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Unveiling the heterogeneity: How adult student attributes impact their experiences of academic challenges in a pilot lifelong learning program

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Abstract: Lifelong learning (LLL) is progressively recognized as a crucial component of personal and professional development, particularly for adult students. As a heavily populated developing country, China requires profound national education reform to support its economic development and maintain its competitive advantage on the global economic stage. The governmental policy endorses the execution of diverse forms of lifelong learning programs to bolster the national education reform. However, implementing such programs can be challenging for all the stakeholders of the programs, especially for adult students. The weaker foundational knowledge and insufficient online learning abilities of adult students particularly highlight the academic challenges they face. This study explores the academic challenges faced by adult learners in a Chinese vocational college's LLL program. Focusing on ex-soldiers, unemployed individuals, migrant workers, and new professional farmers (aged 22–44), data were collected from 16 adult students via purposive sampling. Semi-structured interviews and document analysis revealed recurring thematic academic challenges. Additionally, the study found that adult student attributes (highest education level, age) significantly influenced the unique academic challenges they encountered. This research provides practical solutions to improve LLL programs and promote successful lifelong learning experiences for adult students.

Keywords: LLL program; adult students; academic challenges; online learning and technology

1. Introduction

Contextual information of the study

In the pursuit of remaining globally competitive, China has recognized the growing significance of lifelong learning. Following its introduction in China's policy documents in 1993, lifelong education and learning have been integrated into the framework of national education reform, and a comprehensive perspective on this topic was established by 2012. However, differences in ideology, national political and economic environment, and contextual factors have made it challenging to apply western concepts and practices of lifelong education and learning directly and fully in China. Thus, adapting these approaches to local conditions is crucial to ensure effective implementation of LLL initiatives in China, and to avoid undesirable outcomes that may result from overlooking the primary stakeholder- adult students involved in the specific context.

The Chinese public vocational college has carried out LLL programs in accordance with administrative instructions from the government and higher education authorities. The national policy on higher vocational enrollment expansion was formulated and enacted within a remarkably short timeframe of two months. This haste,

while intended to address pressing societal needs, often leaves insufficient time for policymakers to fully consider the practical challenges faced by implementing institutions. Consequently, crucial supporting policies and measures may not be in place when such programs roll out (Yan and Ke, 2020). Although the policy provides overall guidance and directives for the execution of the LLL program, the implementation of these programs at individual college level poses various challenges for adult learners.

The LLL program in the current college serves as a stark example. Despite its laudable goals and vision, the program's implementation has stumbled upon crucial roadblocks, primarily due to stakeholder unpreparedness. This lack of preparedness is compounded by the characteristics of the enrolled adult learners, as highlighted by existent research. The findings of those research reveal that compared to traditional students, non-traditional students entering higher vocational colleges via enrollment expansion policies demonstrate uneven academic foundations, diverse age ranges, disparate career backgrounds, and varying levels of learning motivation (Huang, 2021; Li and Li, 2020; Wang, 2021). Taking the traditional 5-point scale on quality of students as the reference frame, 86.11% of Higher Vocational Colleges achieved a score of 3 or less (Wang, 2021). This heterogeneity within the student body poses significant challenges for adult students in adapting their learning strategies to effectively fulfill the program's objectives.

While existing research provides some insights into these challenges, few studies have explored them in depth from the specific experiences and perceptions of adult students by employing qualitative inquiry within a Chinese vocational college context.

2. Literature review

2.1. Definition of lifelong learning

As Anne O'Grady noted, the term LLL is an ambiguous concept that is subject to continuous transformation and evolution over time (O'Grady, 2013). The existing literature is replete with studies that have explored and deliberated on various conceptualizations of LLL, thereby contributing to the development and evolution of the LLL conception. Nevertheless, there remains a paucity of agreement among scholars on a precise definition of LLL. According to Nguyen's (2012) assertion, researchers tend to provide diverse justifications for lifelong learning as a result of the impact of their philosophical viewpoint. In spite of that, according to the UNESCO (2022), lifelong learning refers to "all learning activities undertaken throughout life, with the aim of improving knowledge, skills, and competencies within a personal, civic, social, or employment-related perspective." This definition emphasizes the broad scope of lifelong learning, which includes both formal and informal learning activities.

