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Student Profiling for Online Learning During Covid-19: A Systematic Review

Noor Hidayah Azmi[1,*], Norshahila Ibrahim[1], Erni Marlina Saari[1], Asilah Abdul Mutalib[1], Nahdatul Akma[2]

[1] Faculty of Computing and Meta-Technology, Sultan Idris Education University, 48000 Tanjong Malim, Perak, Malaysia
[2] Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, Perak Campus, Tapah Branch, 35400 Tapah, Perak, Malaysia

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ABSTRACT

The Covid-19 epidemic has spurred significant changes in learning paradigms in several countries, including Malaysia. Particularly, the Malaysian government's Movement Control Order (MCO) forced both students and teachers to turn to online learning. It is true that its adoption is rife with fresh difficulties, including network coverage, device appropriateness, and socio-economic status of students, and digital competency, which makes teaching and learning at home incredibly difficult. Since students have a variety of learning needs, abilities, skills, and goals, it is crucial to develop learner profiles that can aid in the development of appropriate online learning approaches in order to address such issues. A systematic review of the most recent literature was conducted using three major databases: Scopus, ERIC, and Mendeley, as was envisioned in this context. The review helped identify 23 relevant publications that were then subjected to a thematic analysis, which helped reveal three (3) key themes for online learning: online platform, learner profile, and learning experience. It might be argued that understanding these thematic elements can assist teaching professionals in creating and putting into practice efficient online learning strategies for students of all educational levels. The results of this study emphasize the value of adopting student or learner profiles as a guideline to assist teaching practitioners in developing and implementing effective online teaching practices, which can ultimately make online learning sustainable long after the Covid-19 outbreak has passed.

1. Introduction

The Covid-19 outbreak that hit the world in 2020 exerted a huge impact on the learning systems of many schools, colleges, and universities throughout the world. The lockdowns imposed by the Covid-19 pandemic pushed all educational institutions to switch to online mode of teaching and learning (T&L). Such a switch was neither expected nor predicted, causing a change in the educational paradigm made evident by the exponential increase in the use of online learning [1], also commonly called as blended and hybrid learning [2], distance learning [3] and remote learning [4] to replace

* *Corresponding author.*
E-mail address: hidayah@meta.upsi.edu.my

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physical classroom learning. Typically, when learning online, students interact with digital technology while being physically separated from their instructors [5]. Given the lack of other physical communication means, the online learning method is the only feasible option for ensuring learning sessions will continue using a variety of platforms. Thus, the utilization of technology to support the learning process has intensified albeit some constraints and challenges.

Since the start of the Movement Control Order (MCO) to curb or restrict movements of the public, Malaysia's Ministry of Education (MoE) has given teachers the discretion to choose and implement suitable teaching and learning strategies depending on the limitations and circumstances that pupils encounter at home [6]. Additionally, the MoE has provided instructors with guidelines for selecting innovative strategies for alternative learning methods. Given the diversity of students' backgrounds, characteristics, motivations, and Internet connectivity, educators have been having a difficult time in choosing the best teaching methods for all students despite the abundance of online applications recommended by the MoE and numerous applications readily available in the market.

Recently, parents have joined in on the trend of relying on educational systems to monitor their children's learning activities. Online learning is undoubtedly a significant problem for parents since they must provide their children the right tools and technologies, which are scarcely available. In light of the challenging situation the parents were in, it is interesting to reflect on a study conducted by the MoE in which only 36.9% of those surveyed had any sort of communication device, while the remaining students were forced to rely on personal computers (6%), tablets (5.76%), laptops (9%), and cellphones (46%) [7]. The lack of Internet connectivity had made the issue even more difficult when combined with these limitations. Such difficulties undoubtedly have a negative impact on online learning, particularly for parents with multiple children and limited communication devices [8]. Additionally, one of the main problems that students encounter in online learning at home is slow internet [9]. Despite the fact that 90.1 percent of households had internet connection in 2019, according to the National Statistics Department, unreliable internet connectivity has been a major concern for many parents, especially those who live in rural areas [10]. Given this situation, it should come as no surprise that internet connectivity has raised significant concerns among parents. According to an egalitarian viewpoint, this may result in a number of socio-educational problems because some children may not receive the same opportunities for a quality education as their peers who are more financially advantaged. Compounding such a problem, some parents would be forced to use and share the same communication tools since they, too, may need to use them to work from home, pushing the use of such tools even further.

