value them more for structured, peer-based engagement.
- **Gendered perceptions of online learning:** Male students reported feeling more confident using digital tools, whereas female students preferred written communication and more structured interaction.
- **Teacher support disparities:** Female students felt they received more communication and feedback support, while male students perceived greater benefit from technical assistance.
- **Challenges in distance learning:** Both male and female students experienced problems with social isolation and keeping schedules while working remotely. However, females faced extra challenges caused by societal expectations and responsibilities.

8.3. Reflection on Research Questions and Objectives lines

8.3.1. Achieving the Research Aim

The overarching aim of this study was to explore gender differences in the use of social media and distance learning in higher education. The study reached its goal using a sequential explanatory mixed methods design to gather and analyse quantitative and qualitative information. The quantitative survey captured measurable data on ICT and social media usage across gender differences, and qualitative interviews provided detailed insights into students' experiences and perceptions. The research questions were answered, and all objectives were achieved by employing a mixed-methods design that established a strong foundation for examining gendered experiences in distance learning. This study set out to investigate how gender differences influence the use of social media platforms in distance learning within higher education, focusing on students' experiences at the University of Strathclyde during and beyond the COVID-19 pandemic. The main research question is, "How are gender differences perceived in the utilisation of social media platforms and distance learning in higher education?"

8.3.2. Addressing the Sub-Questions

Sub-question 1: explored how gender shaped student engagement with social media and other online learning platforms during the pandemic. The findings revealed that female students felt more comfortable expressing themselves in written formats, while male students described themselves as more confident using digital platforms. These gendered perceptions were reflected in the survey findings (Chapter 5, Section 5.3) and interview insights (Chapter 6, Section 6.2.2.1), influencing students' engagement with distance learning environments.

Sub-question 2: examined the implications for equitable use of social media for academic purposes. This was primarily explored through qualitative interviews, where participants discussed challenges and opportunities in achieving digital equity, particularly cultural and social norms. The study found that gender-sensitive support mechanisms, such as targeted communication training or technical assistance, could help balance disparities and promote more inclusive engagement.

Sub-question 3: focused on information behaviours addressed through the questionnaire and interviews. The quantitative phase helped identify patterns in information access and digital resource usage across genders, while interviews revealed

how students evaluate, share, and interact with academic content based on gendered experiences. The findings indicated that female students tended to rely more on peer-based information sharing and structured academic resources. In contrast, male students reported greater independence in navigating and evaluating digital content. The observed differences show that gender affects students' ways of accessing and interacting with online educational resources. Because of these findings, creating inclusive digital learning environments requires collaborative and self-directed learning options.

Sub-question 4: addressed gender-based usage patterns and preferences in distance learning. Both the questionnaire data and interview narratives informed this. The survey identified broad patterns in student engagement, whereas the interviews revealed the underlying behavioural motivations and external obligations students face in distance learning. The flexibility of online education provided benefits to both genders, but males displayed higher tendencies towards multitasking and non-academic digital activities. Female students often faced additional responsibilities such as caregiving, which impacted their study patterns and preferences.

8.3.3. Achieving the Research Objectives

The study utilised quantitative and qualitative research methods to achieve its research objectives. The survey offered measurable perceptions on patterns, preferences, and confidence levels, while interviews provided depth, context, and explanations behind those patterns. The study successfully met its objectives by:

- Providing empirical insights into how gender differences influence the use of social media in academic contexts.
- Exploring students' pandemic-era behaviours and preferences in distance learning.
- Highlighting the need for more equitable digital strategies in higher education.
- Offering a gender-focused lens on information behaviour within the computer and information sciences field.

8.4. Contributions to Knowledge

This study makes several significant contributions to knowledge, particularly in the fields of education technology, information science, and gender studies.

8.4.1. Understanding Gender Differences in Distance Learning

This study contributes to knowledge by identifying how gender influences engagement with social media in distance learning. It reveals essential variances in digital literacy, communication methods, and academic involvement to enhance perceptions of gender-specific experiences in online learning environments.

8.4.2. Integration of Social Media in Learning Environments

The study contributes to the literature on social media's role in education by highlighting how students perceived platforms like WhatsApp, Discord, and YouTube as valuable tools for peer collaboration and group-based learning (see Section 6.4.2). It also identifies challenges such as information overload and digital distractions, demonstrating the need for more structured and intentional social media integration within distance learning curricula.

8.4.3. Technological and Information Science Implications

This research offers information science insights into how male and female students interact with digital learning platforms for academic use during and after the COVID-19 pandemic. The study revealed that students experience and interact with digital learning platforms differently based on gender, as their perceptions of platform usefulness, support, and engagement levels vary. The findings demonstrate the sense-making process students use when they move through online learning environments, which are defined by social expectations, personal duties, and institutional frameworks.

8.4.4. Practical Implications for Educational Institutions

The study's findings have implications beyond Strathclyde University, offering recommendations for universities and policymakers looking to implement more inclusive digital learning strategies. The results point to the fact that institutions should:

- Develop gender-inclusive digital literacy programs.
- Enhance teacher training to provide balanced support in technical and communication areas.
- Promote online learning communities that advance collaboration across gender groups.

8.4.5. Contribution to Future Research in Online Learning

This research establishes a foundation for further studies on gender, social media, and online education. Based on students' heavy use of messaging apps such as WhatsApp and Discord for academic collaboration, future research could explore chat-based sentiment analysis to understand better emotional interactions, peer support patterns, and communication behaviours in online learning contexts. Additional research is also recommended to investigate gender-specific stress and mental health impacts in distance education and the long-term effects of blended learning models on gender equity. Moving forward, research could use Sense-Making techniques like timeline interviews to examine the impact of gender on students' social media information strategies while observing behavioural aspects beyond self-reported data.

8.5. Limitations and Generalisability

While this study offers important insights, its findings are limited to students at the University of Strathclyde. Differences in digital infrastructure, cultural attitudes toward gender, and institutional support models may affect their generalisability to other institutional or cultural contexts. Higher education institutions in regions prioritising less inclusive digital teaching methods or suffering from limited connection capabilities generate distinct gender engagement trends. Subsequent studies need to repeat this research across diverse higher education institutions in the UK and worldwide to validate the gendered social media use patterns in distance learning.

8.6. Chapter Summary

The findings of this study support the importance of a gender-sensitive approach to distance learning, ensuring equitable access and engagement for all students. As online education continues to improve post-pandemic, institutions must proactively address gendered experiences to create inclusive and effective digital learning environments.

