International Journal of Religion
2024
Volume: 5| Number 9 | pp. 717 – 732
ISSN: 2633-352X (Print) | ISSN: 2633-3538 (Online)
ijor.co.uk
DOI: https://doi.org/10.61707/652zk290

A Thematic Analysis on the Factors Influencing Lifelong Learning among Medical Students in Jiangxi Province, China

Lei Zhao[1], Man Jiang[2] and Hu Gao[3]

Abstract

The value of lifelong learning is indispensable in the field of medical education. This research aims to explore the factors that influence medical students' lifelong learning from the perspective of medical teachers. A total of ten front-line instructors who possessed substantial teaching experience in medical institutions located in Jiangxi Province, China, were chosen for individual semi-structured interviews through the use of purposive sampling. This study is guided by theories of adult learning, and thematic analysis is utilized to deduce the factors impacting medical students' lifelong learning. Identified factors include self-directed learning capabilities, learning habits, the acquisition of knowledge and skills, teachers' clinical experience, clinical practice, interdisciplinary learning, career planning, readiness for professional roles, information literacy, personal needs, and societal needs. Notably, self-directed learning capabilities, information literacy, and personal needs are crucial in influencing the lifelong learning of medical students.

Keywords: *Lifelong Learning, Andragogy, Thematic Analysis*

INTRODUCTION

As global dynamics continually shift, it is imperative for individuals to embrace lifelong learning to adapt effectively (Ruodi et al., 2023). Physicians are often confronted with deficiencies in their knowledge and abilities within the ever-changing healthcare environment (Wiljer et al., 2018). Lifelong learning is increasingly recognized as a critical professional competency for medical students and healthcare practitioners (Marzo, 2018; Babenko et al., 2019). At present, international and domestic educational research agendas place a premium on fostering lifelong learning competencies among medical students (Berkhout et al., 2018; Ramamurthy et al., 2021). Despite its prominence in academic discourse, there is a notable dearth of empirical research addressing its practical implementation (Nayak et al., 2020). Furthermore, Thwe and Kalman (2024) argue in favour of broadening the scope of lifelong learning research in Asia so as to improve the applicability of results and address the specific requirements of educators and students in the region. Investigating the factors that influence medical students' commitment to lifelong learning is crucial for the advancement of medical education standards. Thus, this study focuses on identifying these factors among medical students in Jiangxi Province, China, with the aim of fostering a culture of continuous learning.

Undergraduate medical students are considered adult learners (Das et al., 2020). To facilitate learner progression and professional growth, it is critical to integrate exemplary adult education practices into medical instruction (Reed et al., 2014). Adult learning theory, as defined by Knowles (1984), provides a pedagogical framework that is tailored to the unique requirements of adult learners. The pertinence of adult learning theory in medical education is progressively recognized (Karali & Farhad, 2022). As a fundamental concept that improves medical education, adult learning theory serves as the conceptual framework for this investigation, which examines the factors influencing medical students' lifelong learning (Dong et al., 2021).

LITERATURE REVIEW

Lifelong Learning and Its Influencing Factors

The concept of lifelong learning has emerged from the broader framework of lifelong education (Akther,

[1] Dhurakij Pundit University Chinese International College. E-mail: 649890020110@dpu.ac.th

[2] Dhurakij Pundit University Chinese International College. E-mail: man.jia@dpu.ac.th
[3] Dhurakij Pundit University Chinese International College and Shaanxi Vocational Academy of Art. E-mail: hu.gao@icloud.com

2020). Hojat et al. (2003) characterize lifelong learning as an endeavor that encompasses a range of self-initiated activities, skills for acquiring information, intrinsic motivation, and the ability to discern learning necessities. Although this definition is comprehensive, it may not fully capture the complexities of lifelong learning in medical education, where clinical skills and professional behavior are equally critical (Reed et al., 2014). This raises questions about the applicability of Hojat et al.'s (2003) definition in different educational contexts, particularly in medical education where the integration of clinical competence and professional demeanor is essential. Lifelong learning facilitates the continual knowledge renewal essential for medical students (Mahajan et al., 2016). Further, research by Ruodi et al. (2023) suggests that individual, educational, and socio-cultural factors critically shape lifelong learning pursuits. However, their study primarily focuses on general education, leaving a gap in understanding these factors specifically in medical education. This limitation indicates the need for further research to explore how these factors manifest and influence lifelong learning within the context of medical education, which involves unique challenges and requirements

Salleh et al. (2019) demonstrated that autonomous learning is a critical factor influencing lifelong learning. Learning habits reflect the degree to which students consistently engage in their studies within a supportive learning environment (Agha & Rehman, 2016). Lavrijsen and Nicaise (2019) argue that learning habits impact lifelong learning. While these studies emphasize the importance of autonomous learning and learning habits, they overlook the crucial roles of clinical practice and professional identity in medical education. Clinical practice involves complex challenges such as understanding practice, limited capabilities, and interpersonal relationships (Scott et al., 2023), which significantly impact medical students' lifelong learning. Additionally, the development of a professional identity is one of the core missions of medical education (Cooke et al., 2010), and its role in lifelong learning should be considered. All stages of medical education should focus on developing the knowledge, clinical skills, and professional demeanor required of physicians (Reed et al., 2014). Research by Scott et al. (2023) shows that clinical practice involves complex challenges, including practice understanding, limited capabilities, and interpersonal relationships. Clinical teaching is a core aspect of medical intern education (Paul et al., 2023). Mohammadi et al. (2020) investigated the factors motivating medical students to develop a sense of social responsibility in medical school based on the experiences of students and teachers. Hilty et al. (2018) emphasized that cross-disciplinary clinical nursing abilities place greater emphasis on skills and attitudes than on knowledge.

It is essential to consider the diverse experiences adults gain during their professional lives to promote lifelong learning (Billett, 2018). From Billett (2018), it can be drawn the insight that the diverse experiences adults gain during their professional lives are crucial for lifelong learning. This perspective can be applied to medical education to help students engage in lifelong learning at different stages of their careers. Medical students must be equipped to adapt to changes in learning once they enter practice (Allen et al., 2024). The process of becoming a medical professional entails the gradual adoption of the doctor's professional role (Stephens et al., 2020). Furthermore, information literacy supports students in addressing the increasing information needs, thus facilitating their development into lifelong learners (Tachie-Donkor & Ezema, 2023).

The education in professional values in medicine fosters medical students' understanding of the profession's essence and facilitates the internalization of its values (Cruess et al., 2014). Developing a strong professional identity is one of the core missions of medical education (Cooke et al., 2010). Moreover, the career intentions of medical students are significantly influenced by external factors (Pfarrwaller et al., 2023).

As the field of medicine continues to advance, medical students face increasing demands to update their knowledge (Hachoumi et al., 2023). Cognitive skills must be continuously improved to avoid deterioration (Rottman et al., 2023). Lifelong learning covers a wide array of skills and professional characteristics (Edo et al., 2022), and Mlambo et al. (2021) emphasized that continuing professional development is essential for maintaining and refreshing skills in the medical environment.

