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Examining the relationship of self-regulated learning practices and challenges in Chinese vocational and technical education

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Abstract
Aim: This study aimed to explore the relationship between the practices and challenges in the self-regulated learning (SRL) practices and challenges among vocational and technical students in China.
Methodology: This study employed a quantitative approach, specifically descriptive-correlational research, which aimed to describe the variables and their relationships. Through random stratified sampling, the respondents of this study were five hundred ninety-eight (598) students in one of the vocational and technical schools in China.
Results: The results of the study revealed several significant insights into the dynamics of SRL especially in terms of practices and challenge in an educational context.
Conclusion: By identifying prevalent SRL practices and acknowledging challenges through the lens of Bandura's Social Cognitive Theory, the research showed the development of targeted interventions aimed at empowering the Chinese vocational and technical students with the necessary skills and strategies to become autonomous and lifelong learners.

Keywords: self-regulated learning, practices, challenges, Chinese vocational and technical education

INTRODUCTION

Self-regulated learning (SRL) is an important aspect of educational development, particularly for students in vocational and technical education (Mejeh & Held, 2022). As the world rapidly demands a highly skilled and adaptable workforce, vocational and technical education students must possess the ability to take charge of their learning process, set goals, monitor their progress, and adjust their strategies accordingly (Brandt, 2020). SRL empowers students to become active participants in their education, equipping them with the skills and mindset necessary for success in their chosen fields of expertise.

Vocational and technical education, also known as career and technical education, provides specialized training and knowledge to equip students for specific careers or industries. Unlike traditional academic disciplines, vocational and technical education emphasizes hands-on experiences and practical skills development (Bun et al., 2022). In China, vocational and technical schools have a crucial role in the country's education system, offering specialized training and practical skills development to prepare students for specific trades, industries, and professions (Yuan & Wang, 2021). These schools are a vital component of China's efforts to address the growing demand for a skilled and adaptable workforce to support its rapidly expanding economy. Thus, SRL could help students to navigate the unique practices and challenges of their chosen vocations.

According to Pintrich (2004), SRL involves a set of metacognitive, affective, and behavioral strategies that empower students to take control of their learning process. Metacognition refers to the ability to reflect on and regulate one's own thinking and learning. By engaging in metacognitive processes, vocational and technical education students can identify their strengths, weaknesses, and learning preferences, enabling them to make informed decisions about their learning strategies.

Additionally, SRL encompasses affective strategies that involve managing emotions, motivation, and self-perception (Panadero, 2017). Vocational and technical education students often encounter real-world challenges and

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practical tasks, which can be demanding and require perseverance. By cultivating emotional resilience and motivation, students can overcome obstacles, stay focused, and maintain a positive attitude throughout their learning journey.

Furthermore, behavioral strategies are crucial in SRL as they involve planning, organizing, and implementing effective learning strategies (Alvi & Gillies, 2020). Vocational and technical education students must learn to set goals, break them down into manageable steps, prioritize tasks, and regulate their efforts to optimize their learning outcomes. By actively monitoring their progress and adjusting their strategies, when necessary, students can enhance their overall performance and achieve their desired learning outcomes.

SRL plays a pivotal role in the education of vocational and technical students (Jossberger, 2019). By empowering students to become active agents in their own learning process, SRL equips them with essential skills, metacognitive abilities, emotional resilience, and behavioral strategies necessary for success in their chosen vocational fields. As educators and institutions continue to recognize the significance of SRL, fostering self-regulated learners will undoubtedly contribute to the development of a skilled, adaptable, and future-ready workforce.

Much research has been conducted on the outcomes of SRL in the cognitive learning process of students. However, there have been relatively few analyses regarding vocational and technical education among Chinese students, with a focus on their SRL practices and challenges. Through Social Cognitive Theory (SCT) of Albert Bandura, this present study aimed to extend the existing literature by examining the relationship between the practices and challenges of SRL among Chinese students.