In order to learn more about their students' access to the internet in this situation, teachers have conducted a number of short surveys [3]. However, some of the surveys conducted thus far have not fully taken into account a number of aspects, including students' special needs, aptitudes, and parental support, which may result in a number of problems, including instructors' self-reference, prejudice, and self-assumption [11]. As such, it is essential to develop students' learning profiles in order to understand their existing and prevailing needs, given the lack of emphasis on these aspects. It might be argued that utilizing students' perspectives and experiences on these issues will enhance online learning. The following research questions were formulated to guide this investigation in light of the above background.

i. How to effectively review student profiling for online learning?
ii. What are the themes of students profiling that may emerge from the review of the relevant literature on the current trends of online learning?

2. Methods

The systematic review process carried out in this study consists of four main phases, namely identification, screening, eligibility, and data abstraction and analysis, all of which are explained in detail in the following subsections:

2.1 Step 1 - Identification

The first stage involved identifying keywords and searching similar terms in relevant sources, such as past research, thesauruses, dictionaries, and encyclopedias. Having identified all relevant keywords, the search strings for Scopus, ERIC, and Mendeley (see Table 1) databases were processed accordingly, which retrieved 903 papers or articles from the respective databases.

Table 1
The search strings

Scopus	TITLE-ABS-KEY (("*children profil*" OR "student profil*") AND ("online learning" OR "education") AND ("covid-19*")) TITLE-ABS-KEY (("profil*" OR "student profil*") AND ("online learning" OR "education") AND ("covid-19*")) AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "cp")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p")) AND (LIMIT-TO (PUBSTAGE , "final"))
ERIC	(children profiles OR student profiles) AND (online learning) AND (covid-19)
Mendeley	("*children profil*" OR "student profil*") AND ("online learning" OR "education") AND ("covid-19*")

2.2 Step 2 - Screening

For the second stage, screening, 545 articles were eliminated based on a number of criteria shown in Table 2. At this point, all the selected articles' titles and main contents were carefully examined to make sure they adhered to the inclusion criteria and the study's objectives. Only journals published in the 2021–2022 timeframe were examined, in line with the aim of reviewing online learning during the Covid-19 pandemic. Additionally, only journals in English were included. Total of 358 papers that did not fit these requirements for inclusion were left out. In addition, book chapters and conference proceedings were removed from the list of articles. Because some articles would inevitably exist in several databases, their duplicates had to be deleted, leaving 544 articles available for the subsequent review process.

Table 2
The inclusion and exclusion criteria of the search process

Criteria	Inclusion	Exclusion
Language	English	Other than English
Timeline	Between 2021 – 2022	< 2021
Sources type	Journal (only research articles)	Conference proceeding
Document Type	Article	Books, reviews, proceedings, and notes
Publication Stage	Final	In Press

2.3 Step 3 - Eligibility

A total of 544 articles were processed in the third phase of the search analysis, which was eligibility. The fields, titles, and abstracts of the chosen publications were thoroughly examined to make sure that the inclusion and exclusion criteria were satisfied based on the research objectives. Furthermore, 521 articles had to be discarded because there was no full version available for review. Out of the total number of publications that were evaluated for eligibility, only 23 articles were ultimately chosen for the ensuing analysis (see Figure 1).

2.4 Step 4 - Data Abstraction and Analysis

In this investigation, the thematic analysis or qualitative analysis approaches proposed by [12] were used to review the recent literature on student profiling for online learning. The aim of this study was to pinpoint aspects relating to student profiling that have evolved from the trends of online learning after the Covid-19 pandemic. The researchers carefully examined the data they had gathered from reading numerous pertinent articles repeatedly in order to conduct the thematic analysis. Then, the researcher searched for relevant meanings of potential interest in the data, from which appropriate themes and subthemes were earmarked and peer-reviewed for further analysis. Also, the expert from education technology field was conducted to review the thematic findings and eliminate the biasness. Figure 1 shows how the entire data abstraction and analysis procedure contributed to the compilation of a total of 23 articles or records that are pertinent to the study's goals.

