Proceedings of the 2nd International Conference on Social Psychology and Humanity Studies
DOI: 10.54254/2753-7048/38/20240587

Bridging the Digital Divide in Mental Health: An Innovation Diffusion-Based Framework for Advancing Digital Literacy among Professionals

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Abstract: The heightened prominence of digital literacy, as emphasized in the United Nations Sustainable Development Goals (SDGs), signifies a collective effort to address the pressing need for reducing the digital divide. Digital literacy involves adept utilization of information and communication technologies, encompassing both technical expertise and cognitive skills. This research focuses on identifying optimal conceptual approaches and measurement standards for digital literacy, concurrently developing an evidence-based tool to elucidate the essential digital literacy prerequisites for mental health professionals advocating mobile mental health applications. The study draws theoretical inspiration from the Innovation Diffusion Theory (IDT), guiding the formulation of a foundational framework for digital literacy prerequisites among mental health professionals and the strategic crafting of diffusion strategies. The methodological approach entails a meticulous literature review, with a specific emphasis on the Google Scholar database, to identify best practices for evaluating digital literacy among mental health professionals. Four frameworks were deliberately chosen for comprehensive analysis, unraveling associated methodologies and measurement standards. The insights derived from this analysis inform the development of an evaluation framework aligned with the five stages of the Innovation Diffusion Theory: awareness, interest, evaluation, trial, and adoption. The G20 Digital Literacy simplified model, among the selected frameworks, serves as the cornerstone for the developed evaluation framework. This model intricately delineates the digital literacy and competencies required for mental health professionals at various stages of endorsing mobile mental health applications. Importantly, it adopts a professional-centric model, deviating from conventional approaches, providing a unique perspective on the pivotal role professionals play in propagating and endorsing digital applications.

Keywords: Digital literacy, Innovation Diffusion Theory (IDT), Mental health professionals, Mobile mental health applications, G20 Digital Literacy model

1. Introduction

The Global Observatory for eHealth (GOe) of the World Health Organization (WHO) delineates mHealth as the convergence of medical and public health practices leveraging mobile devices [1]. Given the ubiquity of mobile phone ownership, encompassing approximately 2.5 billion individuals

DOI: 10.54254/2753-7048/38/20240587

worldwide, mHealth stands poised to furnish unparalleled access to specialized clinical diagnostics and treatment guidance [2]. Notably, within this landscape, the emergence of mobile applications concentrated on mental health assumes a pivotal developmental trajectory. These applications serve as invaluable assets, particularly for individuals grappling with mental health afflictions who may eschew traditional healthcare avenues due to sentiments of shame or apprehension. Nevertheless, it is imperative to acknowledge that the adoption of mobile applications in the realm of mental health and therapy lags behind other health-centric counterparts [3]. Consequently, mental health professionals emerge as instrumental figures in this domain, prompting a critical research inquiry into how these professionals can efficaciously contribute to steering mental health mHealth applications from their nascent stages to widespread embrace.

Inherent to the digital milieu, the utilization of mHealth mandates a certain degree of digital literacy among its end-users. The recent United Nations report on Sustainable Development Goals (SDGs) underscores the imperative of augmenting digital literacy through educational initiatives and lifelong learning to navigate the perpetual evolution of the digital landscape [4]. Thus, this research undertakes the foundational query: How can this study delineate a framework for the digital literacy of mental health professionals? Recognizing mHealth as an innovative entity, the investigation incorporates the tenets of the Innovation Diffusion Theory (IDT) into the analysis of its dissemination pathways. This integration seeks to explicitly demarcate the multifaceted components of digital literacy essential for mental health professionals to meaningfully contribute to the proliferation and assimilation of mental health mHealth applications. By adopting this methodological approach, the study aims to cultivate a nuanced comprehension of the indispensable roles and requisite skills of mental health professionals in advancing the cause of mHealth applications within the sphere of mental health.

2. Literature Review

This paper aims to conduct a thorough examination of pertinent research and theoretical frameworks through a comprehensive literature review. This approach serves to establish the contextual underpinnings of the present study and discern lacunae within the existing research landscape. The initial section of the paper will furnish an introduction to mental health mobile applications, succeeded by a focused discourse on digital literacy. Within this discourse, specific emphasis will be placed on delineating the deficiencies in the digital literacy skill set of mental health professionals, particularly in the context of advancing mental health mobile applications. Subsequently, the study will delve into the Innovation Diffusion Theory, elucidating the theoretical framework. Noteworthy is the pioneering aspect of this investigation, which marks the first instance of integrating the Innovation Diffusion Theory with the realm of digital literacy. In the final section, the paper will explore the synergistic integration of these two pivotal concepts, addressing extant theoretical lacunae. This synthesis endeavors to contribute to the theoretical framework surrounding the effective involvement of mental health professionals in promoting and facilitating the widespread acceptance of mental health mobile applications. The delineation of this structured approach will enhance the scholarly discourse on the intersection of digital literacy and innovation diffusion within the specialized context of mental health applications.