2.2. The importance of LLL

Various fields, such as education, psychology, and economics, have acknowledged the significance of lifelong learning throughout one's life. In education, it helps individuals to acquire knowledge and skills necessary to adapt to new

technologies and work environments, leading to improved employability and job performance (Tynjälä, 2012). In psychology, it promotes cognitive, emotional, and behavioural development and contributes to improved mental health and well-being (Merriam and Bierema, 2013). In economics, lifelong learning is crucial for the development of a skilled and adaptable workforce, leading to increased productivity and innovation, which can positively impact both individuals and the broader economy (Tynjälä, 2012). Therefore, investing in lifelong learning opportunities is necessary to meet the demands of a rapidly changing world and remain competitive in the job market.

2.3. Previous studies on lifelong learning in China

The historical trajectory of lifelong learning in China is extensive. The concept and practice of lifelong learning are traced back to the time of Confucius around 500 BC (Su, 2009; Zhang, 2008). Therefore, Confucius's emphasis on lifelong learning has a rich historical legacy in China. However, the modern development of lifelong learning in China has encountered challenges at both macro and micro levels (Sun, 2021; Wang and Parker, 2014). The Chinese government's efforts to promote lifelong education in policy and practice have faced obstacles. To gain a deeper understanding of the research topic, researchers have found it useful to examine the literature related to lifelong learning in China.

2.4. Relevant adult learning theories

In the context of lifelong learning programs designed for adult students, it is imperative to provide a succinct introduction and analysis of the knowledge and theories pertaining to adult learning. Adult learning is a multifaceted topic that is intricately interwoven with the socio-cultural environment (Merriam and Baumgartner, 2020). The ever-evolving social and cultural background shapes the diverse learning objectives and interests of adult learners. Concurrently, the advancement and development of adult education foster and facilitate the normal functioning of the socio-cultural context. Despite the complexities involved in adult learning, effective learning and teaching processes are more attainable by adhering to the core principles and instructional strategies of adult learning theories. These theories are essential in ensuring the seamless implementation of adult learning, albeit there is no universally applicable adult learning theory that can be employed in all adult education processes. The selection of adult learning theory ought to consider the research context and the participants' characteristics. In this study, the researcher relies on adult learning theories that are pertinent to the research context, which include andragogy (Knowles, 1968), self-directed learning (Forrest III and Peterson, 2006), and constructivism (Devi, 2019; Khadidja, 2020; Piaget, 1973; Vygotsky, 1978). Additionally, these three theories are interrelated and mutually supportive, thereby constituting the theoretical framework of this study. The following **Figure 1** presents the theoretical framework of the study.