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Appendices

Appendix A: Social Media Definitions

Social Media Definitions with Author Names, Source, and the Number of Citations as of August 2020(**Aichner et al., 2021).**

Year	Definition	Authors	Source	Google Scholar Citations
1996	When computer networks link people as well as machines, they become social networks, which we call **computer supported social networks (CSSNs).**	**Wellman**[26]	Annual Review of Sociology	1,886
1997	**Virtual communities** are groups of people who communicate with each other via electronic media and are a relatively new phenomenon.	**Romm et al.**[27]	International Journal of Information Management	
1997	When a computer network connects people or organisations, it is a **social network**. Just as a computer network is a set of machines connected by a set of cables, a social network is a set of people (or organisations or other social entities) connected by a set of social relationships, such as friendship, co-working, or information exchange	**Garton et al.**[28]	Journal of Computer Mediated Communication	2,158
1999	Virtual communities are defined by bringing people together with a common set of needs or interests. Those needs or interests could span a variety of dimensions. Virtual communities could be organised around an area of interest (such as sports or stock investments), a demographic segment (certain age groups within the population), or a geographic region (metropolitan areas).	**Hagel**[29]	Journal of Interactive Marketing	3,325

2001	For the purposes of this article, we define a **virtual community** (in a relatively neutral way) as any entity that exhibits all of the following characteristics: (a) It is constituted by an aggregation of people. (b) Its constituents are rational utility-maximizers. (c) Its constituents interact with one other without physical collocation, but not every constituent necessarily interacts with every other constituent. (d) Its constituents are engaged in a (broadly defined) social-exchange process that includes mutual production and consumption (e.g., mutual dissemination and perusal of thoughts and opinions). Although each of its constituents is engaged in some level of consumption, not all of them are necessarily engaged in production. Such social exchange (as opposed to monetary or material exchange) is a necessary, but not always the only, component of interaction between the constituents of the entity. (e) The social interaction between constituents revolves around a well-understood focus that comprises a shared objective (e.g., environmental protection), a shared property/identity (e.g., a national culture or a lifestyle choice), or a shared interest (e.g., a hobby).	**Balasubramanian and Mahajan**[30]	International Journal of Electronic Commerce	699
2002	**Virtual communities** can be defined as groups of people with common interests and practices that communicate regularly and for some duration in an organized way over the Internet through a common location or mechanism. The location of the virtual community, although not physical, is important because it establishes the virtual ‘‘place’’ where the members meet. This location or mechanism may be a chatroom, bulletin board, or listserv e-mail program.	**Ridings et al.**[31]	The Journal of Strategic Information Systems	1,891

2005	SNSs [**social networking services**] are designed specifically to facilitate user interaction for a variety of goals, mainly dating, business networking, and promotion.	**Marwick[32]**	Conference: Association of Internet Res. 6.0	146
2006	At the most basic level, an **online social network** is an Internet community where individuals interact, often through profiles that (re)present their public persona (and their networks of connections) to others	**Acquisti and Gross[33]**	Conference: Privacy Enhancing	2,680
2007	A **social networking site** (SNS) connects and presents people based on information gathered about them, as stored in their user profiles.	**O'Murchu et al.[34]**	Book: Viral Marketing: Concepts and Cases	263
2007	**Social network sites** are web-based services that allow individuals to (a) construct a public or semi-public profile within a bounded system, (b) articulate a list of other users with whom they share a connection, and (c) view and traverse their list of	**Boyd and Ellison[35]**	Journal of Computer Mediated Communication	19,908
2008	**Social networking sites** typically provide users with a profile space, facilities for uploading content (e.g., photos, music), messaging in various forms, and the ability to make connections to other people.	**Joinson[36]**	Conference: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems	2,284
2009	**Social network sites** provide a public forum that enables the exchange of digital information, such as pictures, videos, text, blogs, and hyperlinks between users with common interests, such as hobbies, work, school, family, and friendship.	**Sledgianowski and Kulviwat37**	Journal of Computer Information Systems	668

Year	Definition	Authors	Source	Google Scholar Citations
2010	**Social media** is a group of Internet-based applications that builds on the ideological and technological foundations of Web 2.0, and that allows the creation and exchange of user generated content	**Kaplan and Haenlein**[38]	Business Horizons	19,656
2011	**Social media** is a honeycomb of seven functional building blocks: identity, conversations, sharing, presence, relationships, reputation, and groups.	**Kietzmann et al.**[39]	Business Horizons	5,174
2012	**Social networking sites** can be defined as virtual collections of user profiles that can be shared with others	**Hughes et al.**[40]	Computers in Human Behavior	1,079
2013	**A social network site** is a networked communication platform in which participants (a) have uniquely identifiable profiles that consist of user-supplied content, content provided by other users, and/or system-level data; (b) can publicly articulate connections that can be viewed and traversed by others; and (c) can consume, produce, and/or interact with streams of user-generated content provided by their connections on the site.	**Ellison and Boyd**[41]	Book: The Oxford Handbook of Internet Studies	1,118
2015	**Social media** are Internet-based, disentranced, and persistent channels of masspersonal communication facilitating perceptions of interactions among users, deriving value primarily from user-generated content.	**Carr and Hayes**[42]	Atlantic Journal of Communication	386
2016	**Social media** is the colonization of the space between traditional broadcast and private dyadic communication, providing people with a scale of group size and degrees of privacy that we have termed ‘‘scalable sociality.	**Miller et al.**[43]	Book: How the World Changed Social media	568

2018	For this study, we define **"social-media"** as Web sites and technological applications that allow its users to share content and/or to participate in social networking.	**Leyrer-Jackson and Wilson[44]**	Journal of Biological Education	17
2018	**Social media** is made up of various user-driven platforms that facilitate diffusion of compelling content, dialogue creation, and communication to a broader audience. It is essentially a digital space created by the people and for the people, and it provides an environment that is conducive for interactions and networking to occur at different levels (For instance, personal, professional, business, marketing, political, and societal).	**Kapoor et al.[45]**	Information Systems Frontiers	293
2019	For purposes of this chapter, we define **social media** as any online resource that is designed to facilitate engagement between individuals**.**	**Bishop[46]**	Book: Consumer Informatics and Digital Health	4

Appendix B: Survey Instrument

Appendix B.1: Questionnaire

Welcome to the research study!

We are interested in understanding how gender use the social media in distance learning and research purposes in higher education. We would like to know how this differs varies between age groups, level of study, student status, and faculty.

You will be presented with information relevant to Gender Differences in Usage of Social Media for Distance Learning in Higher Education as part of a research and asked to answer some questions about it.
Please be assured that your responses will be kept completely anonymously.

- Your responses will help us improve our teaching and learning in distance learning environment especially using social media.
- The study should take you around [10-15 mins] to complete, and you will receive **£35** in Amazon Voucher if entered your email into a prize draw for your participation.
- Your participation in this research is voluntary. You have the right to withdraw at any point during the study, for any reason, and without any prejudice. If you would like to contact the Principal Investigator in the study to discuss this research, please e-mail Abdoalhamed Zngeena (abdoalhamed.zngeena@strath.ac.uk).
- By clicking the button below, you acknowledge that your participation in the study is voluntary, you are 17 years or over of age, and that you are aware that you may choose to terminate your participation in the study at any time and for any reason.
- Please note that this survey will be best displayed on a laptop or desktop computer. Some features may be less compatible for use on a mobile device.