Andragogy

Knowles (1984) characterized adult learning theory as specifically addressing the unique needs of adult learners, focusing on their development within self-directed learning contexts. Adults are responsible for their learning,

and adult learning programs address their specific needs to support this essential element. Adult learning involves the acquisition of new knowledge by adults after reaching adulthood (Merriam & Baumgartner, 2020). Adult learning theory is an important theoretical framework for adult education practitioners and higher education students (El-Amin, 2020). While Knowles' (1984) characterization and Merriam and Baumgartner's (2020) definitions provide a foundational understanding, they may not fully encompass the unique challenges faced by adult learners in highly specialized fields such as medical education, where the stakes and stress levels are considerably higher.

Adult learning theory includes six fundamental assumptions: Self-concept of the learner; Role of experience; Readiness to learn; Motivation to learn; Orientation to learning; Need to know (Chan, 2010; Forrest & Peterson, 2006; Knowles, 1980; Loeng, 2023; Ozuah, 2016).

Learner's Self-Concept: Knowles (1984) considered adults to be self-motivated and responsible for their learning roles. Adults possess a strong psychological need for recognition as capable, self-directed individuals (Ozuah, 2016). Medical students encounter significant learning challenges, as they must master vast amounts of medical knowledge quickly, necessitating autonomous learning skills for efficient learning and continuous development (Zhao et al., 2024). Although Knowles (1984) and Ozuah (2016) describe adults as inherently self-directed, becoming more autonomous is not an innate process for medical students. Zheng (2022) highlights that medical students often struggle with achieving complete autonomy in clinical settings, a finding supported by Dornan et al. (2005), who observed that medical students rarely achieve full autonomy in clinical environments and usually require various supports.

The Role of Experience: Adult learning practitioners consider previous experience as the most valuable resource for adult learners (Forrest & Peterson, 2006). Lifelong learning requires continuity between early learning experiences and career paths, emphasizing the necessary knowledge and skills for all ages (Tekkol & Demirel, 2018). To foster lifelong learning throughout a career, it is essential to take into account the individual's willingness and experience (Billett, 2018). From Billett (2018), we can draw the insight that the diverse experiences adults gain during their professional lives are crucial for lifelong learning. This perspective can be applied to medical education to help students engage in lifelong learning at different stages of their careers. Each phase of medical education should focus on cultivating the essential knowledge, clinical skills, and professional demeanor required of physicians (Reed et al., 2014). However, the growing scope of medical curricula presents challenges in teaching and learning (Shrivastava & Shrivastava, 2023). Medical educators need to develop effective strategies to help students integrate and apply their experiences in a rapidly evolving medical field (Hayashi et al., 2022).

Readiness to Learn: Adult learners' readiness to learn depends on their awareness of a topic's relevance. Adults are ready to learn skills and knowledge they deem necessary to effectively address real-life situations and problems (Forrest & Peterson, 2006). While this assumption is well-supported, there is a lack of detailed research on how medical students' readiness to learn can be effectively fostered through curriculum design and pedagogical approaches. This is crucial for the formation of professional identity, facilitating medical students' gradual acceptance of the doctor's professional role (Stephens et al., 2020). Medical students should be prepared for learning adaptations post-practice (Allen et al., 2024).

Learning Needs: Adult learners need to comprehend the value and necessity of learning (Chan, 2010). While Chan's assertion holds true, it is essential to further explore how medical students' learning needs can be aligned with their professional goals and the healthcare system's demands. Narayanasamy et al. (2019) indicate that motivations to improve social and economic status and factors linked to professional interests and mission significantly influence medical career choice. This awareness is often shaped by motivations to improve their social and economic status and factors linked to professional interests and mission, influencing their choice of a medical career (Narayanasamy et al., 2019). Furthermore, education fostering the medical profession's ethos is crucial in helping students develop a professional identity in medicine (Cruess et al., 2014).

METHODOLOGY

Research Design

Individual semi-structured interviews were conducted with medical college faculty members in Jiangxi Province, China, for the purposes of this study. The interviews were subjected to thematic analysis in order to ascertain the most influential factors on lifelong learning among medical students.

Research Subjects

The study employed purposive sampling to select 10 experienced frontline instructors from medical institutions in Jiangxi Province. The selection of this sampling technique was based on its capacity to precisely correspond with the research goals, thus enhancing the methodological soundness of the investigation and the reliability of the results (Campbell et al., 2020). Interviews are typically conducted with 8-12 individuals from the target population (Guest et al., 2020). Basic information of the interview participants are presented in Table 3.1.

Table 3.1 Basic Information of Participants

Respondent	Specialty	Education Level	Academic Title	Years of Experience
T1	Clinical Medicine	PhD	Professor	19
T2	Traditional Chinese Medicine	Master	Associate Professor	13
T3	Dentistry	Master	Associate Professor	23
T4	Clinical Medicine	Bachelor	Professor	39
T5	Clinical Medicine	Bachelor	Professor	32
T6	Traditional Chinese Medicine	PhD	Professor	19
T7	Chinese Pharmacy	PhD	Professor	28
T8	Basic Medical Science	PhD	Professor	12
T9	Pharmaceutical Chemistry	Bachelor	Professor	36
T10	Integrative Clinical Medicine	PhD	Associate Professor	13

Note: Organized by This Study.

Research Methodology

The collection of data was conducted via individual semi-structured interviews, a method that is commonly employed in qualitative research to investigate intricate matters and extract comprehensive information (Fontana & Frey, 2005). These interviews offer flexibility and a degree of standardization, enabling consistent data comparison and analysis across various respondents (Denzin & Lincoln, 2017). The interview protocol was designed to explore the significance and factors influencing lifelong learning among medical students, encompassing personal, educational, and societal dimensions. Questions were developed based on a literature review and refined through a pilot study with a small subset of participants to ensure clarity and relevance.

Data Collection

Following the acquisition of informed consent from the participants, face-to-face interviews were conducted, facilitating interaction and verification of information. The duration of each interview ranged from 30 to 60 minutes. The participants were provided with clarification regarding the objectives, recording procedure, and confidentiality guidelines prior to the commencement of the study. Each interview was audio-recorded with the participants' consent. Subsequently, the interviews were transcribed verbatim to facilitate comprehensive analysis. The interviews were conducted in a quiet, private setting to ensure comfort and confidentiality

Data Analysis

Thematic analysis was applied to the interview transcripts to extract, analyze, and interpret meaningful patterns (Braun & Clarke, 2012). This analysis included initial familiarization with the data, coding, theme identification, theme review, theme definition and naming, manuscript preparation, and, ultimately, a comparative and interpretative evaluation of the findings to formulate research conclusions (Braun & Clarke, 2012). NVivo software was utilized to organize and manage the data efficiently. To enhance the reliability of the findings, two researchers independently coded the transcripts and regular peer debriefing sessions were held to discuss

emerging themes and ensure a balanced interpretation of the data. Additionally, member checking was conducted by sharing preliminary themes with participants for validation, and an audit trail was maintained to document the research process and decisions made, enhancing the study's dependability and confirmability.

RESEARCH FINDINGS

Based on this study's goals, semi-structured interviews were held with ten educational administrators from a medical college in Jiangxi Province, China. The interviews, focused on factors influencing medical students' lifelong learning, adhered to a predetermined structure. Interviewees' personal information was anonymized and assigned the code T1 through T10. Open coding of the interview content yielded 48 codes and 11 sub-themes. These findings were integrated into themes such as self-concept, learning experience, readiness, and needs, as framed by adult learning theory, identifying influential factors including autonomous learning capability, learning habits, knowledge and skill acquisition, teachers' clinical experience, clinical practice, interdisciplinary learning, career planning, preparation for professional roles, information literacy, personal needs, and societal needs. These findings are visually summarized in Figure 4.1.