2.1. Mental Health Mobile Application

Mobile health applications, commonly referred to as mobile apps, are software programs specifically designed for use on smartphones and tablet devices [5]. These apps are created with the primary aim of providing content and functionalities intended to promote well-being and health. Within the field of mobile health applications, there exists a distinct category known as mental health apps, which are

DOI: 10.54254/2753-7048/38/20240587

tailored to support various aspects of mental well-being [6]. These include functions related to assessment, diagnosis, treatment, and management of mental health concerns. Furthermore, these applications serve as tools for promoting overall health and mindfulness, offering features such as guided meditation and relaxation exercises.

Certain mental health apps go beyond their traditional role of providing general health support, extending their capabilities to include diagnostic functions. These diagnostic features play a crucial role in evaluating and diagnosing an individual's mental health condition. For instance, the work of Robert and colleagues exemplifies the application of computer-adaptive diagnostic screening and testing methods to detect the presence and severity of mental health disorders such as depression, anxiety, and mania. This approach effectively calibrates the information contained within extensive repositories comprising hundreds of symptom items. It further allows for the precise extraction of information from these extensive repositories using adaptive management involving a subset of symptom items [7]. Moreover, these applications offer valuable assistance tailored to specific mental health conditions by providing resources for treatment and therapeutic support to users.

A particularly noteworthy digital tool is SPARX [8], developed by Theresa Fleming and her team, which has garnered significant support for its role in addressing mental health issues. This program employs a format reminiscent of a gaming experience, comprising seven modules, each requiring approximately 30 minutes to complete. These modules are designed to deliver core content rooted in cognitive behavioral therapy (CBT). User feedback underscores the appeal of the SPARX format, including the sensation of personalized guidance, the captivating narrative structure, and the sense of exploration it fosters, all while providing users with a sense of control. Applications similar to SPARX have the potential to significantly enhance mental health care and disease prevention. However, their successful adoption and widespread use depend on various factors, with one key factor being the digital literacy of mental health professionals. In particular, the enhancement of digital literacy among counselor educators and professional associations plays a critical role in facilitating the effective dissemination of innovative mental health mobile apps throughout the entire mental health care system [9].

2.2. Digital Literacy

Digital literacy is a concept initially proposed by Paul Gilster in his eponymous work [10]. Gilster defined digital literacy as the capacity of individuals to comprehend and effectively utilize information from various digital sources, rather than simply enumerating specific abilities, competencies, or skills. He underscored that digital literacy embodies an individual's ability to navigate the information landscape in the digital age, representing a comprehensive skillset beyond mere proficiency in digital tools.

In recent years, digital literacy has garnered increasing attention and research within the field of healthcare. For instance, Slevin et al. have pointed out the significant challenges faced by healthcare professionals in managing conditions like Chronic Obstructive Pulmonary Disease (COPD), often experiencing a sense of powerlessness and frustration in their treatment of patients [11]. This underscores the critical importance of digital literacy, particularly in the realm of mental health. Tracy et al. argue that understanding various aspects of digital psychiatry has become an essential contemporary requirement for clinicians and healthcare organizations [12]. This entails not only a profound comprehension of digital tools and technologies but also the proficient application of these resources to effectively promote and leverage mental health mobile applications.

However, the existing body of literature has distinctly highlighted a notable research gap concerning the precise components of digital literacy when evaluating mental health professionals. Notably, Tyler et al. [13] introduced the "Seven Abilities of technically literate health professionals" framework, serving as the foundation for the analytical framework in this study. Furthermore, a dearth

DOI: 10.54254/2753-7048/38/20240587

of research explores the implications of this digital literacy on their efficacy in promoting mental health mobile applications. This knowledge void is of paramount significance in contemporary digital healthcare practices, as digital literacy plays a pivotal role in ensuring that professionals can adeptly leverage new technological tools.

2.3. Innovation Diffusion Theory

The Innovation Diffusion Theory (IDT), initially introduced by Everett Rogers in his seminal work "Diffusion of Innovations" [14], has since been further refined. According to Rogers' definition, innovation refers to ideas, practices, or objects that individuals or adopting entities perceive as novel. The core focus of the Innovation Diffusion Theory is to understand how, why, and at what rate these novel ideas and technologies spread within social systems [15]. Furthermore, Rogers and Shoemaker [14] identified five key stages in the diffusion process, which include awareness, interests, evaluation, trial, and adoption (refer to Figure 1). The theory suggests that when an innovation is in its early stages, its acceptance is low, and the number of users is limited, leading to a relatively slow diffusion process. However, when the proportion of users reaches a critical threshold, the innovation diffusion process accelerates rapidly. The adoption of new innovations is influenced by factors such as interpersonal relationships and regular exposure to mass communication.