○ Agree
○ Disagree

A. How would you describe your gender?

- Male ○
- Female ○
- Trans ○
- Prefer not to answer ○

B. What is your age range?

- -16
- 17-21
- 22-25
- 26-35
- 36-45
- 46+

Previous Next

0% Survey Completion 100%

C. What is your level of study?

- Year 1
- Year 2
- Year 3
- Year 4
- Year 5
- Master
- PhD
- Other (please specify)

D. How would you describe yourself?

- A UK Citizen
- An international student
- Prefer not to answer

Previous Next

0% Survey Completion 100%

E. What best describes your student status?

- Full-time student
- Part-time student
- Other (please specify)

F. What is your Faculty?

- Engineering
- Humanities & Social Sciences
- Science
- Business School

Previous Next

0% Survey Completion 100%

G. During the COVID-19 pandemic, how much time do you spend on social media each day as part of your studies?

- < 1 h
- 1 – 2 h
- 2 – 3 h
- 3 – 4 h
- 4 – 5 h
- > 6 h

H. Which device do you mostly use to access digital learning resources, such as MyPlace or lecture videos, through the COVID-19 pandemic?

- Desktop
- Laptop
- Mobile phone
- Tablet (such as an iPad)
- Other (please specify)

I. Which social media sites do lecturers mostly use to communicating and collaborate with you in distance education through the COVID-19 pandemic?

- Twitter ○
- Facebook ○
- Instagram ○
- WhatsApp ○
- LinkedIn ○
- Snapchat ○
- Others ○

J. During the COVID-19 pandemic, how frequently have you used social media as part of your studies?

- Never ○
- Rarely ○
- Sometimes ○
- Often ○
- Always ○

Previous Next

0% Survey Completion 100%

K. What distractions do you face in distance learning? (choose all that apply)

- [ ] My pet
- [ ] Video games
- [ ] The people at home
- [ ] Surfing the internet
- [ ] Sleep
- [ ] Other

L. What are the top three most significant challenges you face in distance learning at home?

- [ ] Maintaining a regular schedule
- [ ] Communicating with the faculty and the management
- [ ] Slow internet coverage
- [ ] Collaborating with fellow students
- [ ] I don't have access to all the prescribed tools needed to study
- [ ] Inconducive study environment
- [ ] No suitable device to study using distance learning
- [ ] Social Isolation
- [ ] Anxiety about the impact of the coronavirus on my career
- [ ] Other

Previous Next

0% Survey Completion 100%

K. As part of your studies, please indicate your level of agreement/disagreement to the following statements (1/3)

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
1. Do you feel that using social media as distance Learning in pandemic is more effective than face-to-face teaching and can replace face-to-face?	○	○	○	○	○
2. Males are more confident than females when it comes to using social media for distance learning.	○	○	○	○	○
3. Males have better an online mode of education in comparison to females	○	○	○	○	○
4. Males use computers more than females for education and entertainment purposes	○	○	○	○	○
5. Females have higher competence in communication and social skills when it comes to the use of social media.	○	○	○	○	○
6. Females are favored over males in distance education in the COVID-19 pandemic	○	○	○	○	○
7. Females often face discrimination and barriers in distance learning courses especially in the COVID-19 pandemic.	○	○	○	○	○
8. Higher levels of perceived teacher effective support among females in distance learning upon the COVID-19 pandemic	○	○	○	○	○

As part of your studies, please indicate your level of agreement/disagreement to the following statements (2/3)

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
9. Lecturers were not willing to communicate via social media	○	○	○	○	○
10. During the COVID-19 pandemic, use of social media for distance learning are more welcoming for shy and quiet students.	○	○	○	○	○
11. I think, in distance learning via social media has been increased my retention of information and take less time.	○	○	○	○	○
12. I think, in distance learning via social media, I always seek help from peers, colleagues and tutors more than in face-to-face teaching,	○	○	○	○	○
13. I think a good learning is good learning, whether it is face-to-face or in distance learning environment.	○	○	○	○	○
14. I think distance learning is suitable for all types of courses and all students	○	○	○	○	○
15. In the COVID-19 pandemic, males have an advantage over females in the online classroom using social media solely based on their higher perceived ability, comfort, and engagement with computer	○	○	○	○	○
16. Perceived teacher support is even more important in digital learning setting including social media, particularly in a situation such as the COVID-19 pandemic.	○	○	○	○	○

As part of your studies, please indicate your level of agreement/disagreement to the following statements (3/3)

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
17. The digital gap between genders in distance learning only exists in higher education	○	○	○	○	○
18. Due to COVID-19 pandemic, there is a need to promote gender equity in distance learning in higher education.	○	○	○	○	○
19. During the COVID-19 pandemic, increasing a gender role socialisation on social media with reference to distance education in higher education	○	○	○	○	○
20. During COVID-19 pandemic, show it the level of digital literacy and competency of faculty still requires some improvement and more systematic approach to the student-teacher education and level of computer literacy	○	○	○	○	○
21. I believe that social media can enhance my learning experience	○	○	○	○	○
22. I believe that the effectiveness of online learning using social media varies amongst age groups, major, and experience .	○	○	○	○	○
23.Social media is the most effectiveness of online learning and distance learning among digital platforms .	○	○	○	○	○
24. I think distance learning is very stressful for me during the COVID-19 pandemic?	○	○	○	○	○

L. Using social media in the distance education context ultimately had a positive effect on the student-teacher relationship which can lead to more positive student outcomes,

- Extremely negative
- Somewhat negative
- Neither positive nor negative
- Somewhat positive
- Extremely positive

M. As part of your studies, how satisfied or dissatisfied were you with the teaching effectiveness of distance learning using social media with the COVID-19 pandemic?

- Very dissatisfied
- Dissatisfied
- Neutral
- Satisfied
- Very Satisfied

N. How likely are you to continue learning in distance learning environment using social media next year as part of your studies?

- Very Unlikely
- Unlikely
- Somewhat Unlikely
- Neither likely nor unlikely
- Somewhat Likely
- Likely
- Very Likely

O. As part of your studies, how effective is the teaching within your major using social media in a distance learning environment at the university?

- Not effective at all
- Slightly effective
- Moderately effective
- Very effective
- Extremely effective

P. How was your overall experience learning from home?

- Much worse
- Somewhat worse
- About the same
- Somewhat better
- Much better

Previous Next

0% Survey Completion 100%

All responses **will remain anonymous** and will be treated with strict confidence.

All respondents who have fully completed the survey and entered the email will be entered into a prize draw to win a whopping **£35** in **Amazon Voucher** as a thanks for taking part! (Please! enter your email if you are interested to win Amazon Voucher):

Previous Submit

0% Survey Completion 100%

Appendix B.2: Participant Information Sheet For Survey

Participant Information Sheet

Name of department: *Computer and Information Sciences*

Title of the study: *Gender Differences in Usage of Social Media for Distance Learning and Research Purposes in Higher Education*

Introduction

The main researcher of this study is Abdoalhamed Zngeena, a PhD student from the Department of Computer and Information Sciences at the University of Strathclyde.

What is the purpose of this research?

The research is investigating Gender Differences in Usage of Social Media for Distance Learning and Research Purposes in Higher Education. The research is focused on the extent to which both genders make use of social media resources and their opinions in distance learning, especially during the COVID-19 pandemic. The research also explores how higher education students use social media to gather information needed for their work.

Do you have to take part?

No, the questionnaire is entirely voluntary. You can also stop filling out the questionnaire or withdraw at any time with no repercussions.

What will you do in the project?

You will participate in a web-based online questionnaire which contains questions relevant to Gender Differences in Usage of Social Media for Distance Learning in Higher Education and asked to answer some questions about it. The responses will be automatically recorded on Qualtrics.