Objectives

This study aimed to examine the relationship between the practices and challenges of vocational and technical students' self-regulated learning in China.

Specifically, it sought answers to the following questions:

a. How may the profile of the respondents be described in terms of:
    1. age
    2. course
    3. sex
b. How may the self-regulated learning practices of the respondents be described?
c. How may the self-regulated learning challenges of the respondents be described?
d. Is there a significant relationship between the challenges and practices of the vocational students' self-regulated learning in China?

Theoretical Framework

The SCT by Bandura focuses on the interactions between personal factors (cognition, motivation, and affect), behavior, and the environment (Bandura, 1986). This theory is particularly suitable for studying SRL practices and challenges in vocational and technical schools, as it emphasizes the role of self-regulation in guiding one's learning behavior.

In the context of this study, the SCT can be used to examine how vocational and technical students' cognitive processes (e.g., metacognition), motivational factors (e.g., self-efficacy, goal-setting), and emotional aspects (e.g., motivation, engagement) influence their SRL practices. Bandura's theory proposes that individuals' beliefs in their capabilities (self-efficacy) play a significant role in determining their willingness to engage in SRL behaviors (Bandura, 1997).

The environment also plays a crucial role in the SCT. In the case of vocational and technical schools in China, the learning environment, teacher support, and resources available can influence students' perceptions of their abilities and their engagement in SRL (Pintrich, 2004).

By adopting the Social Cognitive Theory as the theoretical framework for this study, the researchers can explore the complex interplay between cognitive, motivational, and environmental factors in shaping students' SRL practices and their ability to overcome challenges in vocational and technical education.

Review of Related Literature

SRL Practices

SRL is a critical process in which learners actively take charge of their learning, set goals, monitor progress, and regulate their strategies to achieve academic success. The concept of SRL has gained significant attention in

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educational research, with studies exploring its various components and its effectiveness in improving learning outcomes.

Zimmerman's social cognitive perspective on SRL has been influential in shaping research in this area. Zimmerman (2000) proposed that self-regulated learners engage in metacognitive, affective, and behavioral processes to effectively control their learning. Metacognitive processes involve planning, monitoring, and evaluating one's learning progress, while affective processes include managing motivation and emotions related to learning. Behavioral processes entail employing specific strategies to enhance learning outcomes.

The relationship between SRL and academic achievement has been extensively studied. A meta-analysis by Dignath and Büttner (2008) revealed a positive and significant correlation between SRL and academic performance across various educational levels and subjects. In addition, numerous self-regulatory practices have been found to contribute to academic success in conventional (Jansen et al., 2019) and online (Broadbent and Poon, 2015). Practices for SRL allocating and controlling time have been empirically linked to academic outcomes such as GPA (Thibodeaux et al., 2017; Adams & Blair, 2019; Wolters & Brady, 2020). Therefore, these findings suggest that students who actively practice self-regulation tend to achieve better academic results.

Moreover, research has highlighted the role of SRL in enhancing students' problem-solving skills and critical thinking abilities. Pintrich (2004) proposed a conceptual framework for assessing motivation and SRL in college students, emphasizing the impact of self-regulation on the development of higher-order cognitive skills. By actively involving themselves in their learning process, students can improve their ability to analyze, evaluate, and apply knowledge effectively. Moreover, in the study of Brenner (2022), the SRL practices of pre-service teachers create contextual conditions that foster their development in their future career in teaching. In the study of Gopez and Gopez (2023), it was found that self-regulation was a mediator in the relationship between instructor scaffolding for interaction and students engagement. Thus, SRL practices have a rightful place in the learning development of the students.

Incorporating SRL interventions in educational settings has shown promising results in promoting self-regulated behaviors among students. Zimmerman and Kitsantas (2014) examined the impact of a self-regulation intervention program on middle school students. The program focused on teaching students various SRL strategies, and the findings indicated significant improvements in their academic performance and self-efficacy beliefs.