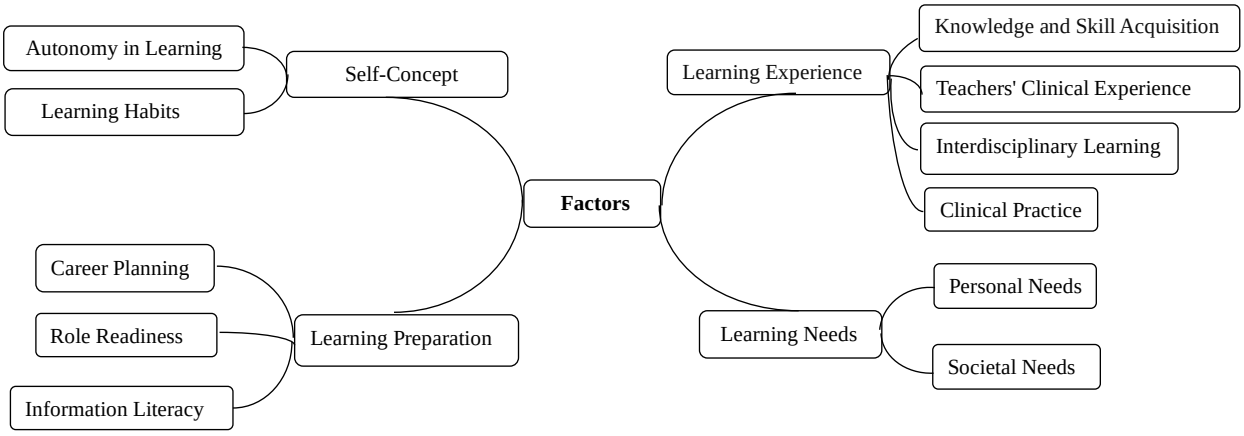

Figure 4.1 Factors Influencing Lifelong Learning among Medical Students in Jiangxi Province, China

Note: Organized by this Study.

Self-Concept

Adult learning theory posits that adults are self-motivated and assume responsibility during learning processes, with a deep need to be recognized and treated as capable, self-directed individuals (Ozuah, 2016). Self-directed learning involves learners managing their own learning processes, seeing themselves as the origin of their actions and decisions, responsible for their lifelong learning (Sze-Yeng & Hussain, 2010). Factors identified from interview texts affecting self-concept include autonomous learning capabilities and learning habits.

Autonomy in Learning

Data analysis reveals unanimous agreement among respondents that autonomous learning is crucial to lifelong learning for medical students. Medical education systems globally have embraced autonomous learning, allowing students to continuously update their knowledge and skills in the evolving medical field (Premkumar et al., 2018). Autonomous learning involves students actively determining their learning needs, setting goals, choosing resources, and implementing strategies to achieve learning outcomes (Hill et al., 2020). It allows learners to clearly understand their learning objectives and content, acquire essential skills, and develop holistically, thus laying a solid foundation for lifelong learning. One respondent noted:

"Medical students should actively learn, not just passively receive knowledge, to meet the needs of the medical profession. They must also understand the importance of autonomous learning, transforming it into a process of self-growth and self-management." (T1)

The significance of autonomous learning is highlighted by respondents who stress the necessity for medical

students to take an active role in their educational journey. This proactive stance is crucial in a field characterized by rapid advancements, which require ongoing learning and adaptation.

Learning Habits

Interviews indicate that excellent learning habits are vital for medical students throughout their careers, helping them sustain enthusiasm and adaptability in the complex clinical environment and motivating continuous learning and development in medicine. One respondent remarked:

"When learning becomes a habit, it becomes part of one's life, which is essential for medical students; conversely, the absence of learning can also become a habit." (T10)

Effective learning habits, such as regular material review, active engagement in discussions, and consistent practice of clinical skills, are recognized as essential for success in medical education. These practices not only improve immediate academic performance but also cultivate a mindset geared towards lifelong learning. Respondents observed that establishing these habits early in medical training can profoundly influence students' professional growth and their capacity to adapt to new knowledge and techniques throughout their careers.

Learning Experience

This research deduces factors from interview transcripts that impact the learning experience, encompassing knowledge and skill acquisition, the clinical experience of instructors, clinical practice, and interdisciplinary learning. Experience constitutes the most substantial resource for adult learners (Forrest & Peterson, 2006). Practitioners of adult learning theory frequently employ experiential techniques (Ozuah, 2016).

Knowledge and Skill Acquisition

Interview data reveal that the continuous updating of knowledge and skills serves as a pivotal motivation for the lifelong learning of medical students. Due to the diversity of clinical diseases within the medical field, medical students are required to continuously acquire and master the most up-to-date medical knowledge and skills. The imperative for lifelong learning is not solely attributable to the ongoing development of medicine, but also to advancements in society. Furthermore, it is imperative that medical students perpetually improve their clinical competencies in order to effectively navigate the ever-evolving clinical landscape. An interview excerpt illustrates this:

"As a physician, it is imperative to continually update my knowledge and skills because of the vast variability in clinical diseases and patient conditions. Given the rapid advancement in medical knowledge, including annual changes in disease spectra and clinical medications, as well as yearly updates to Western medical guidelines, continuous learning is essential to remain abreast of advancements." (T1)

This emphasizes the necessity for medical students to engage in continuous learning to keep pace with the fast-changing medical environment.

Teachers' Clinical Experience

The feedback received from participants suggests that the clinical experience of instructors greatly improves the guidance given to medical students during their clinical practice. Therefore, the mentorship of medical students in clinical settings by instructors who possess substantial clinical experience has a profound effect on the subsequent professional development of the students. Furthermore, an instructor's expertise and experience not only directly influence the learning outcomes and interests of medical students but are also essential in shaping the students' habits of lifelong learning. Additionally, instructors' role modelling subtly influences the professional values and attitudes of their students. Another interview excerpt provides clarity:

"From an instructor's viewpoint, role modeling is crucial. By achieving lifelong learning ourselves, students observing these practices may choose to emulate them." (T7)

This highlights the crucial role of instructors as role models in fostering lifelong learning habits among their students.

Clinical Practice

Clinical practice is a fundamental component of medical education, according to the respondents. In clinical settings, medical students must have a solid theoretical knowledge base, which they apply through observation, inquiry, analysis, and judgment to develop viable diagnostic and therapeutic strategies. Moreover, respondents suggest that clinical practice offers students the chance to apply knowledge within authentic medical environments, thus fostering profound learning. The integration of theory and practice is crucial for medical students' future professional development. An interview excerpt illustrates this point:

"Medicine is a discipline with a strong practical focus that requires students to possess robust clinical skills. Lifelong learning guides medical students to continually enhance their clinical competencies and problem-solving capabilities, thereby improving their ability to effectively serve patients." (T6)

This emphasizes the vital function of clinical practice in linking theoretical knowledge to its practical use.

Interdisciplinary Learning

According to interviews, interdisciplinary learning plays a pivotal role in stimulating medical students' commitment to lifelong learning. Engaging in a multidisciplinary study not only expands the students' knowledge base but also enhances their innovative and adaptive capabilities in practical settings. Respondents contend that through interdisciplinary learning, medical students can achieve sustained academic advancement and address complex clinical challenges by integrating knowledge across various disciplines, thus better preparing for the dynamic changes in the medical profession. An interview excerpt is provided:

"Presently, significant emphasis is placed on systems medicine, which extends beyond basic medicine to include bioinformatics, mathematics, physics, chemistry, and logic, among other disciplines. This comprehensive multidisciplinary support enables the resolution of complex medical problems through interdisciplinary learning." (T4)

This demonstrates the importance of interdisciplinary learning in equipping medical students with the skills necessary to tackle complex medical issues.