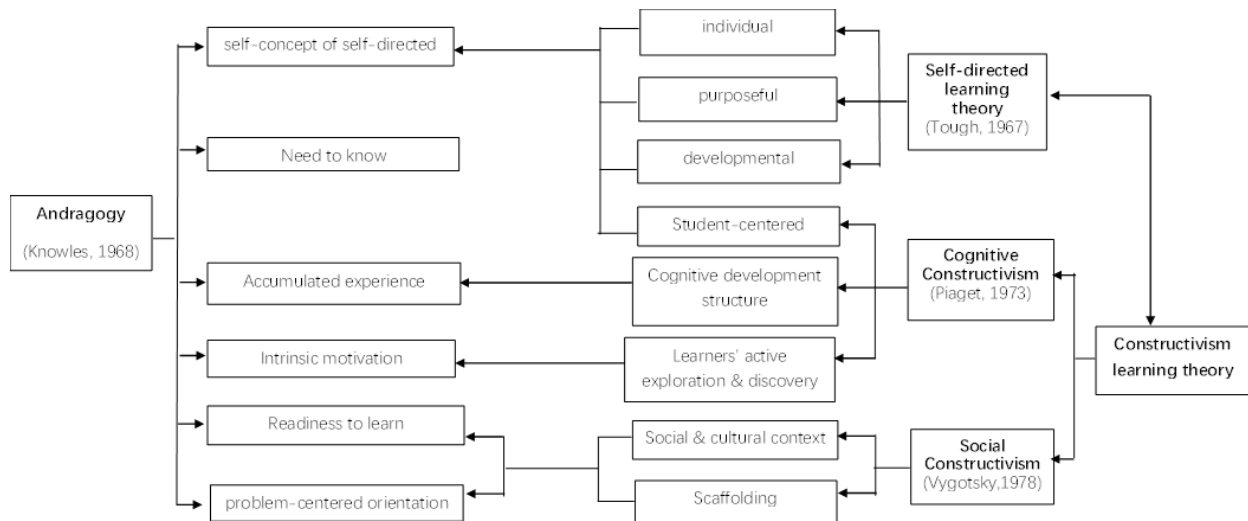


Figure 1. Theoretical framework.

2.5. Challenges faced by adult students in other similar contexts

Several researchers have categorized the challenges faced by adult learners in various ways. A prominent framework, identified by Baharudin, Murad, and Mat (2013) and originating from earlier studies like Ekstrom (1972) and Cross (1981), groups these challenges into three main categories: situational, institutional, and dispositional. Potter and Alderman (1992), later expanded this framework to include academic factors.

Expanding on the traditional three-factor framework, Potter and Alderman (1992, as cited in Baharudin et al., 2013) proposed academic barriers as a fourth category. These encompass foundational skills crucial for learning success, such as basic literacy, computer proficiency, information processing, writing abilities, and critical thinking (MacKeracher et al., 2006, as cited in Baharudin et al., 2013). Interestingly, Deggs' (2011) qualitative study suggests that academic barriers could also be interpreted as a subset of institutional barriers. The current study identified technology competency and limited face-to-face interaction as key challenges, highlighting their interdependency. Increased reliance on technology in learning often reduces direct communication, while a lack of such interaction can further diminish technological confidence and hinder problem-solving when using technology (Deggs, 2011).

In today's technology-driven world, digital literacy is essential for effective social participation. This is particularly true in the context of the Covid-19 pandemic, where online learning and remote collaboration have become crucial tools for education and communication (UNESCO, 2020). Consequently, research in recent years has increasingly focused on the challenges associated with technology application and online learning readiness (Coman et al., 2020; Dhawan, 2020; El Refae et al., 2021; Kauffman, 2015; Kara et al., 2019; Karatas and Arpacı, 2021; Pandey and Sharma, 2020).

3. Methodology

This qualitative study, rooted in the interpretivism paradigm and employing Creswell and Poth's (2012) case study approach, explores a Lifelong Learning (LLL)

program in a Chinese public vocational college. Methodological triangulation is achieved through interviews and document analysis, enriching the study's depth (Denzin, 2017b; Wood et al., 2020). To ensure instrument reliability, content validity checks and translation following Brislin's (1970) model and Chen and Boore's (2010) guide are conducted. Rigor in study design is further ensured through triangulation, member checking, peer review, thick description, audit trail, and reflexivity (Cope, 2014). Ethical considerations, including institutional approval and participant consent, are diligently followed to prioritize privacy and confidentiality.

Regarding participant selection, a purposeful, non-probabilistic sampling approach is employed to target 16 adult students directly engaged in the LLL program, ensuring contextual relevance.

Data collection primarily involved conducting semi-structured interviews online via WeChat, a real-time communication software, to accommodate Covid-19 constraints. To ensure the reliability of the instruments, a pilot study was conducted to refine them and enhance content validity. Subsequently, interviews were recorded and transcribed using Recording and Audio to Text Assistant software. The researcher then meticulously reviewed the transcriptions to verify accuracy. Participants received their transcriptions via email and were later contacted for a feedback call to validate the authenticity of the data. Following this, thematic analysis was performed according to the seven phases proposed by Lester, Cho, and Lochmiller (2020), guided by Braun and Clarke's (2006) approach for flexibility and transparency. NVivo 12 Plus was utilized for efficient data management and theme identification (Jackson and Bazeley, 2019). The identified themes formed the primary findings of the study, which were elaborated and discussed in subsequent sections, drawing on relevant literature (Howitt, 2019; Lester, Cho and Lochmiller, 2020).