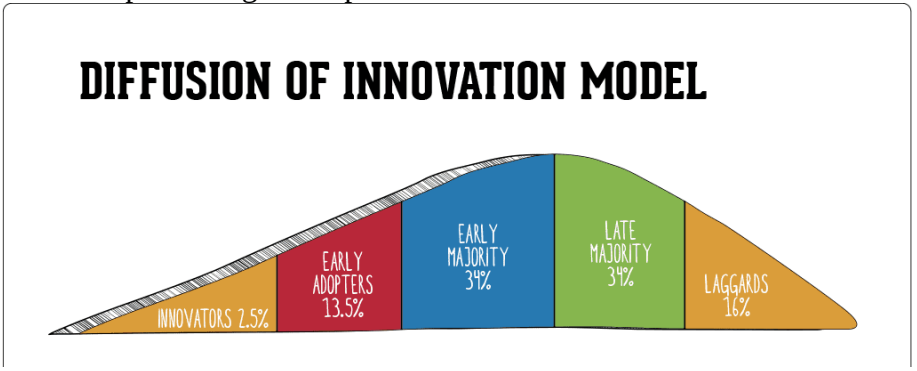

Figure 1: Rogers' Innovation Diffusion Model [14]

In recent years, IDT has found extensive applications in researching the adoption and dissemination of new technologies. For example, Yi-Hsuan Lee and colleagues incorporated IDT with the Technology Acceptance Model (TAM) to investigate the factors shaping business employees' behavioral intentions towards the utilization of e-learning systems, leading to the development of an extended TAM [16].

However, within the evolving landscape of mental health, characterized by the rapid proliferation of mHealth and concurrent advancements in healthcare systems, a discernible lacuna in research becomes evident. Specifically, there exists a dearth of investigations that amalgamate the Innovation Diffusion Theory (IDT) with the intricate concept of digital literacy. This conspicuous theoretical gap highlights an under-explored terrain where limited attention has been directed towards elucidating the manner in which mental health professionals leverage digital literacy in the advocacy of mobile mental health applications, and correspondingly, how these applications are shaped by the tenets of the Innovation Diffusion Theory. Consequently, the integration of these two foundational concepts emerges as imperative, promising the formulation of a bespoke digital literacy framework tailored explicitly for mental health professionals. This synthesis not only addresses the identified theoretical gap but also delves into the nuanced dynamics governing the adoption processes of mental health applications. The amalgamation of digital literacy and Innovation Diffusion Theory in this study assumes paramount significance as it has the potential to engender the creation of a more

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comprehensive theoretical framework, offering practical guidance for the effective promotion of mental health applications. By doing so, this research endeavors to equip mental health technology professionals with enhanced capabilities to proficiently advocate for and utilize new digital tools, thereby augmenting the overall delivery of psychological healthcare and treatment to patients. In effect, the envisioned outcome is an elevation in the proficiency and efficacy of mental health professionals in navigating the contemporary intersection of digital technologies and psychological healthcare.

3. Methodology

3.1. Search Strategy

This research executed an extensive literature search within the Google Scholar database, endeavoring to discern pertinent literature germane to the formulation of a digital literacy measurement framework. Concurrently, the exploration aimed to identify reports delineating noteworthy international examples of existing frameworks. The search strategy adopted encompassed a spectrum of keywords, ranging from broad terms such as "evaluation" and "digital literacy" to more specific terms like "mental health professionals" and "mental health mobile applications." The deliberate inclusion of these specific terms was paramount, given the nuanced nature of digital literacy within the domains of mental health and mobile healthcare applications, where it is often characterized by individualized levels rather than a universal progression. Notably, "mHealth" was employed as a strategic proxy term, symbolizing mobile healthcare applications, in recognition of the intricate relationship between digital literacy and the maturation of these applications. The literature search process entailed meticulous filtering for relevance to mental health and professionals. It is noteworthy that the research design intentionally embraced a broad search strategy to comprehensively capture all evaluation literature pertaining to digital maturity, whether confined to a specific healthcare setting or spanning diverse healthcare pathways. The temporal scope of the search spanned from 2008 to 2023, encapsulating a timeframe conducive to encapsulating the evolution of digital literacy within the designated context. Four distinct Boolean search strings were deployed in this pursuit: (1) "evaluation" and "digital literacy," (2) "mental health professionals" and "diffusion," (3) "mHealth" and "Innovation Diffusion Theory," and (4) "mental health professionals" and "digital literacy." This deliberate and systematic approach to literature retrieval forms the methodological backbone of this research, ensuring a comprehensive exploration of the intersection between digital literacy, mental health professionals, and the diffusion of innovative mHealth applications.