However, SRL practices may vary across different cultures and educational contexts. Järvelä and Järvenoja (2011) investigated SRL in the context of collaborative learning and found that the cultural background and collaborative processes significantly influenced students' SRL behaviors. This suggests the importance of considering cultural factors when designing and implementing SRL interventions.

SRL practices have emerged as a crucial aspect of effective learning and academic achievement. The integration of metacognitive, affective, and behavioral strategies empowers learners to take control of their learning journey and achieve their educational goals. Research has demonstrated the positive correlation between SRL and academic performance, problem-solving skills, and critical thinking abilities. Implementing SRL interventions in educational settings shows great potential in cultivating self-regulated learners and enhancing overall learning outcomes.

SRL Challenges

SRL is a valuable approach that empowers learners to take charge of their educational journey, yet it also presents several challenges that students may encounter. Identifying and understanding these challenges are crucial for educators and institutions to design effective strategies and support systems that foster successful self-regulated learners.

One of the primary challenges in SRL is the development of metacognitive skills. Metacognition involves the ability to reflect on one's own learning process and make informed decisions about learning strategies. However, many students struggle to effectively monitor their learning progress and regulate their behaviors accordingly (Dignath & Büttner, 2008). This lack of metacognitive awareness can hinder students from identifying areas of improvement and adjusting their learning approaches.

Time management is another significant challenge in SRL. Balancing academic responsibilities, extracurricular activities, and personal life can be demanding for students, leading to difficulties in allocating sufficient time for learning tasks (Broadbent, 2017). Moreover, there is a unique characteristic of adolescents that can further increase adolescents' academic challenges (Wu et al., 2023). Time management and procrastination remain difficult for adolescents (Dembo & Eaton, 2000). Hence, poor time management can result in procrastination and inadequate preparation for assessments, ultimately affecting overall learning outcomes.

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Furthermore, maintaining motivation and engagement throughout the learning process is a common challenge in SRL. Students may encounter periods of low motivation, especially when facing complex or uninteresting tasks (Pintrich, 2004). Sustaining motivation is essential for students to persevere through challenges and maintain a positive attitude towards learning.

The transition to SRL from more traditional instructional methods can also pose challenges for students. In traditional learning environments, students may have been accustomed to passive learning, relying heavily on teacher guidance and direction. Shifting to an active role in their learning can be challenging for some students, requiring a shift in mindset and behavior (Zimmerman & Kitsantas, 2014). The study of Xia et al. (2022) revealed that challenges in online learning were experienced by college students during the pandemic.

Cultural factors can also influence SRL practices and challenges. Different cultural backgrounds may affect students' beliefs about learning, their attitudes towards seeking help, and their perceptions of self-efficacy (Järvelä & Järvenoja, 2011). Cultural variations in approaches to learning can impact how students engage with SRL strategies and respond to academic challenges. Addressing these challenges requires a multi-faceted approach that involves both students and educators. Educators play a crucial role in fostering SRL skills by providing explicit instruction on metacognition, time management, and motivation regulation (Huang & Chen, 2020). They can also design learning environments that promote autonomy and provide timely feedback to support students' SRL development.

Support systems and resources are essential for students to overcome SRL challenges. Peer collaboration and support networks can encourage students to exchange strategies and share experiences, fostering a sense of belonging and motivation (Hadwin et al., 2017). Moreover, incorporating technology-based tools and learning platforms can offer personalized learning experiences and facilitate self-monitoring (Broadbent, 2017).

SRL presents several challenges for students, including difficulties in developing metacognitive skills, managing time effectively, maintaining motivation, transitioning from traditional learning methods, and navigating cultural influences. Addressing these challenges requires a comprehensive approach that involves explicit instruction, personalized support, and the integration of technology. By recognizing and addressing these challenges, educators can better equip students to become successful and independent self-regulated learners.