Furthermore, be told the survey data will be collected online for anonymously, what time should take, and will gain no direct benefits from taking part in this study, but you can choose to enter a prize draw to win Amazon Voucher (£35).

Who can take part in the project?

All current students at the University of Strathclyde who are age 17 or older can take part.

What are the potential risks to you in taking part?

The investigation is not expected to pose any health or safety hazards or risks. The research will be conducted online.

What information is being collected in the project?

The survey data will be collected online for anonymously. All data will be saved in Qualtrics and on the university's secure OneDrive server. Only the researcher and his supervisor, listed below, will have access to the data. The data will be deleted upon completion of the researcher's PhD.

What happens next?

If you agree to participate in this study after reading this form, please click the Agree button to begin the survey. By doing this, you acknowledge that your participation in the study is voluntary, you are age 17 years or over, and that you are aware that you may choose to terminate your participation in the study at any time and for any reason.

Researchers' contact details:

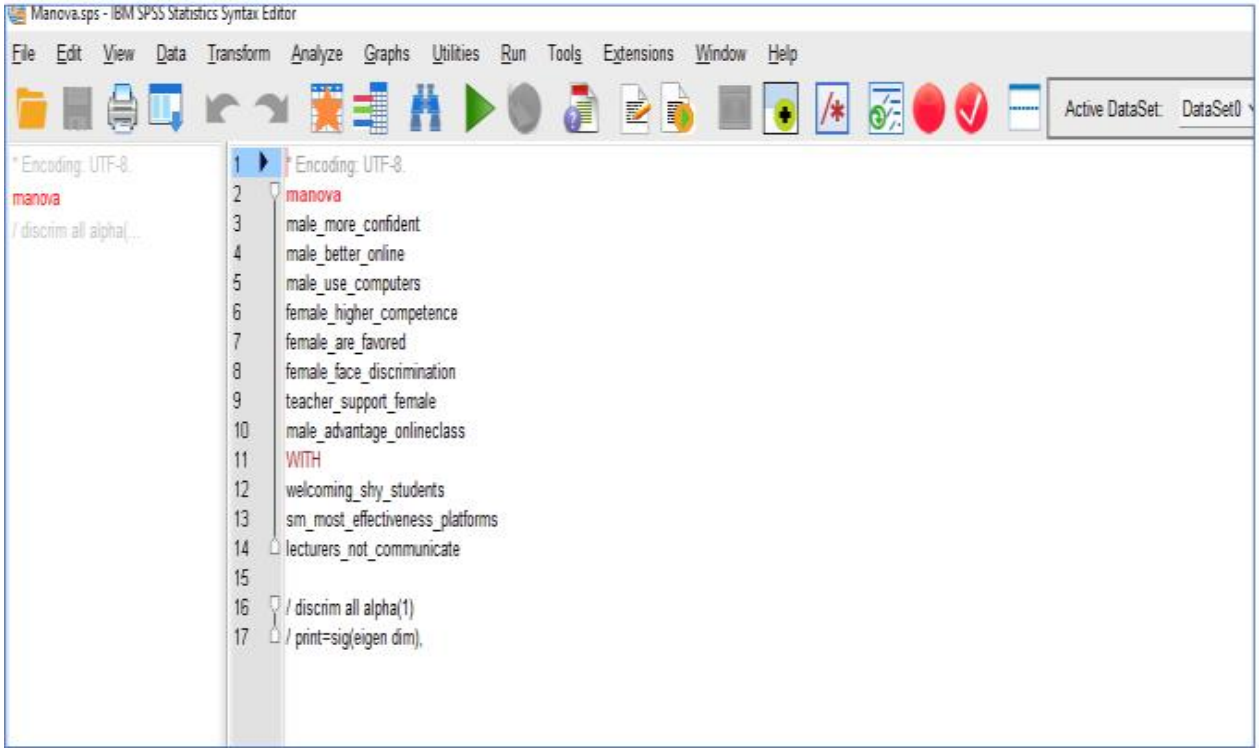
Investigator*: Abdoalhamed Zngeena, abdoalhamed.zngeena@strath.ac.uk*

Supervisor: Dr Diane Pennington, diane.pennington@strath.ac.uk

Appendix C: Variable Sets for CCA Analysis

Gender Perceptions Set	
Extended Name	**Abbreviated Name**
1-Males are more confident than females when it comes to using social media for distance learning.	Male_more_confident
2- Males used computers for education and entertainment purposes more than females.	male_use_computers
3. Males have better an online mode of education in comparison to females.	male_better_online
4. Females have higher competence in communication and social skills in using social media.	female_higher_competence
5. Females are favored over males in distance education in the COVID-19 pandemic.	female_are_favored
6. Females often face discrimination and barriers in distance learning courses especially in the COVID-19 pandemic.	female_face_discrimination
7. Higher levels of perceived teacher effective support among females in distance learning upon the COVID-19 pandemic.	teacher_support_female
8. In the COVID-19 pandemic, males have an advantage over females in the online classroom using social media solely based on their higher perceived ability, comfort, and engagement with a computer.	male_advantage_onlineclass
Social Media Learning Experience Set	
Extended Name	**Abbreviated Name**
1. During the COVID-19 pandemic, the use of social media for distance learning is more welcoming for shy and quiet students.	welcoming_shy_students
2. Social media is the most effective platform for online learning and distance learning among digital platforms.	sm_most_effectiveness_platforms
3. Lecturers were not willing to communicate via social media.	lecturers_not_communicate
Attitudes Toward Distance Learning Set	
Extended Name	**Abbreviated Name**
1. I think distance learning is suitable for all types of courses and all students.	distance_learning_suitable
2. I believe that the effectiveness of online learning using social media varies amongst age groups, major, and experience.	effectiveness_online_learning
3. Do you feel that using social media as distance learning in the pandemic is more effective than face-to-face teaching?	felling_using_sm
4. I think in distance learning via social media has increased my retention of information and takes less time.	increased_retention_information
5. I think in distance learning via social media, I always seek help from peers, colleagues, and tutors more than in face-to-face teaching.	seek_help_in_distance
6. I think that good learning is good learning, whether it is face-to-face or in a distance learning environment.	good_learning_good
7. I believe that social media can enhance my learning experience.	sm_enhance_learning_experience

Variable Sets Manova Example:



Appendix D: Analysis of Variance

1- Analysis Variance - Design between Gender Perceptions and Social Media Experience

EFFECT. WITHIN CELLS Regression

Multivariate Tests of Significance (S = 3, M = 2, N = 80)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.41662	3.30598	24.00	492.00	.000
Hotellings	.52579	3.51986	24.00	482.00	.000
Wilks	.62714	3.42129	24.00	470.45	.000
Roys	.24808				

Eigenvalues and Canonical Correlations

Root No.	Eigenvalue	Pct.	Cum. Pct.	Canon Cor.	Sq. Cor
1	.330	62.750	62.750	.498	.248
2	.178	33.940	96.690	.389	.151
3	.017	3.309	100.000	.130	.017

Dimension Reduction Analysis

Roots	Wilks L.	F	Hypoth. DF	Error DF	Sig. of F
1 TO 3	.62714	3.42129	24.00	470.45	.000
2 TO 3	.83406	2.21142	14.00	326.00	.007
3 TO 3	.98290	.47567	6.00	164.00	.826

Standardized canonical coefficients for DEPENDENT variables

Variable	Function No. 1	2	3
male_more_confident	.498	-.478	-.967
male_bet_online	-.206	.253	.940
male_use_computers	.039	.033	-.598
female_ higher_competence	-.044	-.510	.303
female_ are_favored	-.192	.555	-.523
female_ face_discrimination	.138	-.591	-.102
teacher_ support_female	-.421	.072	-.080
male_ advantage_onlineclass	-.816	.020	.504

Correlations between DEPENDENT and canonical variables

Variable	Function No. 1	2	3
male_more_confident	-.232	-.494	-.451
male_bet_online	-.405	-.249	.051
male_use_computers	-.492	-.190	-.434
female_ higher_competence	-.464	-.586	.024
female_ are_favored	-.640	.232	-.440
female_ face_discrimination	-.324	-.719	-.117
teacher_ support_female	-.653	-.192	-.348
male_ advantage_onlineclass	-.829	-.293	-.047

Standardized canonical coefficients for COVARIATES.