3.2. Review Strategy

The search strategy yielded over 100 papers in order to identify the most suitable digital literacy framework. However, the majority of these papers were either irrelevant to the objectives of this review or did not contribute to a deeper understanding of the digital literacy framework. The inclusion criteria explicitly specified that papers must be relevant to mental health professionals and mHealth, with a specific emphasis on the components of the digital literacy framework, such as information or computer literacy. Papers were excluded if they solely discussed experiences or outcomes related to digital literacy without focusing on the framework itself. Additionally, papers that solely reported evaluation results without providing methodological insights were also excluded. The figure below (Figure 2) presents the four digital literacy frameworks that were selected after a thorough literature review and screening, along with their descriptions and contents.

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Literature Search & Review Strategy					
	Source	Framework	Description	Content	Why/Why not Choose
1	Google Scholar	A Global Framework to Measure Digital Literacy (UNESCO)	The United Nations Educational, Scientific and Cultural Organization (UNESCO) has developed the Digital Literacy Global Framework (DLGF) by leveraging the European Union Commission's Citizen Digital Competence Framework, known as DigComp 2.0.	1. Digital literacy involves fundamental skills essential for working with digital media and information processing, enabling active participation in knowledge-sharing through social networks. 2. It encompasses a broad range of professional computer skills and necessitates an awareness of cognitive and ethical considerations. 3. Digital literacy empowers individuals to assess, synthesize, and generate new information and encourages responsible and innovative technology application. 4. It assumes the ability to discern appropriateness and extract meaning while utilizing digital technologies. 5. It also includes practical competencies such as file management, spreadsheet handling, and computer programming.	There is an excessive focus on the technical aspects of comprehension and proficiency, with little to no coverage of matters pertaining to promotion and dissemination.
2	Google Scholar	G20 Digital Literacy simplified model	The G20 consortium's initial emphasis revolved around the issue of the digital divide and how to mitigate it across nations by means of infrastructure development, digital commerce, and financial inclusion. Subsequently, a shift in focus transpired, directing attention toward narrowing this disparity through the lens of digital literacy. Simultaneously, it became evident that enhancing infrastructure alone would not suffice in bridging the gap, necessitating a comprehensive enhancement of digital skills. One hurdle encountered in this endeavor pertained to the delineation and quantification of digital literacy. To address this challenge, the G20 scrutinized the extensive literature available to identify the most suitable digital literacy framework.	It includes five dimensions and three perspectives. 1. Five dimensions: information, computer, media, communication and technology. 2. Three perspectives: cognitive, technical, ethical.	1. Richness in dimensions: The selection of five dimensions, including information, skills, and promotion, comprehensively evaluates the required digital literacy, which is more aligned with the characteristics of the target population in this study. 2. Clarity in perspectives: By considering the cognitive, technical, and ethical aspects, specific requirements for the abilities needed in each of the five dimensions are proposed, thereby enhancing the clarity and feasibility of the digital literacy framework.
3	Google Scholar	European Digital Competence Framework	The European Union aims to establish secure digital environments and services, ensure fair competition in digital markets, and achieve digital sovereignty. The European Digital Agenda encompasses three primary objectives: 1) enhancing accessibility to digital goods and services for consumers and businesses throughout Europe; 2) fostering an enabling environment for the growth of digital networks and services; and 3) maximizing the economic growth potential of the digital economy (European Parliament).	The entire framework comprises five levels, all of which provide descriptions and requirements for digital competence. From a holistic perspective to detailed aspects, it delineates the mastery of various skills, such as managing data, information, and digital content under the umbrella of information and data literacy.	The framework solely encompasses the requirements for digital competence, but it lacks a comprehensive exploration of the understanding and mastery of a specific digital competence from multiple perspectives. For instance, it does not elaborate on the cognitive aspects that need to be mastered or the specific skills required at the technical level.
4	Google Scholar	Global standard for digital literacy, skills and readiness of the Coalition for Digital Intelligence	The Coalition for Digital Intelligence is a collaborative platform comprising the World Economic Forum, OECD, IEEE Standards Association, and DQ Institute. In 2019, this coalition put forth a global standard for measuring digital intelligence, known as DQ, which encompasses digital literacy, skills, and readiness.	The framework consists of eight major categories, with each category encompassing three items. It represents a comprehensive collection of technical, cognitive, metacognitive, and socio-emotional competencies that empower individuals to navigate the challenges and capitalize on the opportunities presented by the digital world (DQ Institute).	Some aspects of the framework, such as digital rights and digital EQ, may be less relevant to the promotion of mHealth among mental health professionals in this particular study.