4. Findings

4.1. Academic challenges faced by adult students

To explore the impact of adult student attributes on academic challenges, it is necessary to first ascertain the primary academic challenges faced by adult students. This understanding forms the foundation for unravelling how adult student attributes impact their experiences of academic challenges. To achieve this crucial step, the study employed thematic analysis of data from interviews, facilitated by NVivo 12 Plus.

Identifying the most common and impactful challenges is crucial. NVivo 12 Plus facilitated this by allowing an examination through coding reference points. These points systematically identified instances where participants mentioned specific challenge. The number of times each reference point appeared for adult students indicated the prominence of that challenge within that group. Furthermore, by examining the number of interviewees coded for each challenge within each group, the study was able to discern the unique focal points of concern within each stakeholder group. This distribution across participants provided insights into the specific challenges each group faced most frequently.

Therefore, the subsequent analysis explores the key academic challenges specific to adult students within the LLL program.

Table 1. Academic challenges faced by students: coding references and interviewee distribution.

Academic challenges	Coding reference points	Number of interviewees coded
Inadequate foundational knowledge in the chosen field of study	12	8
Challenges in adapting to online learning and technology	4	4

Note: Coding reference points systematically indicate instances where participants mentioned specific challenges. The frequency of each reference point’s appearance for a particular stakeholder group reflects the prominence of that challenge within the group.

As it is shown from the **Table 1**, the thematic analysis of the 8 adult students’ interviews highlighted two prominent academic challenges they faced when learning in the LLL program. It includes inadequate foundational knowledge in the chosen field of study and challenges in adapting to online learning and technology.

Participants shared concerns regarding their limited understanding of core concepts and knowledge gaps in their chosen disciplines, which hampered their learning progress in the LLL program with 12 references from 8 interviewees. Adult students confronted challenges related to their academic readiness and the need to acquire foundational knowledge in their chosen fields of study. For example,

Chu, an exceptionally talkative and intellectually vibrant young ex-soldier, expressed struggles with specialized courses due to a weak understanding of advanced concepts, stating, “I feel that he teaches us as if we were mainstream students, but we can’t fully comprehend the advanced concepts. It’s mainly because our group’s (learning) foundation is too weak.”

And Chu also mentioned an example concerning four elderly ex-soldier classmates:

For instance, during the first face-to-face class, there were four older retired soldiers. It was quite challenging for them to handle basic typing techniques, and sometimes they would make mistakes. They said, ‘Look at my age, I only learned to use a computer when I started working long time ago, and I just learned how to use it for my work. Suddenly, I’m using all these tools like PowerPoint and Word... it can be quite challenging.’

Sun and Zhu’s experiences further highlighted the impact of weak educational backgrounds on their learning journey. Sun stated,

The main challenge is our weak educational foundation. The ex-soldiers and migrant workers have relatively limited educational backgrounds, mostly at the junior or senior high school level. After being away from the campus environment for so many years, we need to devote more time and effort to studying compared to regular students... Yeah, in this course, we may encounter some difficulties while doing assignments.

Additionally, some students faced challenges in adapting to online learning and technology. This challenge, encountered by 4 interviewees and referenced 4 times, pointed to difficulties in navigating online learning environments.

Several adult students encountered challenges in adapting to online learning platforms and technology. Yang’s experience emphasized the challenges faced by elderly adult students in understanding online computer-related subjects. He shared, “At the beginning, I found computer-related subjects a bit difficult. After all, we are older and may struggle a bit with online learning. Computer-related topics were less

familiar to us, and we didn't have much experience with them.” Moreover, Shen’s difficulty in concentrating during online classes highlighted the impact of technological adjustments on the learning process. Shen mentioned, “The difficulty lies in getting back to learning after such a long time. At the beginning, I wasn’t sure how to approach study materials (from the online platform), and my ability to concentrate was also weaker when learning online.”

4.2. The impact of adult student attributes on academic challenges

Academic challenges faced by students also exhibit associations with their distinct attributes. Section 4.2 aims to explore the influence of adult student attributes on academic challenges within Lifelong Learning programs. Recognizing the importance of understanding the diverse characteristics of adult learners, the study focuses on two key attributes: highest education level and age. These attributes, depicted in **Table 2**, provide essential insights into the demographic profile of adult students and serve as foundational elements for the following analysis.

Table 2. Demographic characteristic of adult students.