Learning Preparation

The present study delineates that learning preparation in adult education comprises three fundamental components: career planning, professional role readiness, and information literacy. The preparedness of adult learners to engage in education depends on their recognition of the topic's relevance, as they are inclined to learn what they believe is necessary to effectively navigate practical challenges and scenarios (Forrest & Peterson, 2006).

Career Planning

According to adult learning theory's concept of learning readiness, respondents emphasize that adult learners focus on subjects closely aligned with their career goals. Consequently, deliberate career planning increases the utility and intent of the educational process. This systematic planning not only helps students achieve their short-term and long-term objectives but also enables medical students to tailor their learning processes to meet future professional demands. An interview excerpt is as follows:

"Students are encouraged to develop a reasonable study plan that includes both short-term and long-term objectives, along with specified learning content and methods, to better organize and manage their educational activities." (T6)

This highlights the importance of aligning educational activities with career aspirations to enhance motivation and engagement. This demonstrates the significance of career planning in ensuring that medical students are adequately prepared for the diverse and evolving demands of their future professions.

Role Readiness

Understanding their prospective professional roles and career prospects, according to respondents, encourages

adult learners to engage more actively in their education. Students should be acquainted with potential career paths within the medical field, including becoming clinicians, educators, or researchers, from the outset of their academic journey. This awareness helps students make informed decisions based on their interests and aspirations, preparing them adequately for future professional roles. An interview excerpt is as follows:

"Medical students must prepare for roles that may include becoming clinicians or educators, as clinical physicians often have teaching responsibilities. Choosing a medical specialty, therefore, involves preparing for specific future roles from the outset." (T2)

This emphasizes the necessity for students to understand and prepare for their future professional roles early in their academic journey. This demonstrates the importance of role readiness in ensuring that medical students are well-equipped to transition smoothly into their professional careers with a clear understanding of their responsibilities and opportunities.

Information Literacy

Interviews indicate that information literacy is crucial for medical students to effectively utilize digital resources such as the internet and academic databases to quickly access up-to-date medical knowledge, research discoveries, and clinical data. Information literacy involves the skills to identify information needs, use technology for accessing and organizing information, and critically evaluate this information to make informed decisions (Bayrakçı & Dindar, 2015). An interview excerpt is as follows:

"In our digitally abundant society, it is essential to identify the required information when faced with challenges, effectively locate this information, and then critically assess and select the necessary information for use." (T3)

This underscores the importance of developing strong information literacy skills to navigate the vast amounts of medical information available in the digital age. This demonstrates the critical role of information literacy in empowering medical students to efficiently access, evaluate, and utilize information, thereby enhancing their ability to make informed clinical decisions and stay updated with the latest medical advancements.

Learning Needs

This research identifies from interview transcripts that learning needs are categorized into personal and societal needs. It is imperative that adults comprehend the significance of education and the motivations behind their academic endeavours (Chan, 2010). Awareness of these needs is a hallmark of lifelong learning (Hojat et al., 2003), as adults must recognize the practicality and significance of the materials they study prior to beginning their education.

Personal Needs

Respondents indicate that a sense of professional identity in medical students arises from their feelings of belonging and pride within their medical careers, influenced by factors such as doctor-patient relationships and societal opinions. Some noted that recent tensions in doctor-patient relationships and increased negative media coverage have detrimentally impacted medical students' professional identities. Conversely, in times of substantial public health emergencies such as the ongoing COVID-19 pandemic, the commendable conduct of healthcare practitioners and favourable portrayals in the media have served as sources of motivation for a greater cohort of students to pursue medical education, thereby fortifying their professional identity. The profession's inherent nobility and its responsibility to society are highlighted as core professional values. An interview excerpt is as follows:

"Especially during major public health events, such as the COVID-19 pandemic, the elevated social status of doctors enhances the professional honor felt by medical students, thus fostering their learning interest and motivation." (T7)

This demonstrates how external societal factors can greatly affect the personal motivations and professional identity of medical students. It highlights the importance of developing a robust professional identity in medical students, as this significantly influences their motivation and dedication to lifelong learning in the context of

societal challenges and opportunities.4.4.2 Societal Needs

The interviews provide insight into how the advancement of medical knowledge serves as an indication of societal progress in addition to being a professional imperative. Respondents assert that career development is a compelling motivation for medical students to engage in lifelong learning. Ceasing education upon completion of formal studies places medical students at risk of becoming obsolete. Therefore, medical education must stress the importance of lifelong learning and develop the capacity of students to enhance their professional competencies continuously. It is vital to keep abreast of advancements in medical technology, ensuring their competitiveness in the medical field and their ability to effectively serve patients. An interview excerpt is as follows:

"The understanding of lifelong learning among medical students should emphasize the demands of medical advancement, societal progress, and technological updates. Medical education needs to persistently adapt to new knowledge and technologies, equipping students to become comprehensive medical professionals." (T2)

This emphasizes the significant role of societal needs in influencing the motivations and learning behaviors of medical students. It illustrates the necessity of synchronizing medical education with societal and technological progress to guarantee that graduates stay competitive and are prepared to tackle current medical issues.

DISCUSSION

Self-concept

Autonomy in Learning

This study emphasizes the substantial impact that autonomous learning has on medical students' lifelong learning. Prior studies have shown that this capability significantly affects lifelong learning (Kaulback, 2020; Salleh et al., 2019; Tekkol & Demirel, 2018). Autonomous learning is a crucial skill for lifelong learning (Sze-Yeng & Hussain, 2010). Autonomy increases as students progressively assume more responsibility for their learning, with decreasing guidance from teachers (Miflin et al., 2000). Given the vast amount of medical knowledge to be acquired in limited time, autonomous learning is crucial for medical students' effective and ongoing learning (Zhao et al., 2024). Despite the expectation that medical students be self-directed, becoming more self-directed is not automatic (Zheng, 2022). Dornan et al. (2005) also observed that medical students seldom achieve complete autonomy and need supportive guidance. To effectively integrate this with adult learning theory, it is crucial to note that adult learning principles emphasize self-directed learning, highlighting the need for medical educators to foster an environment that supports autonomy while providing necessary guidance.

Learning Habits

Learning habits significantly influence lifelong learning (Brooks & Everett, 2008; Lavrijsen & Nicaise, 2019). These habits are a continuously evolving process (Agha & Rehman, 2016). Initially, students learn how to learn at school, developing habits that significantly affect subsequent learning (Endres et al., 2021). Global medical education promotes adult learning principles, encouraging autonomous and deep learning, with learning habits helping students to consistently engage in learning within supportive environments (Agha & Rehman, 2016).