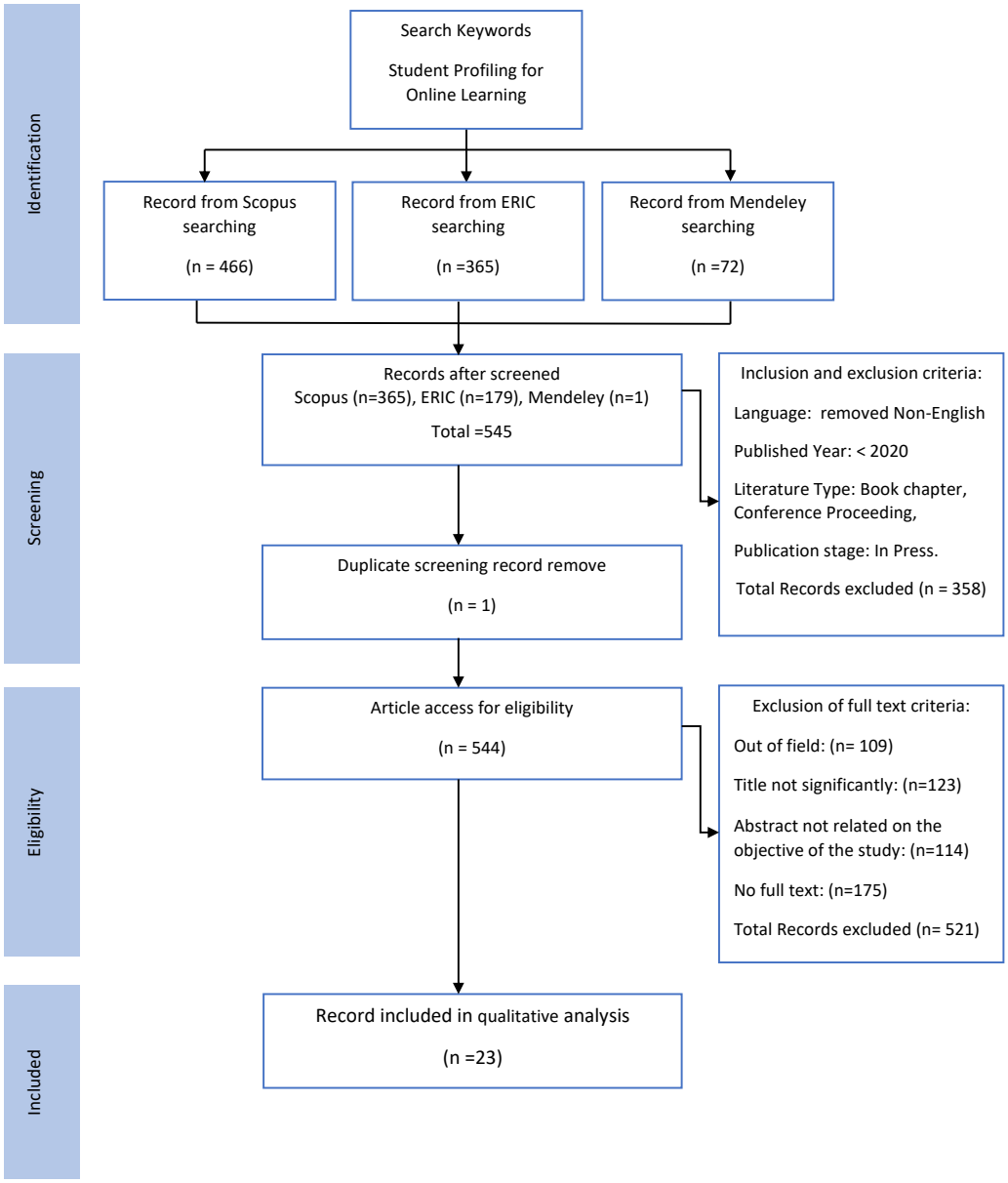

Fig. 1. The flow diagram of the search process

3. Results and Discussion

As highlighted earlier, the search process helped identify 23 relevant articles, which were then extracted from the databases and analysed using Microsoft Excel, as depicted in detail in Table 3. Three themes were brought to light as a result of the subsequent thematic analysis: online platforms, learner profiles, and learning experiences.

3.1 Online Platform

The thematic analysis showed that the online platform theme can be divided into four sub-themes. The first sub-theme, video conferencing, is backed by students' comments that they have used various video conferencing services, such as MS Teams, Zoom, and WhatsApp, to encourage synchronous communication [13-15]. Many colleges and universities have adopted the Google package, which includes a number of communication tools like Google Meet and Google Classroom,

as the standard online communication platform. In this respect, teachers and students have been advised to use synchronous e-learning systems like Zoom, WebEx, and Google Meet when there is stable internet access [16]. Similarly, online tests can be performed using Kahoot, Google Form, or Quizizz. By contrast, students living in residential areas with slow and erratic internet connectivity are strongly advised to employ asynchronous e-learning or e-learning platforms like Edmodo.