Demographic characteristic	Population		Full sample	
	N	%	n	%
Student source				
Ex-soldiers	38	84	12	75
Others ¹	7	16	4	25
Gender				
Female	3	7	2	12.5
male	42	93	14	87.5
Age				
22–40	39	86.7	13	81.3
>40	6	13.3	3	18.7
Highest educational level				
Middle school	17	37.8	7	43.8
High school	28	62.2	9	56.2

Note: N = 45, n = 16.

¹ refers to unemployed and laid-off persons, migrant workers, and new professional farmers.

Table 3. Coverage of challenges faced by interviewed students based on different highest education level.

Challenges	Highest education level	
	Middle school	High school
1.Inadequate foundational knowledge in the chosen field of study	48.18%	51.82%
2.Challenges in adapting to online learning and technology	93.69%	6.31%

Note: The percentages represent the distribution of nodes associated with specific challenges in different highest education level (e.g., middle school and high school). Each percentage corresponds to the proportion of coded segments related to specific challenges within nodes associated with the respective highest education level.

Tables 3 and 4 are the analysis concerning comparisons of the coverage rates of two key learnability challenges based on different educational levels and age categories of the interviewed students.

Both middle school and high school-educated adult students grapple with the challenge of inadequate foundational knowledge in their chosen field of study. The data reveals that individuals with a middle school education reported a 48.18% coverage of this challenge, whereas those with a high school education reported 51.82%. The significant contrast in challenges related to adapting to online learning and technology between middle school and high school-educated individuals highlights the impact of educational background and experiences. A vast majority, 93.69% coverage is reported by individuals with a middle school education reported facing this challenge, while only 6.31% by those with a high school education encountered it.

Table 4. Coverage of challenges faced by interviewed students based on different age categories.

Challenges	Age	
	Age = 22–40	Age ≥ 40
1. Inadequate foundational knowledge in the chosen field of study	80.2%	19.8%
2. Challenges in adapting to online learning and technology	38.06%	61.94%

Note: The percentages represent the distribution of nodes associated with specific challenges in different age group (e.g., 22–40 and >40). Each percentage corresponds to the proportion of coded segments related to specific challenges within nodes associated with the respective age group.

When scrutinizing the prevalence of challenges across different age groups, the researcher notices a common recognition of academic challenges, with a notable distinction between age categories from **Table 4** above. Approximately 80.2% of the nodes relating to inadequate foundational knowledge in the chosen field of study were contributed by individuals aged between 22 and 40, while merely 19.8% were reported by those over the age of 40. This finding underscores that students across different age groups share a common understanding of the hurdles posed by weaker foundational knowledge in their learning experiences within the program.

In contrast, challenges in adapting to online learning and technology displayed a notable difference based on age. 38.06% was from individuals aged between 22 and 40, while 61.94% from those aged over 40.

5. Discussion

5.1. Interpretations of the findings

This study aimed to explore the thematic academic challenges faced by adult learners in a LLL program. The findings highlight two prominent recurring themes: inadequate foundational knowledge and difficulties adapting to online learning and technology. These challenges resonate with existing research on adult learners, where a lack of recent academic experience and comfort with technology can hinder academic success. The study’s findings corroborate several key areas of alignment with existing literature. Furthermore, in order to make sense of the challenges and their

implications, it is essential to ground the preceding interpretation in established theories and literature within the field, particularly the key principles from andragogical theories, self-directed learning, and constructivist theories in adult education. By drawing connections between these challenges and relevant educational theories, this section aims to contextualize and substantiate the interpretations.

The lack of a strong foundation in the chosen field of study emerged as a significant challenge for adult learners. This could be due to various factors, such as a long gap from formal education or pursuing a field entirely new to their prior experience. Institutions offering LLL programs can address this by providing preparatory courses or resources to strengthen foundational knowledge before diving into advanced topics. The issue of inadequate foundational knowledge in the chosen field of study is a common concern, aligning with the works of Baharudin et al. (2013) and Kenner and Weinerman (2011).