Connecting this to adult learning theory, it becomes evident that cultivating good learning habits aligns with the principles of self-directed and active learning, which are essential for medical students to adapt to continuous advancements in medical knowledge

Learning Experience

Knowledge and Skill Acquisition

This study provides empirical evidence that medical students' lifelong learning is substantially impacted by their career planning. Lifelong learning necessitates continuity between early learning experiences and professional life, focusing on essential knowledge and skills irrespective of age (Tekkol & Demirel, 2018). Medical education at all stages aims to develop the necessary knowledge, clinical skills, and professional demeanor to provide high-

quality patient care, ultimately aiming to enhance both patient and societal health (Reed et al., 2014). Moreover, the constantly expanding medical curriculum presents significant challenges to teaching and learning processes (Shrivastava & Shrivastava, 2023). Additionally, with advancements in the medical field, the volume of knowledge and skills required for medical students continues to grow (Hayashi et al., 2022). This persistent development emphasizes the need for lifelong learning, which is in line with adult learning theories that underline the significance of ongoing skill and knowledge acquisition throughout a professional career.

Clinical Experience of Teachers

This research underscores the critical role of clinically experienced instructors in guiding medical students through clinical practice and their profound impact on lifelong learning. Mcmillan and Jones (2022) describe lifelong learning as a continuous process that emphasizes reflection, accountability for learning, and sustained motivation, profoundly influenced by practical clinical experiences. Furthermore, Chitkara et al. (2016) identify teacher guidance as an essential component of achieving learning objectives. Clinical education is deeply rooted in experiential learning, especially learning from patients (Duffy et al., 2006). As a central element of internship education, clinical teaching (Paul et al., 2023) and Mohammadi et al. (2020) assert that physicians must be accountable for their actions, with medical students beginning to develop this responsibility during their studies. These insights underscore the impact that clinical experience and instructor guidance have on lifelong learning and medical education. These findings stress the importance of experiential learning and mentorship in encouraging lifelong learning, consistent with adult learning theory principles that underscore the benefits of practical experiences and reflective practice.

Clinical Practice

This study demonstrates that medical students' enduring learning is impacted by clinical practice. This programme offers students the chance to utilise their acquired knowledge in practical medical environments, thereby encouraging more profound learning through direct involvement in patient care and treatment. Active participation in this field enables individuals to comprehend the pragmatic implications of theoretical understanding and enhances their comprehension of medical science. Professionalism, a core component of a physician's capability, requires lifelong learning to improve performance in practice (Duffy et al., 2006). Roberts et al. (2024) observe that by the end of pre-clinical years, medical students' experiences positively influence their self-directed decision-making. After undergoing core internship experiences, senior students recognize the value of flexibility, personalization, and exploration in diverse settings (Chitkara et al., 2016). This practical experience is consistent with adult learning theory, which emphasizes the importance of real-world practice in cultivating self-directed learning skills and professional competencies.

Interdisciplinary Learning

This study indicates that interdisciplinary learning impacts the lifelong learning of medical students. Lifelong learning is not limited to traditional classroom settings; instead, it is a continuous process (Edo et al., 2022). Clinicians face the crucial challenge of adjusting to healthcare changes, where interdisciplinary clinical skills in medicine prioritize skills and attitudes more than knowledge (Hilty et al., 2018). The main purpose of providing clinical knowledge early in medical education is to aid students in comprehensively understanding medical concepts and humanitarian principles (Surapaneni, 2024). Interdisciplinary learning is essential in this context, fostering a holistic understanding of medical practice and aligning with adult learning theory's emphasis on the integration of diverse knowledge and skills.

Learning Readiness

Career Planning

Career planning has a substantial influence on the lifelong learning of medical students, as demonstrated by this study. Well-defined career objectives enhance the concentration and practicality of learning. To promote lifelong learning throughout their careers, considering individual aspirations and experiences is crucial, along with the range of experiences adults gain in their careers, often from daily work (Billett, 2018). To foster

meaningful learning, preparing medical students and interns for learning changes after they begin practicing is essential (Allen et al., 2024). The incorporation of career planning and guidance into medical education programs is imperative, as it corresponds to adult learning theories that prioritize the connection between learning and personal and professional aspirations.

Preparedness For Professional Roles

This study demonstrates that medical students' lifelong learning is substantially impacted by their readiness for professional roles. There is a positive correlation between the clarification of professional roles and career paths by medical students and their level of active learning engagement. The formation of a professional identity is viewed as a sociocultural process in which medical students gradually embrace the professional role of a doctor (Stephens et al., 2020). Furthermore, passing the national medical licensing examination is essential for qualifying as a doctor in China, marking a critical step in professional role preparation (Wang et al., 2023). The development of a professional identity is instrumental in cultivating a lifelong learning mentality, as it converges with adult learning principles that prioritize the evolution of self-perception and the assimilation of professional responsibilities.

Information Literacy

This study demonstrates that information literacy has a significant impact on the lifelong learning of medical students. Findings align with previous research, indicating that information literacy helps students acquire and process information and enhances their problem-solving and innovative capabilities (Naveed et al., 2023). Furthermore, Tachie-Donkor and Ezema (2023) observed that medical students' preference for internet resources positively correlates with their information-seeking behaviors and lifelong learning. Students have the flexibility to learn anything, anywhere via the internet (Rafiola et al., 2020). Medical students' engagement in self-directed learning through online platforms enhances their autonomy and authority over learning resources. Medical students' engagement in self-directed learning through online platforms enhances their autonomy and authority over learning resources, which is a core principle of adult learning theory.

Learning Needs

Personal Needs

Individual requirements are determined by professional values and identity, which have a substantial effect on the lifelong learning of medical students, according to this study. Individuals' pursuit of significant objectives and benchmarks reflects these values, which emphasize the innate nobleness of medicine and a sense of social obligation. Factors such as improvement in personal socioeconomic status and professional interest influence students' choice of the medical field (Narayanasamy et al., 2019). Professional identity, reflecting students' sense of belonging and pride in their chosen field, is influenced by external factors like doctor-patient relationships and public opinion. Education in the spirit of the medical profession is essential for helping students understand and internalize the essence and obligations of the medical profession. This education aids in developing students' professional identity. Additionally, Cooke et al. (2010) emphasize that forming a professional identity is as crucial as acquiring medical knowledge and clinical skills, highlighting it as one of the core missions of medical education. This highlights the importance of medical education programs cultivating a robust professional identity, consistent with adult learning theories that stress the significance of self-awareness and professional growth.

Societal Needs

This study demonstrates that societal demands encompass the necessity for medical knowledge and professional development to remain current. Healthcare professionals need to regularly enhance their skills, emphasizing the essential role of continuing education or professional development in maintaining and updating skills in healthcare (Mlambo et al., 2021). Cognitive abilities and skills must advance to prevent obsolescence (Rottman et al., 2023). Drude et al. (2019) further highlight the importance of continuous professional development, stressing the necessity for professionals to monitor and reflect on their performance, and identify and improve gaps in professional practice. This viewpoint is consistent with adult learning theory,

which underscores the continuous nature of learning and the importance of ongoing self-reflection and enhancement.

Medical education is a continuous learning process that does not end with the completion of a program (Dasgupta, 2020). Research by Alenezi and Yaiesh (2018) indicates that the knowledge and skills medical students acquire at the end of their undergraduate studies may be insufficient for their entire careers. With ongoing advancements in medicine, the rapid renewal of medical knowledge and technology increasingly demands that medical students and doctors update their knowledge (Hachoumi et al., 2023). The ongoing updating of knowledge highlights the significance of lifelong learning and the need for medical education programs to integrate mechanisms that support ongoing professional growth, in line with adult learning theory's stress on continuous learning and adaptation.