COVARIATE	1	2	3
welcoming_shy_students	-.534	-.620	.645
sm_most_effectiveness_platforms	-.721	.517	-.546
lecturers_not_communicate	-.009	-.610	-.808

Correlations between COVARIATES and canonical variables

Covariate	1	2	3
welcoming_shy_students	-.717	-.551	.424
sm_most_effectiveness_platforms	-.855	.418	-.305
lecturers_not_communicate	.005	-.722	-.701

2- Analysis Variance - Design between Demographics and Gender Perceptions

EFFECT.|. WITHIN CELLS Regression
Multivariate Tests of Significance (S = 4, M = 1 1/2, N = 79 1/2)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.24489	1.33689	32.00	656.00	.104
Hotellings	.27901	1.39068	32.00	638.00	.077
Wilks	.77028	1.36441	32.00	595.33	.090
Roys	.16247				

Eigenvalues and Canonical Correlations

Root No.	Eigenvalue	Pct.	Cum. Pct.	Canon Cor.	Sq. Cor
1	.193	69.525	69.525	.403	.162
2	.038	13.900	83.426	.193	.037
3	.030	11.070	94.496	.173	.030
4	.015	5.503	100.000	.122	.015

Dimension Reduction Analysis

Roots	Wilks L.	F	Hypoth. DF	Error DF	Sig. of F
1 TO 4	.77028	1.36441	32.00	595.33	.090
2 TO 4	.91970	.65604	21.00	465.73	.876
3 TO 4	.95537	.62732	12.00	326.00	.819
4 TO 4	.98488	.50361	5.00	164.00	.773

Standardized canonical coefficients for DEPENDENT variables
Function No.

Variable	1	2	3	4
Gender	.950	-.315	.110	.158
Age_G	.070	-.240	-1.215	.243
Year_Of_Study	-.088	-.066	.972	.826
Faculty_G	-.308	-.911	.277	-.170

Correlations between DEPENDENT and canonical variables
Function No.

Variable	1	2	3	4
Gender	.95269	-.28330	.10209	-.04122
Age_G	-.13710	-.27864	-.63356	.70864
Year_Of_Study	-.19961	-.05329	.19112	.95958
Faculty_G	-.27938	-.92136	.11800	-.24313

Standardized canonical coefficients for COVARIATES
CAN. VAR.

COVARIATE	1	2	3	4
male_mor	.151	.007	.475	-.905
male_bet	-.782	.056	-1.071	.077
male_use	.064	.973	.545	.494
female_h	.295	.459	-.355	.080
female_a	-.35631	-.29399	-.12801	.34660
female_f	.82260	-.02760	-.40524	-.02760
teacher_	-.11486	-.23046	.13007	-.35876
male_adv	-.20920	-.22775	.40642	-.37627

Correlations between COVARIATES and canonical variables
CAN. VAR.

Covariate	1	2	3	4
male_mor	-.19736	.38078	-.06007	-.82886
male_bet	-.48825	.46123	-.53538	-.45253
male_use	-.22114	.85619	.16578	-.10467
female_h	.17512	.56593	-.38553	-.20403
female_a	-.38813	.04143	-.15842	-.00732
female_f	.51375	.21290	-.42107	-.38946
teacher_	-.09017	.16538	-.05550	-.41459
male_adv	-.18743	.28884	.10806	-.51976

3- Analysis Variance - Design between Gender Perceptions and Attitudes Toward Distance Learning.

EFFECT.. WITHIN CELLS Regression
Multivariate Tests of Significance (S = 8, M = -1/2, N = 77 1/2)

Test Name	Value	Approx. F	Hypoth. DF	Error DF	Sig. of F
Pillais	.64074	1.78484	64.00	1312.00	.000
Hotellings	.77151	1.87151	64.00	1242.00	.000
Wilks	.49598	1.84221	64.00	912.05	.000
Roys	.22961				

Eigenvalues and Canonical Correlations

Root No.	Eigenvalue	Pct.	Cum. Pct.	Canon Cor.	Sq. Cor
1	.298	38.631	38.631	.479	.229
2	.245	31.832	70.464	.444	.197
3	.094	12.202	82.666	.293	.086
4	.060	7.837	90.503	.238	.057
5	.043	5.573	96.077	.203	.041
6	.023	3.069	99.147	.152	.023
7	.006	.852	99.999	.080	.006
8	.000	.000	00.000	.002	.000

Dimension Reduction Analysis

Roots	Wilks L.	F	Hypoth. DF	Error DF	Sig. of F
1 TO 8	.49598	1.84221	64.00	912.05	.000
2 TO 8	.64381	1.49150	49.00	806.56	.018
3 TO 8	.80192	1.00384	36.00	700.98	.465
4 TO 8	.87742	.85401	25.00	595.88	.671
5 TO 8	.93047	.73475	16.00	492.50	.759
6 TO 8	.97048	.54293	9.00	394.42	.843
7 TO 8	.99346	.26771	4.00	326.00	.899
8 TO 8	1.00000	.00071	1.00	164.00	.979

Standardized canonical coefficients for DEPENDENT variables Function No.

Variable	1	2	3	4	5	6	7	8
distance_learning_suitable	-.150	.315	-.205	-.230	-.211	-.394	-.300	-.901
effectiveness_online_learning	-.058	-.260	-.465	-.368	.350	-.540	.640	-.144
felling_using_sm	-.159	-.131	-.705	.424	-.588	.319	.520	.343
increased_retention_information	.358	.584	-.034	-.410	-.195	-.618	-.408	.675
seek_help_in_distance	.069	.075	-.070	-.597	.236	.908	.323	-.346
good_learning_good	.266	-.224	-.364	.383	.746	.072	-.529	.140
sm_enhance_learning_experience	-.016	.566	.704	.754	.304	.016	.282	-.259
perceived teacher support	.907	-.272	-.008	.021	-.460	.001	-.207	-.170

Correlations between DEPENDENT and canonical variables Function No.