Figure 2: Literature search and review strategy

3.3. Analysis and Framework Development

The examination of identified papers in this study aimed at elucidating their contributions to the construction of a digital literacy framework. This entailed a meticulous analysis to discern insights into the assessment of digital literacy, the factors deemed essential for measurement, and the optimal timing for conducting assessments. Drawing upon the outcomes derived from the comprehensive literature search and review, the research proceeded to synthesize these insights into a coherent framework. Throughout the analytical process, the study distilled five overarching themes, aligning with the five stages delineated in the Innovation Diffusion Theory. These themes were subsequently translated into distinct levels within the framework, with each level incorporating various facets informed by the G20 Digital Literacy simplified model [17]. A noteworthy departure from existing digital literacy measurement methodologies is the focal point of the resulting framework, which revolves around mental health professionals. This framework systematically gauges each level at significant junctures along the innovation diffusion pathway. This methodological innovation stands in contrast to extant digital literacy measurement approaches, which are often tethered to service-specific objectives, thereby constraining their efficacy in fostering comprehensive enhancements across the entirety of the innovation diffusion pathway. The resultant framework, emerging from the integration of insights garnered from both the Innovation Diffusion Theory and the G20 Digital Literacy model, holds promise in providing a nuanced and holistic approach to the assessment and augmentation of digital literacy among mental health professionals.

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4. Result

In the course of this research, a meticulous analysis of findings extracted from 19 identified papers in the literature search was undertaken. Ultimately, the decision was made to ground the research framework (Table 1) on the G20 Digital Literacy Simplified Model [18]. This selection was motivated by the model's alignment with the requisite five stages outlined by the Innovation Diffusion Theory (IDT), thereby harmonizing with the foundational context essential for the digital literacy concept. The categorization of these papers into five themes, reflective of the five stages of IDT—namely Awareness, Interest, Evaluation, Trial, and Adoption—was pivotal in elucidating the varying degrees of emphasis accorded to each stage in the extant literature. Subsequently, in the forthcoming discussion, an in-depth exploration of these themes will be conducted, accompanied by a detailed presentation of pertinent indicators gleaned from the literature. An awareness of this contextual background proves instrumental in informing the development of the evaluation framework. It is noteworthy that while these themes encompass diverse dimensions, a significant observation is the prevalent absence of a mental health professional-centric perspective in the majority of the examined papers. Instead, the focus often gravitated towards other groups such as teachers and healthcare personnel. This implies that the evaluations were predominantly confined to specific environments, with only a limited acknowledgment of the unique considerations pertinent to mental health professionals. Despite occasional recognition of the significance of specific indicators for healthcare professionals, a conspicuous void exists in discussions addressing how evaluations encompass success across the entirety of the innovation diffusion pathway. This underscores the critical gap in the literature that this research seeks to address through the development of a comprehensive evaluation framework tailored specifically to the digital literacy needs of mental health professionals.

Table 1: G20 Digital Literacy simplified model

Dimension	**Perspective**		
	Cognitive	**Technical**	**Ethical**
Information (Digital Content)	Synthesis	Access, Usage	Appropriate Usage
Computer (Hardware and software)	Evaluate	Usage	Appropriate Usage
Media (Text, sound, image, video, social)	Critique, Create	Navigation	Assess truthfulness
Communication (non-linear interaction)	Critique, Create	Develop and use content	Appropriate Usage
Technology (Tools for life situations)	Invent, evaluate tools	Usage	Appropriate usage

Consequently, this study will leverage the identified five stages as the foundational framework for conceptualizing the digital literacy of mental health professionals. The intent is to scrutinize how mental health professionals traverse these stages, encompassing their comprehension of the significance of digital literacy, generation of interest, assessment of practical value, experimentation, and ultimately, adoption and promotion of the use of mental health mobile applications. The pivotal factors in this dynamic process include information, computing, media, communication, and

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technology. The synthesized framework is visually represented in Figure 3 below. By anchoring this framework within the context of the Innovation Diffusion Theory, this research endeavors to gain a deeper understanding and facilitate the augmentation and application of digital literacy among mental health professionals. This strategic alignment with the Innovation Diffusion Theory serves as a guiding paradigm to comprehensively navigate the challenges presented by the digital environment. Furthermore, it is anticipated that this holistic theoretical framework will not only contribute to the professional growth and efficacy of mental health practitioners but also catalyze innovation and development within the broader field. This strategic integration of theoretical underpinnings is positioned to propel the sustainable advancement of the field, aligning with the imperatives of contemporary digital landscapes.