Vocation and Technical Education in China

Vocational and technical education plays a crucial role in China's education system, providing specialized training and skills development for students pursuing specific trades and industries. The vocational and technical school system in China has undergone significant reforms and development over the years, aimed at meeting the changing demands of the job market and supporting economic growth.

One essential aspect of vocational and technical education in China is the establishment and expansion of vocational and technical schools. According to Zhang and Li (2018), vocational and technical schools have witnessed remarkable growth in China, with an increasing number of students enrolling in these institutions. These schools offer a diverse range of vocational programs, including engineering, agriculture, business, and healthcare, among others.

The curriculum in vocational and technical schools in China is designed to integrate theoretical knowledge with practical skills. Huang and Lin (2020) emphasize that these schools focus on hands-on training and experiential learning, preparing students for the specific demands and requirements of their chosen vocations. The practical orientation of vocational and technical education in China aligns with the country's emphasis on applied skills and workforce development.

To enhance the quality of vocational and technical education, China has implemented various policies and initiatives. One notable policy is the "Double Teacher" system, as highlighted by Yin et al. (2019). This system involves pairing vocational and technical school teachers with industry professionals, allowing students to benefit from the combined expertise and bridge the gap between education and industry needs. The "Double Teacher" system aims to ensure that vocational and technical students receive up-to-date and industry-relevant training.

The importance of vocational and technical education in China's economic development is widely recognized. Chen and Zhu (2018) argue that vocational and technical education contributes to the country's overall competitiveness and productivity. By providing a skilled workforce, vocational and technical schools support China's industrial growth, technological advancements, and innovation.

However, challenges and areas for improvement within the vocational and technical education system in China have also been identified. Liu and Guo (2019) note the need to enhance the alignment between vocational and technical education and industry demands, as well as improve the professional development of vocational teachers. Additionally, Huang and Chen (2020) suggest that the integration of information technology and digital skills into vocational curricula is crucial for preparing students for the evolving job market.

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Vocational and technical schools in China play a vital role in preparing students for specific trades and industries through a practical and skills-oriented approach to education. The growth of vocational and technical schools, policies like the "Double Teacher" system, and the recognition of vocational and technical education's contribution to economic development highlight China's commitment to fostering a skilled workforce. However, ongoing efforts are needed to further align vocational education with industry demands and enhance the integration of digital skills.

Demographic Profile and SRL

Demographics have long been investigated for relationships with many aspects of educational research. Gender was shown as a significant factor in predicting learners' perceived learning wherein female students had higher perceived learning than the male students (Rovai & Baker, 2005). In the study of Colorado and Eberle (2012), higher level or graduate students tended to be more self-regulated in learning. According to Lan (2015), Older students used more advanced strategies to monitor their own learning behaviors frequently than younger students. Vermunt and Vermetten (2004) reported that more experienced learners showed better mastery and usage of effective learning strategies. Demographic variables like gender influenced students' cognitive strategy usage but not regulation/management strategy usage (Wolters & Pintrich, 1998). Artino and Stephens (2009) found that graduate students showed more critical thinking patterns during learning than undergraduate students when their experiences were controlled. Students who had taken online courses before used more SRL strategies (Wang et al., 2013). Law et al. (2008) did not find significant different SRL strategy usage between students of different ages; however, they did reveal that female students reported more SRL strategy usage than the male students. Wang et al. (2013) reported that students who had more successful prior online learning experiences tended to use more SRL strategies.

Synthesis

Vocational and technical schools in China serve as essential platforms for students to receive specialized training and skills development. To enhance their learning experience, vocational and technical students can benefit from adopting SRL practices. While SRL offers significant advantages, students may encounter challenges in developing metacognitive skills, managing time, sustaining motivation, and transitioning to an active role in their learning. Addressing these challenges requires comprehensive strategies that involve explicit instruction, personalized support, and understanding cultural influences. By equipping vocational and technical students with effective SRL practices, educators and institutions can foster a skilled and independent workforce capable of meeting the demands of a rapidly changing job market.