Variable	1	2	3	4	5	6	7	8
distance_learning_suitable	-.140	.452	-.476	.060	-.157	-.120	-.301	-.644
effectiveness_online_learning	.293	-.105	-.214	-.137	.370	.492	.670	-.096
felling_using_sm	.027	.402	-.693	.401	-.296	.200	.244	.092
increased_retention_information	.330	.784	-.260	-.220	.041	-.120	-.005	.380
seek_help_in_distance	.302	.503	-.223	-.381	.234	.604	.201	-.106
good_learning_good	.235	.140	-.576	.335	.576	.121	-.363	-.012
sm_enhance_learning_experience	.358	.621	.112	.454	.222	-.044	.433	-.160
perceived_teacher_support	.886	-.239	.076	.097	-.253	-.051	.137	-.238

Standardized canonical coefficients for COVARIATES CAN. VAR.

COVARIATE	1	2	3	4	5	6	7	8
male_more_confident	-.234	-.203	-.352	-.754	.212	-.864	-.010	.823
male_better_online	-.168	.295	.843	.404	-.964	-.032	.294	-.515
male_use_computers	.386	-.334	.411	-.416	.095	.884	-.278	.550
female_higher_competence	.364	-.143	-.226	.810	.072	-.170	.551	.593
female_are_favored	-.307	.436	-.595	.160	-.441	.134	-.681	.388
female_face_discrimination	.581	-.558	-.135	-.070	-.265	-.190	-.716	-.426
teacher_support_female	.234	.305	-.334	-.597	-.096	.226	.781	-.604
male_advantage_onlineclass	.185	.835	.339	.249	.843	-.244	-.102	-.407

Correlations between COVARIATES and canonical variables CAN. VAR.

Covariate	1	2	3	4	5	6	7	8
male_more_confident	.288	.251	.205	-.477	-.211	-.590	.019	.440
male_better_online	.308	.370	.525	-.101	-.613	-.292	.062	.167
male_use_computers	.576	.246	.380	-.318	-.120	.333	-.093	.476
female_higher_competence	.706	.146	-.142	.381	-.166	-.150	.304	.413
female_are_favored	.186	.661	-.382	.008	-.418	.113	-.336	.283
female_face_discrimination	.793	-.090	-.081	-.062	-.263	-.342	-.361	-.185
teacher_support_female	.562	.432	-.333	-.410	-.273	.080	.358	-.092
male_advantage_onlineclass	.548	.687	.256	-.042	.231	-.249	-.198	.071

Appendix E: The interview questions

Themes	Questions
1- Attitudes Toward Distance Learning	**Q1:** Do you have preference for offline or online learning platforms? (Why?) **Q2:** What experiences or factors have influenced your opinions about online learning? **Q3:** Can you describe specific situations where you found distance learning suitable or not suitable for your needs? **Q4:** How does your perception of teacher support in online classes affect your experiences as a student? **Q4.1:** What kind of support do you expect from teachers and peers in online classes? **Q4.2:** Have you ever received or provided support to fellow students in an online learning environment? (Following up, from whom do you receive support?) **Q5:** How do you evaluate the effectiveness of online learning in comparison to traditional classroom settings?
2- Gender Perceptions and Experiences in Distance Learning	**Q6:** Do you believe that males and females have different advantages or disadvantages in online learning environments? **Q7:** Have you ever felt discriminated against (or witnessed discrimination) based on your gender in an online learning environment? (If yes, explain.)
3- The Influence of Gender on Learning	**Q8:** Do you believe that certain features of the online platforms that you are asked to use (such as MyPlace, Zoom, Google Meeting, Microsoft Teams, etc.) are more suitable for males or females? **Q8:1:** From your experience, which of these platforms do you think are best suited for facilitating distance learning? **Q8:2:** What are your thoughts on the university's MyPlace Online Classes?
4- Improving the Online Learning Experience	**Q9:** In your opinion, what can institutions do to create gender-inclusive online learning environments?

Appendix F: Interview Materials

Appendix F.1: The inclusion criteria for the interviews

Title of research:
Gender Differences in Usage of Social Media and Distance Learning in Higher Education

Summary of research (short overview of the background and aims of this study):
The research is investigating Gender Differences in Usage of Social media and Distance Learning in Higher Education. Interviews will be conducted to get information about distance learning in higher education. Any current University of Strathclyde student who is 18 or older can participate. The research will be focused on the use of online learning resources and their opinions on distance learning.

How will participants be recruited?

The participant recruitment for this study will utilize a dual approach, involving on campus and online strategies. On-campus recruitment will target students within the University of Strathclyde, making use of physical locations such as posters at Strathclyde Students' Union, the library, and departments. At the same time, online platforms, such as the RDP newsletter, will be used to reach a larger audience.

What will the participants be told about the proposed research study? Either upload or include a copy of the briefing notes issued to participants. In particular this should include details of yourself, the context of the study and an overview of the data that you plan to collect, your supervisor, and contact details for the Departmental Ethics Committee

I will send or show the PIS to all participants to see my research before the interview. If they are happy to participate in this study, they will sign the form and send or give it back to me by email or hand. Also, the interviews will be conducted separately, face-to-face or by ZOOM, if necessary, with a set time for each.

Please see the included Participant Information Sheet.

How will consent be demonstrated? Either upload or include here a copy of the consent form/instructions issued to participants. It is particularly important that you make the rights of the participants to freely withdraw from the study at any point (if they begin to feel stressed for example), nor feel under any pressure or obligation to complete the study, answer any particular question, or undertake any particular task. Their rights regarding associated data collected should also be made explicit.

The researcher will contact or talk to the participants by email or in person and send or show them the Participant Information Sheet (PIS) first to see the details of conducting the interview, data collection, and consent form. If they agree and meet the participating criteria, they will sign the form and send or give it back to the researcher. Also, please see the Participant Information Sheet (PIS).

What will participants be expected to do? Either upload or include a copy of the instructions issued to participants along with a copy of or link to the survey, interview script or task description you intend to carry out. Please also confirm (where appropriate) that your supervisor has seen and approved both your planned study, and this associated ethics application.

My supervisor has seen and approved the interview questions and this application. These interviews will be semi-structured, and we will concentrate as much as possible on the feedback and information provided by the participant.

The interview questions:

Q1: Do you have preference for offline or online learning platforms? (why?)

Q2: What experiences or factors have influenced your opinions about online learning?

Q3: Can you describe specific situations where you found distance learning suitable or not suitable for your needs?

Q4: How does your perception of teacher support in online classes affect your experiences as a student?

Q4.1: What kind of support do you expect from teachers and peers in online classes?

Q4.2: Have you ever received or provided support to fellow students in an online learning environment? (Following up, from whom do you receive support?)

Q5: How do you evaluate the effectiveness of online learning in comparison to traditional classroom settings?

Q6: Do you believe that males and females have different advantages or disadvantages in online learning environments?

Q7: Have you ever felt discriminated against (or witnessed discrimination) based on your gender in an online learning environment? (if yes, explain.)

Q8: Do you believe that certain features of the online platforms that you are asked to use (such as MyPlace, Zoom, Google Meeting, Microsoft Teams, etc.) are more suitable for males or females?

Q8:1: From your experience, which of these platforms do you think are best suited for facilitating distance learning?

Q8:2: What are your thoughts on the university's MyPlace Online Classes?

Q9: In your opinion, what can institutions do to create gender-inclusive online learning environments?