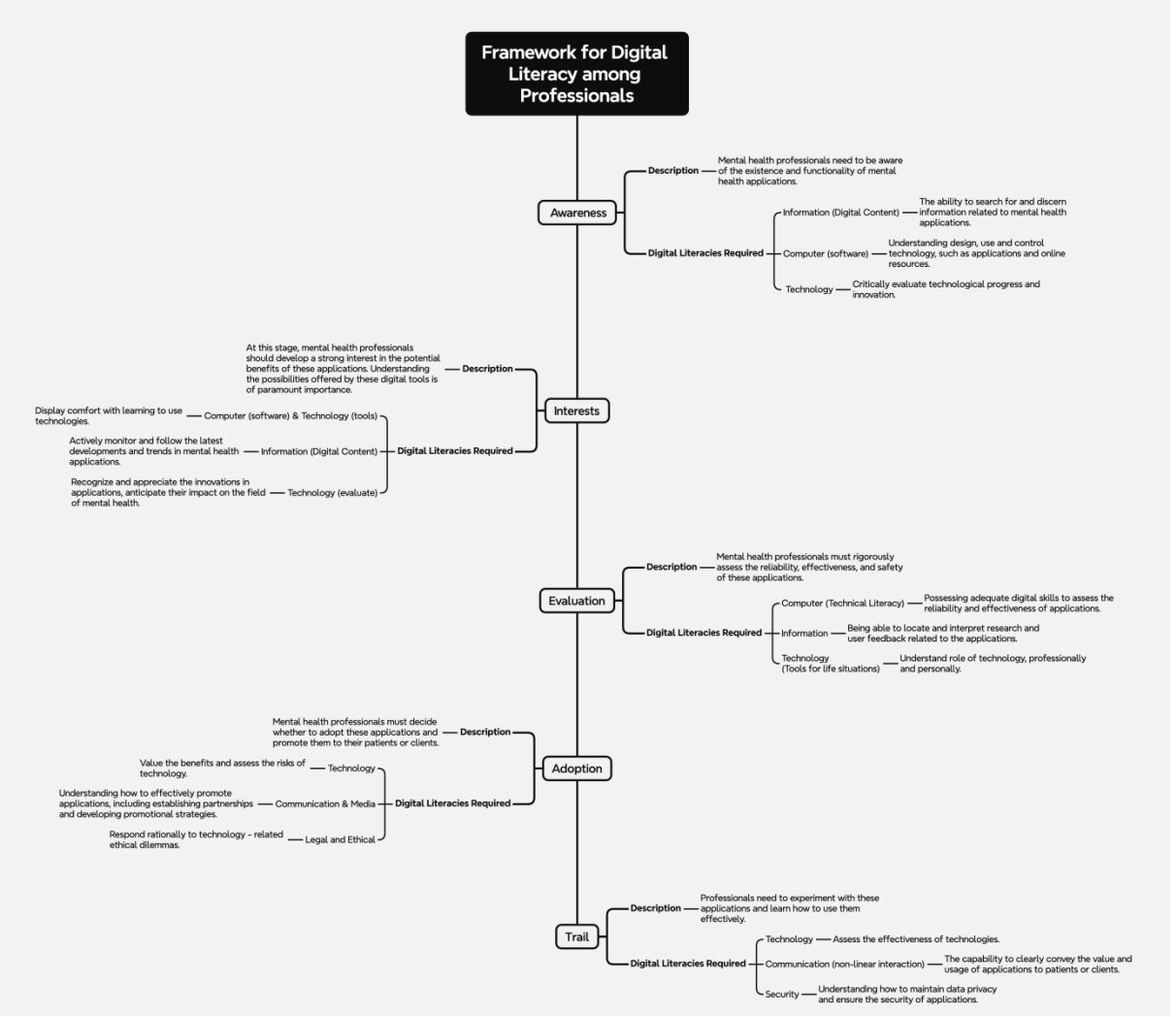

Figure 3: A framework of Digital literacy prerequisites for mental health professionals

4.1. Awareness

In this stage, mental health professionals need to possess digital literacy (computer skills), which includes an understanding of basic digital concepts such as applications and online resources, to become aware of the existence and functionality of mental health applications. Simultaneously, they also need to know how to seek and discern information related to mental health applications, encompassing aspects of information literacy, to ensure that they can access accurate and relevant resources. Furthermore, mental health professionals should have scientific literacy to comprehend the

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concepts and theoretical foundations of these applications, enabling them to better assess their practical applications and benefits. This entails having fundamental scientific thinking skills to analyze and evaluate the scientific basis of these applications. Without these competencies in digital, information, and scientific literacy, there is a possibility of overlooking the potential significance of these applications, underscoring the importance of this stage within their professional domain.

4.2. Interests

In this stage, mental health professionals should cultivate a strong interest in the potential benefits of these applications, emphasizing the crucial understanding of the possibilities offered by these digital tools. The role of technological literacy becomes paramount in this process, as it enables professionals to gain in-depth insights into these applications and digital tools, recognizing their value and significance. Additionally, digital literacy is of vital importance at this stage. Mental health professionals must further deepen their comprehension of applications and digital tools to better grasp their potential benefits. Furthermore, information literacy is also essential. Professionals should actively monitor and stay updated on the latest developments and trends in mental health applications, ensuring they keep pace with this rapidly evolving field. Moreover, innovative literacy is indispensable as it empowers them to identify and appreciate the innovations within these applications and anticipate their potential impact on the field of mental health.