The second sub-theme that came out of the thematic analysis is social media, which is a potent tool for sharing and transferring information in the modern era. Notably, during the Covid-19 pandemic, students all over the world were using various social media platforms, including Twitter, Chatbot, Facebook, and LinkedIn, to enhance online learning [17]. Given their capacity to offer highly engaging, dynamic, and collaborative spaces, which encourage increased engagement [18], maintain close contact [15], and aid students in coping with the pandemic [18], such widespread adoption of these applications was scarcely surprising.

The students' preference for Wikipedia, blogs, and YouTube as their primary knowledge sources points to the third sub-theme, which is webpages [17]. The Massive Open Online Courses (MOOC) and Moodle are examples of online courses that fall under the fourth sub-theme. The former gained enormous student popularity during the Covid-19 pandemic [19]. According to some reports, the reason MOOCs are so well-liked is because they have cutting-edge elements like eye-catching graphics, infographics, and multimedia that can help improve learning in the higher educational setting [20]. By contrast, a lot of institutions of higher learning use Moodle as a platform for their internal teaching and learning activities [15]. The descriptions of the sub-themes of the online platform theme are summarized in Table 3.

Table 3
The summary of the Online Platform theme

Authors	Title	Journal	Type of online platform
Ismail *et al.,* [5]	Readiness for Online Learning among Foreign Language Undergraduates in a Private University in Malaysia	Asian Journal of University Education	MS Teams
Neupane [6]	University Students' Perceptions of Online Learning during Covid-19 Pandemic	International Journal of Multidisciplinary Perspectives in Higher Education	Zoom Google Classroom Microsoft Teams
Contreras *et al.,* [7]	Challenges of virtual education during the Covid-19 pandemic: Experiences of Mexican university professors and students	International Journal of Learning, Teaching and Educational Research	Moodle Zoom Social media
Bruguera *et al.,* [8]	Social media in the learning ecologies of communications students: Identifying profiles from students' perspective	Education and Information Technologies	Wikipedia Blogs YouTube Twitter Facebook LinkedIn
Donitsa-Schmidt *et al.,* [9]	Shaping the future of distance learning in teacher education: MOOCS during Covid-19	Perspectives in Education	MOOC- including visuals, infographics and multimedia that support the learning process
Friedman *et al.,* [10]	Twitter Engagement of Medical Students Applying to Urology Residency During Covid-19: A Mixed Methods Study	Urology	Twitter
Draxler *et al.,* [11]	Flexibility and Social Disconnectedness: Assessing University Students' Well-Being	DIS 2022 - Designing Interactive Systems	Chatbot

	Using an Experience Sampling Chatbot and Surveys Over Two Years of Covid-19	Conference: Digital Wellbeing	
Chamdani *et al.,* [12]	Perceptions of First-Year Students in Online Lectures in the Covid-19 Pandemic Era Viewed from Learning Motivation	Pegem Journal of Education and Instruction	SPADA Google Meet WhatsApp

3.2 Learner Profile

Learner profiling is a technique that has been widely utilized in educational research to examine different elements of learning [24]. The major objective of this study was to identify relevant learner profiles that emerged from the thematic analysis on selected articles based on a number of criteria. According to the research findings, social-media users can be categorized as "detached," "reliant," "self-guided," "analog," or "versatile" pupils [15]. In addition, MOOC users can be classified into zealous, guarded, and pragmatic users [18]. Moreover, students can be classified into a number of profiles based on a variety of internal and external factors, namely Unfavourable (less indirect family support), Family-supported (high family support), High internal (highest manifestations of home learning), and Teacher-supported (teachers always providing materials and resources) [25]. With each student having a unique set of characteristics, the creation of such learner profiles unquestionably highlights the need for personalized learning models rather than depending on "one-size-fits-all" strategies. Arguably, teaching can be adapted to assist students learn more effectively when guided by such learner profiles [25].

According to some research, students' roles during the Movement Control Order (MCO) included taking on a variety of activities in addition to attending classes and learning [26]. Additionally, a number of factors, including student motivation, social presence, digital culture, psychological aspect, and platform utility, must be taken into account when classifying learner profiles [23,27]. In reality, a lot of researchers have split these criteria into more observable internal and external elements. In general, students' study habits and their physical and mental health are considered internal elements, while learning surroundings are considered external [25]. The descriptions of the learner profiles are summarized in Table 4.