What data will be collected and how will it be captured and stored? In particular indicate how adherence to the Data Protection Act and the General Data Protection Regulation (GDPR) will be guaranteed and how participant confidentiality will be handled.

The researcher aims to use a voice recording. For recording interviews with participants, I will use digital audio recorders equipped with high-quality microphones to capture

clear and accurate dialogue (e.g., the AOMAGO 32GB Digital Voice Recorder for Lectures and Meetings) to collect responses from students at Strathclyde about their use of social media and distance learning resources for study. To ensure the protection of recordings, the device will be password-protected, and recordings will be stored on encrypted external drives (the university's OneDrive). Access to these recordings will be restricted to the research team, and any personally identifiable information will be pseudonymized during transcription. For confidentiality, data will be securely stored for the duration required by the study and any publications related to the project before secure deletion. Moreover, it is pertinent to mention here that the researcher would not collect any personally identifying or sensitive information from the research participants, and all responses would be anonymous. As for the demographics of the students, the investigation would be based on some personal data (level of study and faculty).

How will the data be processed? (e.g. analysed, reported, visualised, integrated with other data, etc.) Please pay particular attention to descibing how personal or sensitive data will be handled and how GDPR regulations will be met.

The data collected in this study will be processed in accordance with strict data protection protocols, ensuring full compliance with GDPR regulations. Following data collection, my immediate focus will be on completing my PhD thesis within the next six months. Subsequently, within these months, I plan to prepare and submit a thesis and journal article based on the study's findings. The interview data will be securely stored on the Strathclyde hard drive, and access will be restricted to only my supervisor and me.

The analysis phase, utilizing statistical methods, thematic coding, NVivo software, and potentially manual techniques, is projected to start immediately after data collection and continue over the following six months. The finalized results, both combined and de-identified, will be incorporated into academic publications or reports within the next year.

How and when will data be disposed of? Either upload a copy of your data management plan or describe how data will be disposed.

The data will be destroyed when no longer needed to conduct the study, and by the end of my study and pass my PhD thesis next year.

Appendix F.2: Recruitment Poster

Exploring Gender Differences in Distance Learning

HAVE YOUR SAY!!

Take part in our interview (**in-person or online on ZOOM**)

Have you had experience with distance learning in higher education?

We are a friendly research team that would like to gain a comprehensive understanding of gender differences in the use of distance learning. To provide more insight, our interview questions will go around various themes, including but not limited to participants' **experiences with online courses**, **challenges faced, and preferences for virtual learning environments**. We believe that understanding these aspects will contribute to a more comprehensive view of the subject. Our study is open to individuals from different backgrounds and experiences within higher education. We welcome opinions from students who have recently graduated. If you have engaged in distance learning, your unique insights can significantly contribute to our research. Participation is entirely voluntary, and you have the right to withdraw at any stage without consequences. The interview process is expected to take approximately **20–40 minutes** of your time. Your voice matters in shaping the future of higher education; join us in this impactful exploration!

Email: abdoalhamed.zngeena@strath.ac.uk

Scan QR code or type the link for more information

(https://qr.de/en/W6mJcV)

Thank you
Abdoalhamed Zngeena, PhD.

Appendix G: The Departmental Ethics Committee in Computer and Information Sciences Approval.

Application ID: 1601

CIS Ethics Approval System

You are Abdoalhamed Zngeena (Research Student - 201971376)

Return to Main

Application ID: 1601

Title of research:

Gender Differences in Usage of Social Media for Distance Learning and Research Purposes in Higher Education

Summary of research (short overview of the background and aims of this study):

The research is investigating Gender Differences in Usage of Social Media for Distance Learning and Research Purposes in Higher Education. An online survey will be conducted to get information about the use of social media for distance learning and research purposes in higher education. Any current University of Strathclyde students who are age 17 or older can participate. The research will be focused on the extent to which both genders make use of social media resources and their opinions in distance learning only, especially during the COVID-19 pandemic as first part of research.

How will participants be recruited?

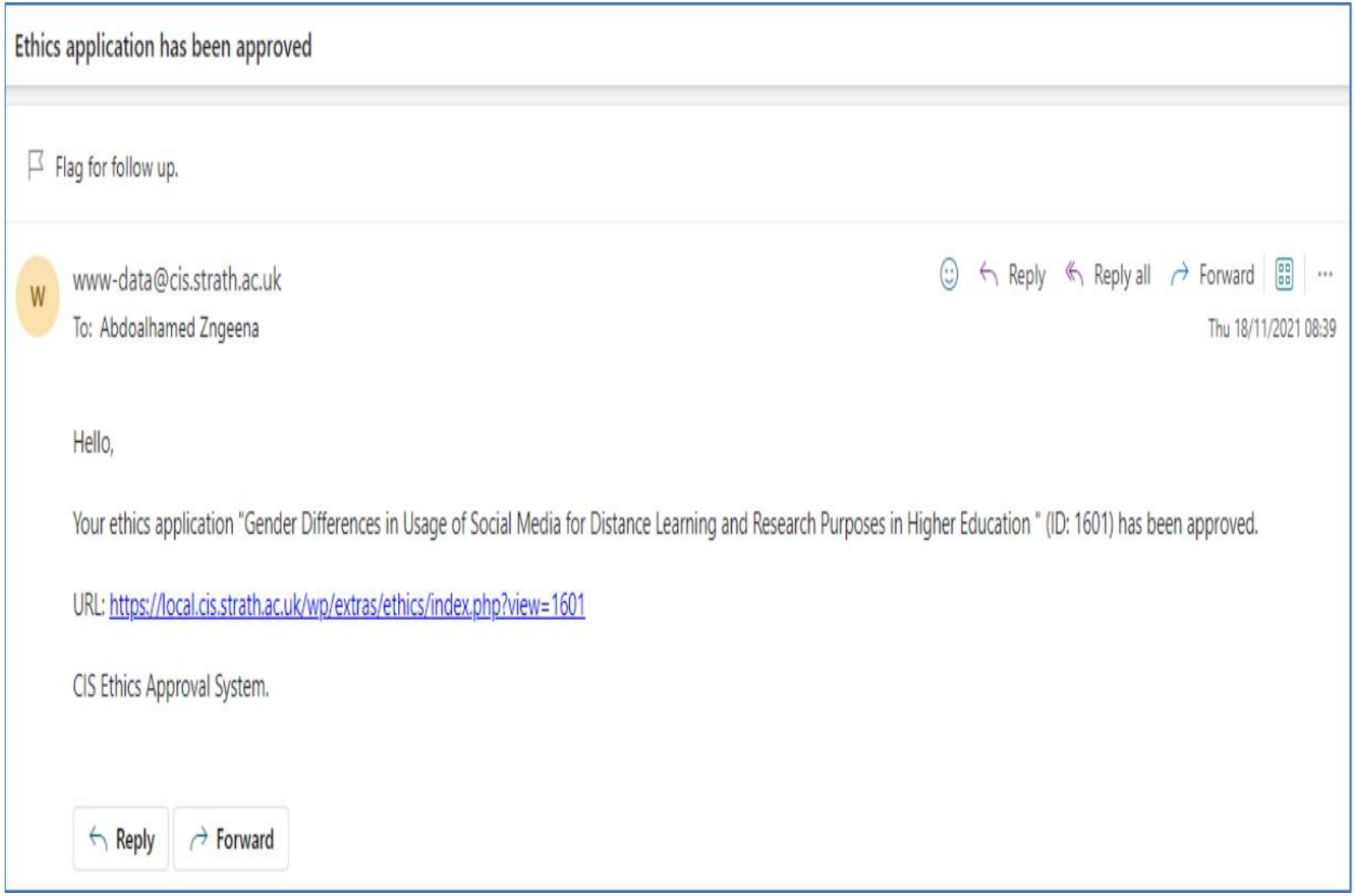
Efficient and merit-based recruitment and selection of research participants is the key to successful and credible research work. for this particular research, an online survey would be sent to the administrators of all departments of the university in order for them to be delivered to the students of those departments. The students would then complete the questionnaire and submit their responses, which would be on the Qualtrics software. I have also sent an email to the Computer and Information Sciences (CIS) department's administrator to ensure sending emails to all current students at the university. I will request the authorities responsible for this job to get more and more participants for this research work.