4.3. Evaluation

Mental health professionals must rigorously assess these applications for their reliability, effectiveness, and safety, adhering to the highest standards. In this evaluation process, the role of technological literacy is of paramount importance, as it equips professionals with a profound understanding of digital skills, enabling them to accurately evaluate the quality and practicality of these tools. Technological literacy provides them with the capability to judge the reliability and effectiveness of applications, ensuring that these tools not only adhere to rational standards but also meet professional criteria. Additionally, information literacy is indispensable, as mental health professionals need to be able to find and interpret research and user feedback related to these applications. Understanding the actual effects of applications and user experiences is a critical component of assessing their effectiveness. Lastly, data literacy is equally vital, as it allows professionals to comprehend how to analyze the data generated by these applications to evaluate their effectiveness. Proficiency in data analysis aids in revealing the performance and potential issues of applications in real-world applications.

4.4. Trail

Professionals need to possess technological literacy as they explore these applications and learn how to use them effectively, as it is a crucial element in ensuring their correct and efficient utilization. Technological literacy enables them to operate applications, providing support and training to patients or clients, ensuring they can fully benefit from these digital tools. In addition to technological literacy, communication literacy is equally vital. Professionals must be capable of clearly conveying the value and usage methods of these applications to patients or clients. This involves effective communication skills, allowing patients or clients to comprehend and use these applications rationally, thus enhancing their mental well-being. Furthermore, security literacy is indispensable, as professionals need to understand how to maintain data privacy and ensure the security of the applications. This is critical in protecting patient or client information while guaranteeing that these applications do not adversely affect their privacy rights.

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4.5. Adoption

Mental health professionals play a critical role in deciding whether to adopt these applications and promote them to their patients or clients. This decision involves multiple factors, including innovation literacy, meaning that professionals must be able to assess the potential benefits of these applications for patients or clients and determine whether to adopt them. They need to scrutinize the characteristics of the applications to ensure they can provide effective support to patients or clients. Additionally, promotional literacy (media usage and information integration promotion capabilities) is equally vital, as professionals must understand how to effectively promote these applications. This involves establishing partnerships, devising promotional strategies, and ensuring that patients or clients are aware of the potential of these digital tools. Promotion involves a comprehensive promotional plan to ensure widespread acceptance of these applications. Finally, legal and ethical literacy is equally indispensable. Professionals must comply with legal regulations and ethical guidelines, ensuring that they do not violate the privacy rights and interests of patients or clients when promoting applications. This entails understanding relevant laws and ethical guidelines and ensuring the legality and ethics of promotional activities.

5. Discussion

5.1. Strategies Proposed

The articulated framework above aspires to furnish a comprehensive model delineating the digital literacy of mental health professionals, positioning them as central figures within the digital landscape. The primary objective is to encapsulate the diffusion trajectory of mobile mental health applications and explicate how mental health professionals employ distinct levels of digital literacy across diverse stages of dissemination. This, in turn, substantively impacts the adoption and advocacy of these applications within their professional domain. Derived from the multifaceted digital skills and literacies outlined within the framework, this study proposes a series of strategic interventions, as illustrated in Figure 4. These strategies are conceived to empower mental health professionals with the requisite digital competencies and insights to navigate the intricacies of the digital environment. Through a targeted implementation of these strategies, mental health professionals can not only enhance their digital literacy but also catalyze a more robust adoption and promotion of mobile mental health applications. The symbiotic relationship between the proposed strategies and the digital literacy framework is poised to fortify the role of mental health professionals as key catalysts in the integration and advancement of digital technologies within their specialized domain.