Table 4
The summary of the Learner Profile theme

Authors	Title	Journal	Classification of Learner Profile
Bruguera *et al.,* [8]	Social media in the learning ecologies of communications students: Identifying profiles from students' perspective	Education and Information Technologies	• "Versatile" students: Wikipedia, blogs, and YouTube provide excellent support while students learn in a variety of circumstances • "Dependent" students: Prefer learning tools that are academically focused • "Self-guided" students: Favor informal and digital learning environments, with social networks as a support • "Analog" students: Favor formal and physical settings, while they do embrace interactive social media platforms to a lesser extent • "Detached" students: Rarely use social media sites and use learning tools sparingly

Donitsa-Schmidt *et al.,* [9]	Shaping the future of distance learning in teacher education: MOOCS during Covid-19	Perspectives in Education	• Zealous: The benefits of MOOCs, such as how they would affect their future learning, professional growth, and lifetime learning, have captured their attention • Guarded: Only a few characteristics of MOOCs, namely convenience, independent learning, and taking a variety of courses from well-known experts, are thought to be beneficial by students • Pragmatic: High-opportunistic and utilitarian students who just see MOOCs as a way to get over time and location restrictions
Draxler *et al.,* [11]	Flexibility and Social Disconnectedness: Assessing University Students' Well-Being Using an Experience Sampling Chatbot and Surveys Over Two Years of Covid-19	DIS 2022 - Designing Interactive Systems Conference: Digital Wellbeing	• The ongoing social distance had a significant negative impact on students' emotions • Valuing the adaptability and time saved as a result of the adjustments to the instructional methods
Chamdani *et al.,* [12]	Perceptions of First-Year Students in Online Lectures in the Covid-19 Pandemic Era Viewed from Learning Motivation	Pegem Journal of Education and Instruction	• Strong desire to learn • A modest motivation for learning • Low desire to learn
Hofer *et al.,* [13]	Students home alone—profiles of internal and external conditions associated with mathematics learning from home	European Journal of Psychology of Education	• Unfavorable profile: Less indirect family support • Family-supported: Strong family support • High internal: Greater engagement in home learning • Teacher-supported: The materials and resources were typically provided by the teachers
Bravo *et al.,* [14]	Model Maturity to Determine Student Profile During Covid-19 Pandemic at Public University	Smart Innovation, Systems and Technologies	• Silent • Cooperative • Creative, star • Superstar
Ritonga *et al.,* [15]	Online Learning During the Covid-19 Pandemic Period: Studies on the Social Presence and Affective and Cognitive Engagement of Students	Pegem Journal of Education and Instruction	• Affective emotions of learners • Mental engagement
Zamecnik, *et al.,* [16]	Exploring non-traditional learner motivations and characteristics in online learning: A learner profile study	Computers and Education: Artificial Intelligence	• Groups that are more susceptible to attrition and have lower academic achievement • Three learner categories, distinguished by their reasons for choosing online learning • Six more detailed learner profiles that stand out for their levels of engagement, demographics, and learning achievements

3.3 Learning Experience

It is obvious that learning experiences have a significant role in influencing online learning. Two sub-themes, positive and negative online learning experiences, emerged from the thematic analysis under the theme of learning experience. The revelation of these sub-themes is consistent with the findings of [30], who claim that both learning experiences are contentious topics discussed in the literature. The thrill of using online platforms, increased knowledge [31], productivity [22], and support [14] are all associated with positive learning experiences. These experiences are ascribed to the ability of online learning environments to offer students a well-structured course outline, a variety of learning materials, and a wide range of resources [32], which can promote better communication and higher motivation. Such platforms encourage students to feel motivated to participate in the learning process [33]. Surprisingly, students' preference for online learning has not changed despite the decline of the Covid-19 pandemic [14,21]. It shows that ICT has assisted a lot in the Covid-19 generation [17].

The second sub-theme, the negative experience of online learning, is linked to uncomfortable feelings [21], demotivation [22], extreme burnout [30], weariness from distant learning [31], and information loss [32]. Undoubtedly, all of these negative learning experiences can negatively affect online learning. Technical issues have been identified as one of the main factors contributing to students experience about online learning [33]. Several techno-pedagogical issues, including the reliability of internet connection, the teaching methods or styles of teachers, and a lack of facilities, can also have a negative impact on learning experiences [34]. Despite the widespread use of online learning, many academics have expressed some reservations about its advantages, claiming that it is less effective at improving students' social skills and competencies [35], which is brought on by a lack of enthusiasm and engagement, as well as stress and anxiety [36]. Table 5 provides a summary of the two sub-themes that make up the learning experience theme.