Furthermore, the shift to online learning environments presented difficulties for some adult learners. This could be due to unfamiliarity with online learning platforms, time management challenges while juggling work and personal commitments, or limited access to reliable technology. The challenges in adapting to online learning and technology, as reflected in the works of Kauffman (2015), Țiru, Meseșan-Schmitz, Stanciu and Bularca (2020), and Dhawan (2020), encompass a broad spectrum of factors, including technical issues, institutional preparedness, inadequate teacher training and adaptation to the online environment, as well as student variability in capability, comfort, and engagement levels, all of which can hinder the effectiveness of the teaching-learning process. LLL programs can mitigate these issues by offering comprehensive training on using the online platform, providing flexible learning schedules, and ensuring accessible technology resources for all students. In today's evolving landscape of adult education, foundational knowledge and technological adaptation remain fundamental aspects, and the study highlights that such challenges persist even in specific contexts such as vocational colleges.

The study also revealed that adult learner attributes, such as prior educational level and age, can influence the nature of academic challenges encountered.

This similar prevalence in challenges of inadequate foundational knowledge in their chosen field of study across educational backgrounds of adult students (48.18% for middle school vs. 51.82% for high school) suggests a willingness to acknowledge and question their existing knowledge, exemplifying self-directed learning principles. As Mezirow (1985) states, self-directedness involves awareness of their own learning needs and capabilities, emphasizing the importance of critical self-reflection. Such an attitude of self-awareness is crucial when individuals take responsibility for their own thoughts and actions (Kruszelnicki, 2020). In this context, adult students' motivation to enhance their foundational knowledge demonstrates their initiative in overcoming knowledge gaps, aligning with the core principles of self-directed learning.

The stark difference in challenges adapting to online learning between middle school and high school-educated adults (93.69% for middle school vs. 6.31% for high school) suggests a clear impact of educational background and experiences. This point is exemplified by empirical evidence gathered from interviews with three students who completed junior high school education before enlisting in the program. They shared valuable insights that echo the andragogical theory's second assumption regarding the

role of experience in adult learning (Knowles, 1977; Kolb, 2014). These students reported that their prior education placed limited demands on digital skills, and their subsequent non-tech related jobs, particularly in military roles, didn't involve internet or digital technologies. This aligns with the andragogical perspective, which posits that adults draw upon their life experiences, including their educational backgrounds, to shape their learning.

As adults accumulate acquired knowledge and skills overtime, this experience guides their learning and helps bridge knowledge gaps (Forrest III and Peterson, 2006). Therefore, individuals with limited exposure to digital technologies during their earlier educational and work environments may encounter greater difficulty adapting to online learning. Recognizing this, it is crucial to acknowledge and build upon adults' accumulated experiences. Tailored strategies that consider their unique backgrounds and address specific challenges should be developed, recognizing the andragogical assumption that adults draw upon their life experiences in their learning processes.

The findings further reveal a notable age-related difference in reported academic challenges. While both younger and older students acknowledge this hurdle, it's more frequently cited by those aged 22–40 (80.2%) compared to those over 40 (19.8%). This suggests a shared awareness of foundational knowledge gaps across age groups but different perceptions of their severity. Several factors potentially explain this discrepancy. Firstly, younger adults, with their recent academic experiences and familiarity with digital resources, may readily expect online solutions. Encountering limitations in readily available online support might amplify their perception of inadequate foundational knowledge as a significant challenge. Piaget's cognitive constructivism theory can shed light on this phenomenon. This aligns with Piaget's cognitive constructivism, where new materials or experiences are integrated with the learners' existing knowledge, forming internal cognitive structures (Amineh and Asl, 2015; Barrouillet, 2015; Fei, 2002). Younger students, accustomed to digitally accessible academic resources, might perceive limited online support as a significant knowledge gap. According to cognitive constructivism, new materials or experiences are integrated with the learners' existing knowledge, forming internal cognitive structures (Amineh and Asl, 2015; Barrouillet, 2015; Fei, 2002). For younger students, recent digital experiences make online resources readily accessible, leading them to expect solutions online. When these expectations are unmet, they perceive a lack of foundational knowledge as a significant barrier.