CONCLUSION

Due to the unique nature of the medical profession, medical education is a continuous learning process (Dasgupta, 2020). Medical students, as autonomous learners, need self-directed learning abilities to support lifelong learning. Nevertheless, this research demonstrates that medical students initially encounter challenges in acquiring independent learning skills as a result of their limited understanding of systematic medical principles and the experiential character of the field. Consequently, it is imperative that educators foster lifelong learning by applying their expertise to augment students' attainment of medical knowledge and competencies. Medical students' education is highly dependent on the guidance of their instructors. Ensuring that clinical practice of medical students is supervised by instructors who possess substantial clinical experience is vital for their professional growth.

Medical students' learning readiness primarily depends on their career planning and preparation for professional roles, which improves the focus and usefulness of learning. Therefore, medical students should align their learning plans with their professional interests to ensure that their education matches their future career needs. Additionally, information literacy enables students to effectively use resources like the internet and academic databases to swiftly access new medical knowledge, research, and clinical data. It also improves their ability to discern and select essential information from a large pool. Furthermore, information literacy bolsters medical students' critical thinking skills, enabling them to thoroughly analyze and assess the medical information they acquire.

Learning needs consist of individual needs, governed by professional values and identity, and societal needs, driven by the need for professional development and evolving medical knowledge. Professional values are manifested through essential goals and standards that individuals pursue in their careers, particularly in medicine, which often entails a commitment to the inherent nobility of the field and social responsibilities. Professional identity, shaped by various external factors including doctor-patient relationships and public opinion, expresses medical students' belonging and pride in their chosen field. Particularly in the midst of noteworthy public health occurrences such as the COVID-19 pandemic, the elevated social status of the medical profession and favourable societal acknowledgement of the critical contributions of medical personnel served to strengthen the professional identity of medical students. Notwithstanding the detrimental effects of tense doctor-patient relationships and unfavourable media attention on professional reputation, the substantial praise and favourable feedback received amid public health emergencies considerably fortified this identity. This reinforcement not only encourages more students to select medicine as their future profession but also increases the overall appeal and value of the medical field.

Rapidly evolving treatment methods and perpetually revised theoretical knowledge in the medical field require medical students to engage in ongoing education and adjust to novel medical practices. Lifelong learning is thus an essential requirement for the advancement of medical professionals' careers. The importance of continuous learning transcends the professional development of physicians and is vital for the provision of high-quality public health services and the resolution of ever-changing global health issues.

Limitations and Future Directions of the Research

This study possesses specific constraints in exploring the factors influencing lifelong learning among medical students. The study was performed exclusively at a solitary institution, utilising a sample that was restricted to educational administrators and students of a single medical school. In order to increase the generalizability and validity of the findings, it is suggested that future research endeavours broaden the scope of the study and incorporate additional regions, countries, and medical specialties into the research area and sample size. Additionally, the survey period of this study was relatively short. It is recommended that the research period be extended in order to more thoroughly examine the factors that influence lifelong learning among medical students at various educational phases, thereby contributing to a more comprehensive understanding of these factors.

REFERENCES

Agha, S., & ur Rehman, A. (2016). Learning habits as factors influencing academic performance in medical students. Pakistan Journal of Psychology, 47(2), 3-20. http://www.pjpku.com/index.php/pjp/article/view/59

Akther, J. (2020). Influence of UNESCO in the development of lifelong learning. Open Journal of Social Sciences, 8(03), Article e103. https://doi.org/103. 10.4236/jss.2020.83010

Alenezi, A. N., & Yaiesh, S. M. (2018). The ubiquitous invasion of social media in lifelong learning in medical education. Review Article Kuwait Medical Journal, 50(3), 271-277. https://www.researchgate.net/profile/Said-Yaiesh/publication/327633908_The_Ubiquitous_Invasion_of_Social_Media_in_Lifelong_Learning_in_Medical_Education_Review_Article_ABSTRACT/links/5c151da692851c39ebef84bb/The-Ubiquitous-Invasion-of-Social-Media-in-Lifelong-Learning-in-Medical-Education-Review-Article-ABSTRACT.pdf

Allen, L. M., Balmer, D., & Varpio, L. (2024). Physicians' lifelong learning journeys: A narrative analysis of continuing professional development struggles. Medical Education. https://doi.org/10.1111/medu.15375

Babenko, O., Koppula, S., Daniels, L. I. A., Nadon, L., & Daniels, V. (2017). Lifelong learning along the education and career continuum: Meta-analysis of studies in health professions. Journal of Advances in Medical Education & Professionalism, 5(4), Article e157. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5611424/

Bayrakçı, M., & Dindar, H. (2015). Factors effecting students' lifelong learning in higher education. International Journal on Lifelong Education and Leadership, 1(1), 11-20. https://dergipark.org.tr/en/pub/ijlel/issue/39621/468903

Berkhout, J. J., Helmich, E., Teunissen, P. W., van der Vleuten, C. P., & Jaarsma, A. D. C. (2018). Context matters when striving to promote active and lifelong learning in medical education. Medical Education, 52(1), 34-44. https://doi.org/10.1111/medu.13463

Billett, S. (2018). Distinguishing lifelong learning from lifelong education. Journal of Adult Learning, Knowledge and Innovation, 2(1), 1-7. https://doi.org/10.1556/2059.01.2017.3

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77–101. https://www.tandfonline.com/doi/abs/10.1191/1478088706QP063OA

Brooks, R., & Everett, G. (2008). The impact of higher education on lifelong learning. International Journal of Lifelong Education, 27(3), 239-254. https://www.tandfonline.com/doi/abs/10.1080/02601370802047759

Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., Walker, K. (2020). Purposive sampling: Complex or simple? Research case examples. Journal of Research in Nursing, 25(8), 652–661. https://doi.org/10.1177/1744987120927206

Chan, S. (2010). Applications of andragogy in multi-disciplined teaching and learning. Journal of Adult Education, 39(2), 25-35. https://files.eric.ed.gov/fulltext/EJ930244.pdf

Chitkara, M. B., Satnick, D., Lu, W. H., Fleit, H., Go, R. A., & Chandran, L. (2016). Can individualized learning plans in an advanced clinical experience course for fourth year medical students foster self-directed learning?. BMC Medical Education, 16, 1-6. https://doi.org/10.1186/s12909-016-0744-8

Cooke, M., Irby, D. M., & O'Brien, B. C. (2010). Educating physicians: a call for reform of medical school and residency (Vol. 16). John Wiley & Sons

Cruess, R. L., Cruess, S. R., Boudreau, J. D., Snell, L., & Steinert, Y. (2014). Reframing medical education to support professional identity formation. Academic Medicine, 89(11), 1446-1451. https://doi.org/10.1097/ACM.0000000000000427

Das, A., Bhattacharya, S., Student, M. B. B. S., Chakraborty, A., & Student, M. B. B. S. (2020). Seven factors affecting medical undergraduate students' performance in academics: a study using ron fry questionnaire in Eastern India. Journal of Advances in Medical Education & Professionalism, 8(4), Article e158. https://doi.org/10.30476/jamp.2020.86444.1239

Dasgupta, A. (2020). Problem based learning: Its application in medical education. J West Bengal Univ Health Sci, 1(2), 11-18. https://jwbuhs.in/issue/pdf/html?file_path=%2Fhtml-files%2F1655453731_MEU-article-Arunava-Dasgupta.html