What will the participants be told about the proposed research study? Either upload or include a copy of the briefing notes issued to participants. In particular this should include details of yourself, the context of the study and an overview of the data that you plan to collect, your supervisor, and contact details for the Departmental Ethics Committee.

PDF File: View document

Please see the included Participant Information Sheet

The Approval (ID: 1601)



Ethics application has been approved

Flag for follow up.

W www-data@cis.strath.ac.uk

To: Abdoalhamed Zngeena

Reply Reply all Forward ...

Thu 18/11/2021 08:39

Hello,

Your ethics application "Gender Differences in Usage of Social Media for Distance Learning and Research Purposes in Higher Education " (ID: 1601) has been approved.

URL: https://local.cis.strath.ac.uk/wp/extras/ethics/index.php?view=1601

CIS Ethics Approval System.

Reply Forward

Application ID: 2428

CIS Ethics Approval System

You are Abdoalhamed Zngeena (Research Student - 201971376)

Return to Main

Application ID: 2428

Title of research:

Gender Differences in Usage of Social Media and Distance Learning in Higher Education

Summary of research (short overview of the background and aims of this study):

The research is investigating Gender Differences in Usage of Social media and Distance Learning in Higher Education. Interviews will be conducted to get information about distance learning in higher education. Any current University of Strathclyde student who is 18 or older can participate. The research will be focused on the use of online learning resources and their opinions on distance learning.

How will participants be recruited?

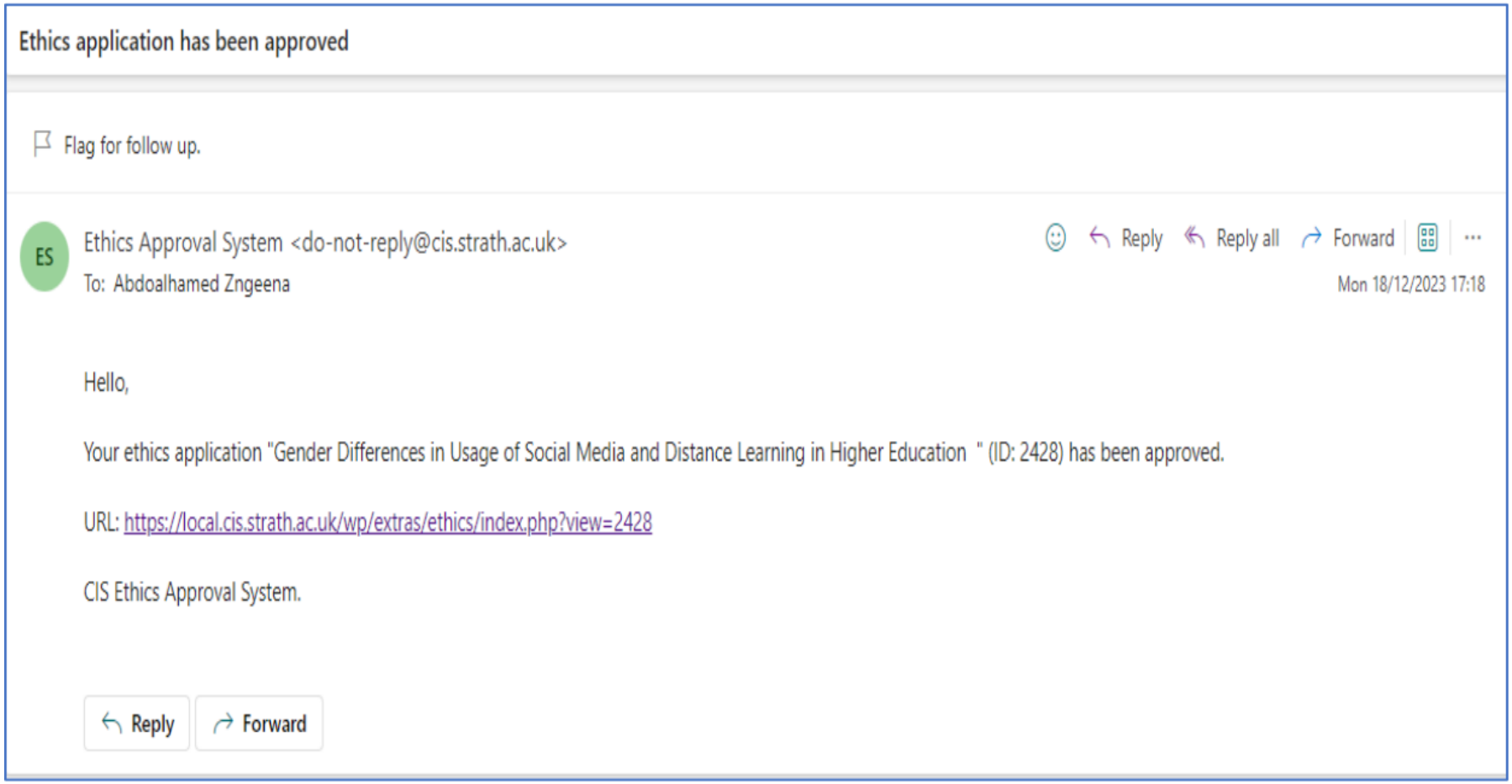
The participant recruitment for this study will utilize a dual approach, involving on-campus and online strategies. On-campus recruitment will target students within the University of Strathclyde, making use of physical locations such as posters at Strathclyde Students' Union, the library, and departments. At the same time, online platforms, such as the RDP newsletter, will be used to reach a larger audience.
A copy of the poster as the fallowing;

Exploring Gender Differences in Distance Learning

HAVE YOUR SAY!

Take part in our interview (in-person or online)

The Approval (ID: 2428)



Ethics application has been approved

Flag for follow up.

ES

Ethics Approval System <do-not-reply@cis.strath.ac.uk>

To: Abdoalhamed Zngeena

Reply Reply all Forward

Mon 18/12/2023 17:18

Hello,

Your ethics application "Gender Differences in Usage of Social Media and Distance Learning in Higher Education " (ID: 2428) has been approved.

URL: https://local.cis.strath.ac.uk/wp/extras/ethics/index.php?view=2428

CIS Ethics Approval System.

Reply Forward