Table 5
The summary of the Learning Experience theme

Authors	Title	Journal	Learning Experience
Draxler *et al.,* [11]	Flexibility and Social Disconnectedness: Assessing University Students' Well-Being Using an Experience Sampling Chatbot and Surveys Over Two Years of Covid-19	DIS 2022 - Designing Interactive Systems Conference: Digital Wellbeing	• A perceived decline in student motivation but an uptick in output
Juriševič *et al.,* [4]	Higher education students' experience of emergency remote teaching during the Covid-19 pandemic in relation to self-regulation and positivity	Center for Educational Policy Studies Journal	• Employed more adaptive coping techniques (positive reappraisal, acceptance, and refocus on planning) • Fewer inappropriate behaviors (blaming others or catastrophizing)
Neupane [6]	University Students' Perceptions of Online Learning during Covid-19 Pandemic	International Journal of Multidisciplinary Perspectives in Higher Education	• Students preferred the continuity of online learning even after the Covid-19 outbreak and found it helpful throughout the pandemic
Friedman *et al.,* [10]	Twitter Engagement of Medical Students Applying to Urology Residency During Covid-19: A Mixed Methods Study	Urology	• Students wished to keep using Twitter

			• Students reported feeling uneasy when tweeting about diversity, politics, or racial concerns
Ritonga *et al.,* [15]	Online Learning During the Covid-19 Pandemic Period: Studies on the Social Presence and Affective and Cognitive Engagement of Students	Pegem Journal of Education and Instruction	• Online learning may not be felt the same to students who are socially, affectively, and intellectually active in offline learning
Asih and Alief [18]	Students' experiences and learning objectives: Implications for future online learning	Journal of Education and Learning (EduLearn)	• Due to their extensive online learning, students became burnt out and had trouble adjusting to other instructional strategies
Corcoran [19]	Learning During the Pandemic: Observations and Suggestions	Journal of Instructional Pedagogies	• Remote-learning fatigue
Zhdanov *et al.,* [20]	Analysis of Learning Losses of Students During the Covid-19 Pandemic	Contemporary Educational Technology	• Significant information loss
Alsayed and Althaqafi [21]	Online Learning During the Covid-19 Pandemic: Benefits and Challenges for EFL Students	International Education Studies	• Efficient access to online resources • The capability to record sessions and meetings • Effective information retrieval • Technical problems
Haningsih and Rohmi [22]	The pattern of hybrid learning to maintain learning effectiveness at the higher education level post-Covid-19 pandemic	European Journal of Educational Research	• Enhanced students' knowledge • Less effective in enhancing their social skills and communication abilities
Limniou *et al.,* [23]	Learning, Student Digital Capabilities and Academic Performance over the Covid-19 Pandemic	Education Sciences	• High levels of self-control and computer proficiency allowed some students to maintain their attention and engagement during the pandemic
Ozfidan *et al.,* [24]	Student Perspectives of Online Teaching and Learning During the Covid-19 Pandemic	Online Learning	• Encouraging learners • Having efficient communication • Meeting the needs of pupils • Giving users access to a variety of content • Providing a structured course curriculum • Offering a variety of resources • Giving illuminating criticism • Leading insightful dialogues
Alkhudiry and Alahdal [25]	The Role of Online Learning During and Post Covid-19: A Case of Psycho-Social Study	TESOL International Journal	• Enhanced feelings of intrinsic motivation
Trask *et al.,* [26]	Using appreciative approaches to explore New Zealand youth perspectives of online learning support during Covid-19	Asian Journal of Distance Education	• Students have not been performing well academically, and some have struggled to stay motivated and time-focused

4. Conclusions

In this study, 23 publications were found to be pertinent to the research goals after being rigorously evaluated and thematically analyzed across three databases: Scopus, ERIC, and Mendeley. The thematic analysis that was undertaken indicated three (3) major themes for online learning: online platform, learner profile, and learning experience. It can be strongly argued that using the knowledge of these thematic elements of online learning can guide teaching practitioners, particularly teachers and instructors, to develop and implement effective online learning strategies for their students of all educational levels. In conclusion, the use of such learner profile can support the continuation of student learning even after the end of Covid-19 pandemic.

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