Conversely, older adult students, out of formal education for longer, can potentially compensate for foundational gaps with their rich life experiences and wider social connections. They leverage these networks and resources to navigate learnability challenges, minimizing the perceived impact of weaker foundational knowledge. From Vygotsky's perspective of social constructivism, older adult learners might be more adept at compensating for their inadequate foundational knowledge through social interactions and knowledge transfer within their cultural contexts. Therefore, they may perceive the challenge of inadequate foundational knowledge as relatively minor because they believe that social interactions and cultural contexts can provide the necessary support and knowledge. This aligns with the social constructivist view that learning is a process of social interaction where individuals collectively construct knowledge within their social and cultural

backgrounds (Khadidja, 2020; Liu, and Chen, 2010). Additionally, the significant difference in reported challenges between the two age groups may be influenced by the notably small proportion of students over the age of forty, with only 3 out of 16 belonging to this age group.

Challenges in adapting to online learning and technology displayed a marked difference based on age (38.06% for individuals aged between 22 and 40 vs 61.94% for aged over 40). This indicates that the older age group is more challenged by adapting to online learning and technology, potentially due to a less familiar relationship with online learning environments and weaker digital skills. They may not be as proficient in using digital devices and technology as younger individuals.

While this explanation aligns with the context of the current study, it does not necessarily establish a direct link between age and digital proficiency, as indicated by previous research (Nasah et al., 2010). The study conducted by Nasah et al. (2010) suggests that while age plays a role in information and communication technology (ICT) use, it is not the primary factor. Nasah et al.'s research provides valuable insights into the complex relationship between age and digital literacy, highlighting that age alone cannot explain all differences in digital proficiency. Recognizing limitations inherent to each research findings, including sample size, scope, methods, and context, is essential. Thus, the findings of the current study require contextualization, acknowledging their specific applicability and not generalizing them to all adult learners.

Learners with higher prior educational attainment might face less difficulty acquiring new knowledge. Similarly, younger adult learners might adapt more readily to online learning environments compared to their older counterparts. LLL programs can benefit from tailoring support structures based on these factors. For example, offering more personalized guidance to adult learners with lower prior educational backgrounds or providing additional training on online learning tools for older adults. The finding underscores the importance of personalized and differentiated support mechanisms. Recognizing that learners come from diverse backgrounds and possess varying levels of prior knowledge and experience, educators and program administrators must adopt flexible and responsive approaches to meet the individual needs of each learner. This could involve tailored instructional strategies, customized support services, and flexible course delivery formats to accommodate the diverse learning styles and preferences of adult students.

5.2. Implications

The findings of this study carry significant implications for professionals, practitioners, and policymakers involved in the development and implementation of LLL programs.

Primarily, the study underscores the importance of tailoring support strategies for adult students enrolled in LLL programs, with a focus on enhancing their adaptation to online learning and technology, as well as strengthening their foundational learning skills and methods. Recognizing the diverse backgrounds of adult learners, a one-size-fits-all approach proves ineffective. Practitioners and policymakers must acknowledge this diversity and invest in personalized support mechanisms to cater to the unique needs of adult learners in these areas.

Moreover, the study emphasizes the necessity of adopting a student-centered approach in LLL programs, particularly in facilitating adult students' adaptation to online learning and technology, while also enhancing their foundational learning abilities and methods. This entails providing customized support that aligns with the individual needs of adult learners and addresses their challenges in adapting to online learning environments. By implementing personalized, adaptive instruction and integrating both online and offline resources, LLL programs can create an inclusive learning environment that fosters self-directed learning, strengthens foundational learning skills, and enhances adult students' proficiency with online learning tools.

Furthermore, LLL programs should empower adult learners to pursue self-directed and personalized learning journeys, including mastering the skills necessary for successful online learning and enhancing their foundational learning abilities and methods. This involves granting them the flexibility to tailor their educational paths according to their specific needs, interests, and career aspirations, while also providing targeted support to improve their adaptation to online learning and technology, as well as their foundational learning skills and methods. By cultivating an environment that prioritizes personalized learning, digital literacy, and foundational learning, LLL programs can empower adult students to navigate online learning platforms effectively, strengthen their foundational learning abilities, and enhance their overall learning experience.