METHODS

Study Design and Locale

This study employed a quantitative approach, specifically descriptive-correlational research, which aimed to describe the variables and their relationships. This approach emphasizes the use of objective measurements and statistical, mathematical, or numerical analysis of data. Data will be collected through questionnaires, surveys, or by utilizing computational techniques to compute existing statistical data. With this descriptive-correlational design, this study aimed to understand relationships between two variables - SRL practices and SRL challenges to identify trends and patterns, inform decision-making processes, explore new areas of inquiry, and guide practical applications in various fields.

The locale of this study was in a selected vocational and technical school at Yantai City, Shandong Province, China. In this vocational and technical school, the number of students is increasing. Thus, the finding of this study may aid the school administration in the continuous improvement of vocational and technical students through SRL.

Study Participants

Stratified random sampling was utilized to determine the number of respondents in this study. Using the Raosoft calculator to calculate the sample size, the population size of the locale had an estimated 10,000 vocational and technical students with a 95% margin of level and a 5% margin of error. Thus, the computed sample size based on the Raosoft calculator was at least 370 respondents.

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Inclusion and Exclusion Criteria

For the inclusion criteria, a respondent should be: (1) above 18 years old, (2) a Chinese citizen, and (3) currently enrolled in a vocational and technical school in China. For exclusion criteria, a respondent should not be (1) a part-time student (less than 4 subjects), (2) with medical or psychological conditions, and (3) have a conflict of interest with the researchers.

Study Instruments

The variables were measured through the following adapted instruments

1. The SRL Practices Scale

The SRL-Practices Scale (Hadwin et al., 2021) is a questionnaire designed to assess students' perceptions of their engagement in SRL practices. It consists of 31 items that measure various aspects of SRL. These items are divided into eight subscales that capture different dimensions of SRL goal management (items 1-5) (α=.89), task understanding (items 6-10) (α=.78), task value (items 11-13) (α=.61), motivation appraisal (items 14-16) (α=.73), monitoring (items 17-19) (α=.80), adaptation (items 20-25) (α=.83) time management (items 26-28) (α=.68), , and academic social engagement (items 29-31) (α=.72) (Wu et al., 2023). Respondents are required to rate their level of agreement with each statement on a five-point Likert scale, ranging from (1) "Strongly disagree" to (5) "Strongly agree. The SRL-Practices Scale (SRL-P) is a comprehensive questionnaire that assesses students' perceptions of their engagement in various SRL practices. It provides valuable insights into students' beliefs and behaviors related to SRL, helping researchers and educators gain a deeper understanding of students' self-regulation processes and guide the development of interventions to enhance SRL skills.

2. The SRL Challenges Scale

The SRL-C Scale measures the degree of students when encountered challenges in their studies. Respondents will be asked to rate their responses on a 5-point Likert scale, ranging from (0) "Strongly disagree" to (0) "Strongly agree." Higher scores on the scale indicate that students may be facing challenges in effectively managing various aspects of studying, which are commonly linked to student success and performance. This instrument has 6 subscales: metacognitive challenges (items 1-9) (α=.92), social and emotional challenges (items 10-15) (α=.84), cognitive challenges (items 16-21) (α=.88), initiating-sustaining challenges (items 22-25) (α=.79), behavioral challenges (items 26-29) (α=.83) and motivation challenges (items 30-33) (α=.79) (Wu et al., 2023).

Procedures

Prior to the data collection, the test questionnaires were translated into Mandarin and face-validated by three (3) experts who have a background in the Mandarin and English language. Once translated and validated, the researchers asked permission from the school administrator to conduct the study via online survey. The letter provided a detailed description of the study's nature and purpose, along with the ethics clearance certificate after it was approved by the Ethics Review Committee of Angeles University Foundation. Additionally, the letter included the informed consent form, demographic information, and test questionnaires by the researchers for data collection purposes. The students were recruited through the assistance of the department chairs. The researchers provided a QR code of the online survey to the department chairs who shared it to their students. The students may answer the online survey in their most convenient time. Also, they may use their gadgets (cellular phones, laptops, etc.) in accomplishing the online survey. The online consent form sought the respondent's permission to complete the survey questions, which would take approximately 10-15 minutes of their time.