Denzin, N. K., Lincoln, Y. S., MacLure, M., Otterstad, A. M., Torrance, H., Cannella, G. S., ... & McTier, T. (2017). Critical qualitative methodologies: Reconceptualizations and emergent construction. International Review of Qualitative Research, 10(4), 482-498. https://doi.org/10.1525/irqr.2017.10.4.482

Dong, H., Lio, J., Sherer, R., & Jiang, I. (2021). Some learning theories for medical educators. Medical Science Educator, 31, 1157-1172. https://doi.org/10.1007/s40670-021-01270-6

Dornan, T., Hadfield, J., Brown, M., Boshuizen, H., & Scherpbier, A. (2005). How can medical students learn in a self-directed way in the clinical environment? Design-based research. Medical Education, 39(4), 356-364. https://doi.org/10.1111/j.1365-2929.2005.02112.x

Duffy, F. D., & Holmboe, E. S. (2006). Self-assessment in lifelong learning and improving performance in practice: Physician know thyself. Jama, 296(9), 1137-1139. https://doi.org/10.1001/jama.296.9.1137

Edo, T., Nwisagbo, M., Ebunolu, Y., & Kagbaraneh, M. (2022). Development of lifelong learning skills for sustainable development in rivers state. International Journal of Innovative Development and Policy Studies, 10(3), 1-7. http://seahipaj.org/journals-ci/sept-2022/IJIDPS/full/IJIDPS-S-1-2022.pdf

El-Amin, A. (2020). Andragogy: A Theory in Practice in Higher Education. Journal of Research in Higher Education, 4(2), 54–69. https://doi.org/10.24193/JRHE.2020.2.4

Endres, T., Leber, J., Böttger, C., Rovers, S., & Renkl, A. (2021). Improving lifelong learning by fostering students' learning strategies at university. Psychology Learning & Teaching, 20(1), 144-160. https://doi.org/10.1177/1475725720952025

Fontana, A., & Frey, J. H. (2005). The interview. The Sage Handbook of Qualitative Research, 3, 695-727. http://www.iot.ntnu.no/Innovation/Norsi-Common-Courses/Lincoln/Fontana%20&%20frey%20(2000)%20interview.Pdf

Forrest III, S. P., & Peterson, T. O. (2006). It's called andragogy. Academy of Management Learning & Education, 5(1), 113-122. https://doi.org/10.5465/amle.2006.20388390

Guest, G., Namey, E., & Chen, M. (2020). A simple method to assess and report thematic saturation in qualitative research. Plos One, 15(5), Article e0232076. https://doi.org/10.1371/journal.pone.0232076

Hachoumi, N., Eddabbah, M., & El Adib, A. R. (2023). Health sciences lifelong learning and professional development in the era of artificial intelligence. International Journal of Medical Informatics, 178, Article e105171. https://doi.org/10.1016/j.ijmedinf.2023.105171

Hayashi, M., Son, D., Nanishi, K., & Eto, M. (2020). Long-term contribution of international electives for medical students to professional identity formation: A qualitative study. BMJ Open, 10(8), Article e039944. http://dx.doi.org/10.1136/bmjopen-2020-039944

Hill, M., Peters, M., Salvaggio, M., Vinnedge, J., & Darden, A. (2020). Implementation and evaluation of a self-directed learning activity for first-year medical students. Medical Education Online, 25(1), Article e1717780. https://doi.org/10.1080/10872981.2020.1717780

Hilty, D. M., Turvey, C., & Hwang, T. (2018). Lifelong learning for clinical practice: how to leverage technology for telebehavioral health care and digital continuing medical education. Current Psychiatry Reports, 20, 1-11. https://doi.org/10.1007/s11920-018-0878-y

Hojat, M., Nasca, T. J., Erdmann, J. B., Frisby, A. J., Veloski, J. J., & Gonnella, J. S. (2003). An operational measure of physician lifelong learning: Its development, components and preliminary psychometric data. Medical Teacher, 25(4), 433-437. https://doi.org/10.1080/0142159031000137463

Karali, H. F., & Farhad, E. S.(2022). Changing teaching strategies and lecture preparation to improve medical students' knowledge acquisition and retention. International Journal of Advanced Community Medicine, 5(1): 50-54. https://doi.org/10.33545/comed.2022.v5.i1a.226

Kaulback, M. K. (2020). Correlating self-directed learning abilities to lifelong learning orientation in Baccalaureate nursing students. Nurse Educator, 45(6), 347-351. https://doi.org/10.1097/NNE.0000000000000803

Knowles, M. (1984). Andragogy in action. Applying modern principles of adult education. Jossey Bass.

Knowles, M. S. (1980). The modern practice of adult education: From pedagogy to andragogy. Prentice Hall.

Lavrijsen, J., & Nicaise, I. (2019). Systemic obstacles to lifelong learning: the influence of the educational system design on learning attitudes. Advancing theory and research in widening participation (pp. 60-80). Routledge. http://dx.doi.org/10.1080/0158037X.2016.1275540

Loeng, S. (2023). Pedagogy and andragogy in comparison–conceptions and perspectives. Andragoška Spoznanja, 29(2), 39-52.https://doi.org/10.4312/as/11482

Mahajan, R., Badyal, D. K., Gupta, P., & Singh, T. (2016). Cultivating lifelong learning skills during graduate medical training. Indian Pediatrics, 53, 797-804. https://doi.org/10.1007/s13312-016-0934-9

Marzo, R. R. (2018). Role of medical education in cultivating lifelong learning skills for future doctors. Education in Medicine Journal, 10(3). 70-76. https://eduimed.usm.my/EIMJ20181003/EIMJ20181003_07.pdf

McMillan, J. C. D., & Jones, L. (2022). A qualitative study exploring how students' conceptualisations of lifelong learning develop in an undergraduate medical training programme. Practice, 4(3), 212-225. https://doi.org/10.1080/25783858.2022.2133624.

Merriam, S. B., & Baumgartner, L. M. (2020). Learning in adulthood: A comprehensive guide. John Wiley & Sons.

Miflin, Campbell, & Price. (2000). A conceptual framework to guide the development of self-directed, lifelong learning in problem-based medical curricula. Medical Education, 34(4), 299-306. https://doi.org/10.1046/j.1365-2923.2000.00564.x

Mlambo, M., Silén, C., & McGrath, C. (2021). Lifelong learning and nurses' continuing professional development, a Meta synthesis of the literature. BMC Nursing, 20, 1-13. https://doi.org/10.1186/s12912-021-00579-2

Mohammadi, M., Bagheri, M., Jafari, P., & Bazrafkan, L. (2020). Motivating medical students for social accountability in medical schools. Journal of Advances in Medical Education & Professionalism, 8(2), 90-99. https://doi.org/90.10.30476/jamp.2020.84117.1128

Narayanasamy, M., Ruban, A., & Sankaran, P. S. (2019). Factors influencing to study medicine: a survey of first-year medical students from India. Korean Journal of Medical Education, 31(1), 61-71. https://doi.org/10.3946/kjme.2019.119

Naveed, M. A., Iqbal, J., Asghar, M. Z., Shaukat, R., & Kishwer, R. (2023). How information literacy influences creative skills among medical students? The mediating role of lifelong learning. Medical Education Online, 28(1), Article e2176734. https://doi.org/10.1080/10872981.2023.2176734