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Strategies		
Information (Digital Content)	Enhancement of Cognitive Skills	Encourage professionals to develop comprehensive cognitive skills in the field of digital content. This includes the comprehensive evaluation of information from different sources to ensure the accuracy and credibility of the provided information. Cultivate critical thinking among professionals so that they can distinguish high-quality digital content.
	Technical Utilization	Provide training and resources to assist professionals in effectively accessing and using digital content. This may involve ensuring their proficiency in using professional databases, search engines, and other online tools to access necessary information and resources.
	Continuous Learning	Encourage professionals to actively engage in lifelong learning to keep abreast of the latest developments in the field of digital content. This may include participation in webinars, training courses, and academic conferences to maintain their level of digital literacy.
Computer (hardware and software)	Training in Hardware and Software Usage	Provide professionals with training regarding computer hardware and software to ensure they have a comprehensive understanding of and proficiency in using various types of computer devices and applications. This includes operating systems, office software, and specialized software tools relevant to their field.
	Cybersecurity Education	Strengthen professionals' awareness of cybersecurity and educate them on how to effectively protect their electronic devices and digital data. This training encompasses aspects such as password management, protection against malicious software, and data backup procedures.
	Assessment and Selection of Software Tools	Assist professionals in understanding how to assess and select appropriate software tools to meet their specific professional needs. This includes gaining knowledge about the functionalities, feasibility, and performance of different applications.
Media (text, sound, image, video, social)	Multimedia Content Comprehension and Evaluation	Cultivate professionals' skills in understanding and evaluating multimedia content, including text, audio, images, and videos. This involves training them to discern false information, media biases, and inaccuracies.
	Social Media Management	Provide training on social media platforms to help professionals effectively manage and engage on social media. This includes privacy settings, best practices for information sharing, and strategies for handling negative interactions.
	Application of Digital Media Tools	Teach professionals how to use digital media tools to promote professional development, information sharing, and patient education. This may include creating multimedia educational materials, digital therapeutic tools, and online support groups.
Communication (non-linear interaction)	Teletherapy Skills	Training professionals to provide mental health counseling and therapy remotely, including skills related to privacy protection, effective communication, trust-building, and handling technical issues.
	Online Collaboration and Teamwork	Encouraging professionals to use digital tools for online collaboration and teamwork. Training them to use collaboration platforms, cloud storage, online document editing, and other tools to collaborate more effectively with colleagues.
	Digital Communication Ethics	Emphasizing the ethical principles for professionals in digital communication, including protecting patient privacy, appropriate online behavior, and information security. Through training, ensuring that professionals' digital communication adheres to ethical standards.
Technology (tools for life situations)	Digital Tool Training	Provide professionals with the necessary training in digital tools to meet their professional needs in various contexts. This includes training them on how to use specific applications, devices, or software to improve patient care, record cases, and manage daily tasks.
	Customized Digital Solutions	Encourage professionals to understand and utilize customized digital solutions to meet their specific life and work requirements. This may involve using specific applications or tools to enhance work efficiency and meet patient needs.
	Digital Technology Integration	Encourage professionals to integrate digital technologies into their daily life and work contexts. This includes training them on better management of digital tools, data, and information to enhance work efficiency and patient care.

Figure 4: Strategies Proposed

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5.2. Limitations

It is unlikely that Google Scholar excluded any relevant sources; however, it is possible to supplement the results of the literature review by searching in other databases. Moreover, it is important to consider that some relevant resources may be found in the less easily identifiable gray literature. Additionally, despite expanding the search terms to be as inclusive as possible, there may still be a bias towards the application of digital literacy within the five stages of Innovation Diffusion Theory, particularly in the context of information exchange. It is worth noting that this framework is specifically tailored to digital literacy for mental health professionals, which limits its applicability to a narrower audience. Furthermore, the framework primarily focuses on the dissemination of mobile mental health applications and may not comprehensively consider other modes of dissemination, thus having certain limitations.

6. Future Directions

While the developed framework provides a valuable contribution to understanding digital literacy among mental health professionals and its application in the dissemination of mobile mental health applications, there are several avenues for future research and development.

6.1. Assessment of the Framework

Conducting empirical studies to evaluate the framework's effectiveness and usability would be an essential next step. This could involve testing the framework in real-world scenarios to validate its practicality and potential impact on enhancing digital literacy among healthcare professionals.

6.2. Expansion to Diverse Healthcare Professionals

To enhance the applicability of the framework, future research can explore extending it to various healthcare professionals beyond mental health specialists. This extension would enable a broader audience to benefit from improved digital literacy specific to their respective domains, leading to more effective healthcare delivery.

6.3. Digital Maturity Across the Patient Journey

Expanding the framework's focus to assess digital maturity throughout the entire patient journey, rather than just professional practice, can provide a more comprehensive understanding of how digital literacy impacts healthcare outcomes. This broader perspective could lead to improved patient care and experiences.

7. Conclusion

In the realm of digital literacy, as a comprehensive advancement geared towards specific domains with a primary focus on particular groups, this concept has seen substantial practical implementation in various fields, such as the education sector, where assessment frameworks primarily revolve around educators. However, within the domains of mental health and the promotion of mobile mental health applications, the progress of digital literacy is predominantly assessed through the evaluation of individual services or environmental performances. This approach not only falls short of providing a comprehensive overview of digital literacy but, more critically, it fails to indicate whether novel digital applications can offer assistance and influence at various critical junctures in the innovative dissemination pathway.

DOI: 10.54254/2753-7048/38/20240587

In order to facilitate the promotion of digital technology advancements in the field of mental health and, consequently, promote the interests of mental health professionals in health coordination and information enhancement, digital literacy needs to be conceptualized as an industry-wide, professional-centric metric. This study draws on existing theories regarding the measurement of the various components of digital literacy, best practices for collecting indicators of its components, and examples of existing assessment frameworks to propose a contemporary framework. This framework spans five critical levels of digital literacy along the dissemination pathway of mobile mental health applications in the field of mental health, elucidating how digital literacy can be most meaningfully enhanced.

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