For instance, collaborative learning environments facilitated by student-led study groups can enhance the learning process by promoting the exchange of knowledge and experiences among peers, including tips and strategies for effective online learning and foundational learning. Additionally, online learning seminars and workshops focused on digital literacy skills and foundational learning methods can offer valuable opportunities for interaction, knowledge sharing, and engagement, further enriching the learning experience for adult students and improving their adaptation to online learning and technology, as well as their foundational learning abilities and methods.

5.3. Limitations and future directions

The current study acknowledges certain limitations that should be considered alongside its findings.

While focusing on a single college allowed for an in-depth exploration of the LLL program's implementation within its specific context, it also resulted in a relatively small sample size. This college was chosen as the pilot program location by the administrative department for education, and due to policy restrictions, only one to three majors could participate in the LLL program each year. Consequently, the study involved only 16 adult students. This limited scope restricts the generalizability of the findings beyond the specific college context.

The second limitation arises from the inherent nature of qualitative research. As a qualitative study, this study focused on gaining a nuanced understanding of the LLL program through the perspectives of adult students. While providing valuable insights into their experiences and perspectives, the findings cannot be directly extrapolated to other contexts or populations without further research.

Despite these limitations, the study's strengths lie in its detailed exploration of the LLL program's implementation within a specific context and the rich data

collected through one-to-one interviews with adult students. The findings offer valuable insights into the academic challenges faced by adult students involved in the program, as well as their strategies for overcoming these challenges. This in-depth understanding can inform the improvement of the LLL program at the micro-level within the college itself. Additionally, the study contributes to the growing body of research on adult education and lifelong learning, particularly in the context of vocational colleges. The findings can guide further research and inform program improvement at both the college and local levels.

The current study not only contributes to the existing literature but also opens the door to potential research directions for future investigations. Due to limitations in location, sample size, and constraints on data collection resources and time, this study did not delve into the specific and nuanced insights of students, teachers, and administrators within the context of a vocational college in China to provide a comprehensive picture of the implementation of the LLL program. By exploring the perceptions and experiences of these key stakeholders, future studies could offer a more comprehensive understanding of the challenges they face when participating in lifelong learning programs. The scarcity of studies addressing the challenges encountered by the main key stakeholders of lifelong learning programs in the context of a Chinese vocational college highlights the novelty and importance of this type of study.

In addition to academic challenges, adult students in LLL programs may encounter other types of challenges, including situational, institutional, and dispositional barriers. Future research could continue to delve comprehensively into the challenges faced by adult students in LLL programs, encompassing a broader spectrum of obstacles they may encounter.

Furthermore, obtaining relevant data from teachers and administrators could fill the academic gap of specific classifications of challenges faced by them, complementing the existing literature that predominantly focuses on challenges encountered by adult students. Exploring the feasibility of applying thematic categorization systems of challenges faced by adult students to teachers and administrators in LLL programs could offer valuable insights into program management and support strategies.

Moreover, this study did not quantitatively explore the interrelationships among the challenges faced by adult students, which presents an exciting avenue for further research. Future studies could employ quantitative methodologies to investigate the intricate interplay and correlations between the academic challenges experienced by adult students within the context of lifelong learning programs. This would provide a more comprehensive understanding of how these challenges may influence or be influenced by each other, offering invaluable insights for program enhancement and development.

6. Conclusion

In closing, this study contributes to the gap in the literature by focusing on the unique experiences of adult students within a vocational college LLL program in China. It explored beyond mere academic challenges faced by adult students in the

LLL program, but also offered an in-depth understanding of their experiences, encompassing the influence of individual student attributes on these academic challenges.

Through semi-structured interviews and a comprehensive document review, this qualitative investigation paints a picture of the teething academic difficulties encountered by adult students. Furthermore, the study sheds light on how diverse adult student attributes including education level and age can influence the academic challenges they face.

The study adds significant value to the existing literature by offering in-depth insights into the unique experiences and perspectives of these key stakeholders in a vocational college setting in China. The identified challenges and their subsequent implications highlight the importance of tailored support and digital literacy training for addressing the academic issues adult students can encounter in LLL programs. These findings not only inform the field but also have practical implications for program development and decision-making, ensuring that adult students receive the support they need to succeed.

By exploring these challenges and proposing practical solutions, hopefully it could advance the field and ensure the successful implementation of LLL programs, ultimately benefitting adult students in their lifelong educational journeys.

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