Nayak, K. R., Punja, D., Suryavanshi, C. A., & Kamath, A. (2020). Application of case-based readiness assurance process as a model for case-based pedagogy and collaborative learning in physiology. Medical Science Educator, 30, 869-877. https://doi.org/10.1007/s40670-020-00967-4

Ozuah, P. O. (2016). First, there was pedagogy and then came andragogy. Einstein Journal of Biology and Medicine, 21(2), 83-87. https://www.einsteinmed.edu/uploadedFiles/EJBM/21Ozuah83.pdf

Paul, A., Leung, D., Salas, R. M. E., Cruz, T. E., Abras, C., Saylor, D., ... & Strowd, R. E. (2023). Comparative effectiveness study of flipped classroom versus online-only instruction of clinical reasoning for medical students. Medical Education Online, 28(1), Article e2142358. https://doi.org/10.1080/10872981.2022.2142358

Pfarrwaller, E., Voirol, L., Karemera, M., Guerrier, S., & Baroffio, A. (2023). Dynamics of career intentions in a medical student cohort: A four-year longitudinal study. BMC Medical Education, 23(1), Article e131. https://doi.org/10.1186/s12909-023-04102-w

Premkumar, K., Vinod, E., Sathishkumar, S., Pulimood, A. B., Umaefulam, V., Prasanna Samuel, P., & John, T. A. (2018). Self-directed learning readiness of Indian medical students: A mixed method study. BMC Medical Education, 18, 1-10. https://doi.org/10.1186/s12909-018-1244-9

Rafiola, R., Setyosari, P., Radjah, C., & Ramli, M. (2020). The effect of learning motivation, self-efficacy, and blended learning on students' achievement in the industrial revolution 4.0. International Journal of Emerging Technologies in Learning (iJET), 15(8), 71-82. https://doi.org/10.3991/ijet.v15i08.12525

Ramamurthy, S., Er, H. M., Devi Nadarajah, V., & Radhakrishnan, A. K. (2021). Medical students' orientation toward lifelong learning in an outcome-based curriculum and the lessons learnt. Medical Teacher, 43(1), 6-11. https://www.tandfonline.com/doi/abs/10.1080/0142159X.2019.1646894

Reed, S., Shell, R., Kassis, K., Tartaglia, K., Wallihan, R., Smith, K., ... & Mahan, J. D. (2014). Applying adult learning practices in medical education. Current Problems in Pediatric and Adolescent Health Care, 44(6), 170-181. http://dx.doi.org/10.1016/j.cppeds.2014.01.008

Roberts, M., Darden, A., Wiskur, B., & Hill, M. (2024). A longitudinal assessment of self-directed learning readiness and development in medical students. Journal of Medical Education and Curricular Development, 11, Article e23821205241242261. https://doi.org/10.1177/23821205241242261

Rottman, B. M., Caddick, Z. A., Nokes-Malach, T. J., & Fraundorf, S. H. (2023). Cognitive perspectives on maintaining physicians' medical expertise: I. Reimagining maintenance of certification to promote lifelong learning. Cognitive Research: Principles and Implications, 8(1), Article e46. https://doi.org/10.1186/s41235-023-00496-9

Ruodi A, S., Ayati, M., & Akbary, M. (2023). Factors Affecting Lifelong Learning in Educational Environments (Systematic Review). Journal of Educational Sciences, 30(2), 235-260. https://doi.org/10.22055/edus.2023.43562.3450

Ruodi Aliabadi, S., Ayati, M., & Akbary, M. (2023). Factors Affecting Lifelong Learning in Educational Environments (Systematic Review). Journal of Educational Sciences, 30(2), 235-260. https://doi.org/10.22055/edus.2023.43562.3450

Salleh, U. K. M., Zulnaidi, H., Rahim, S. S. A., Bin Zakaria, A. R., & Hidayat, R. (2019). Roles of self-directed learning and social networking sites in lifelong learning. International Journal of Instruction, 12(4), 167-182. https://doi.org/10.29333/iji.2019.12411a

Scott, I. A., Doust, J. A., Keijzers, G. B., & Wallis, K. A. (2023). Coping with uncertainty in clinical practice: a narrative review. Medical Journal of Australia, 218(9), 418-425. https://www.mja.com.au/system/files/issues/218_09/mja251925.pdf

Shrivastava, S. R., & Shrivastava, P. S. (2023). Strategies to neutralize the impact of factors that influence learning among medical students.Al Am een J Med Sci, 16(3): 197-202. http://ajms.alameenmedical.org/ArticlePDFs/3%20AJMS%20V16.N3.2023%20p%20197-202.pdf

Stephens, M. B., Bowen, J. L., McGinley, E. L., & Rainey, P. (2020). Organizing chaos: iterative professional identity formation through the lens of mask making. PRiMER: Peer-Review Reports in Medical Education Research, 4. Article e10. https://doi.org/10.22454/PRiMER.2020.705788

Surapaneni, K. M. (2024). Innovative Self-directed, Problem-oriented, Lifelong learning, Integrated Clinical case Exercise (SPLICE) modules promote critical thinking skills, early clinical exposure, and contextual learning among first professional-year medical students. Advances in Physiology Education, 48(1), 69-79. https://doi.org/10.1152/advan.00211.2023

Sze-Yeng, F., & Hussain, R. M. R. (2010). Self-directed learning in a socioconstructivist learning environment. Procedia-Social and Behavioral Sciences, 9, 1913-1917. https://doi.org/10.1016/j.sbspro.2010.12.423

Tachie-Donkor, G., & Ezema, I. J. (2023). Effect of information literacy skills on university students' information seeking behaviour and lifelong learning. Heliyon, 9(8), Article e18427. https://doi.org/10.1016/j.heliyon.2023.e18427

Tekkol, İ. A., & Demirel, M. (2018). An investigation of self-directed learning skills of undergraduate students. Frontiers in Psychology, 9, Article e410879. https://doi.org/10.3389/fpsyg.2018.02324

Thwe, W. P., & Kalman, A. (2024). Lifelong learning in the educational setting: A systematic literature review. The Asia-Pacific Education Researcher, 33(2), 407-417. https://doi.org/10.1007/s40299-023-00738-w

Wang, X., Gong, Z., Wang, G., Jia, J., Xu, Y., Zhao, J., & Li, X. (2023). ChatGPT performs on the Chinese national medical licensing examination. Journal of Medical Systems, 47(1), Article e86. https://doi.org/10.21203/rs.3.rs-2584079/v1

Wiljer, D., Tavares, W., Mylopoulos, M., Campbell, C., Charow, R., Davis, D., ... & Sockalingam, S. (2018). Data and lifelong learning protocol: understanding cultural barriers and facilitators to using clinical performance data to support continuing professional development. Journal of Continuing Education in the Health Professions, 38(4), 293-298. https://doi.org/10.1097/CEH.0000000000000223.

Zhao, C. X., Wang, Z. J., Yang, X. J., Ma, X., Cui, Y., Zhang, Y. X., & Cao, D. P. (2024). Promotion of self-directed learning abilities among Chinese medical students through preparing for career calling and enhancing teaching competencies in medical education: A cross-sectional study. BMC Medical Education, 24(1), Article e386. https://doi.org/10.1186/s12909-024-05330-4

Zheng, B. (2022). Medical Students' technology use for self-directed learning: contributing and constraining factors. Medical Science Educator, 32(1), 149-156. https://doi.org/10.1007/s40670-021-01497-3