Statistical Analysis of Data

The researchers will employ the jamovi project (2023) version 2.3 to compute and analyze the collected data. The profile of the respondent was described in terms of sex, age and course. For the descriptive statistics, the respondents' SRL practices and challenges were reported using the research instruments. For the inferential statistics, Pearson correlation was performed to analyze the collected data if there is a significant relationship between the respondents' SRL practices and challenges.

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Ethical Considerations

In this study, strict adherence to research ethics principles was ensured. The researchesr fulfilled all necessary requirements and followed the recommendations of the Ethics Review Committee at the Angeles University Foundation to obtain permission for data collection. Prior to their participation, the respondents were asked to provide informed consent by agreeing to participate in the online version of the consent form. Choosing the option "I hereby voluntarily agree to participate." ("我在此自愿同意参加。") would be the indication that a respondent gave his/her consent to answer the online survey. To protect participants' privacy, the researchers upheld the security and confidentiality of their data. The online survey would take approximately 10-15 minutes.

The participation of the respondents in the research was voluntary, and their decision was respected entirely. The respondents were informed that they could withdraw from the study at any time without facing any consequences if they felt uncomfortable during the survey. If there would be inconvenience, they may stop answering the online survey anytime. The collected data of those who decided not to continue finishing the survey were discarded immediately.

Throughout the study, the identities of respondents were kept anonymous to ensure confidentiality. The data provided by them would only be used for the intended purpose and be treated with utmost care and confidentiality. There was no alteration of the data to maintain its integrity. Thus, there were minimal potential risks that may occur. All collected information was securely stored on a protected laptop, using a password that only the researchers would have access to. Personal data and information disclosed by the respondents were accessible solely to the researchers. Once the research obtained sufficient valid criteria, all available data would be deleted promptly, but no later than two years after collection. Participants would not receive any monetary benefits for taking part in this study. Their right to refuse future storage and use of their data for potential future studies were respected, and they would be informed that the study might be presented in a research forum or published in a journal. Participants would have the option to receive a summary of the findings before they are publicly accessible.

RESULTS AND DISCUSSIONS

The present study explored the relationship between SRL practices and challenges among Chinese vocational and technical students. The findings revealed several significant insights into the dynamics of SRL in this specific educational context.

Profile of the Respondents

The total number of respondents who accomplished the online survey was 774 students. However, 176 respondents were disregarded due to missing entries and not meeting the established exclusion criteria. Thus, the total study sample was 598 respondents. Their ages ranged from 18-20 years old with the mean=18.4 (see Table 3), wherein most were male (n=388, 64.9%) (see Table 1). In terms of major, early childhood education had the highest number of respondents (n=89, 14.9%), and the lowest was art and design (n=25, 4.2%).

Table 1. Distribution of the Respondents by Sex

Sex	Frequency	Percentage
Male	388	64.9
Female	210	35.1
Total	598	100

Table 2. Distribution of the Respondents by Course

Course	Frequency	Percentage
Early Childhood Education	89	14.9
Computer Science	79	13.2

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Architecture	42	7.0
Fashion Design	65	10.9
Automotive	32	5.4
Mechatronics	76	12.7
Tourism Management	45	7.5
E-Commerce	66	11.0
Art and Design	25	4.2
Nursing	79	13.2
Total	598	100

Table 3. Descriptive Statistics of the Age of the Respondents

	Mean	SD
Age	18.4	0.59

Descriptive Statistics of the SRL Practices and SRL Challenges

Table 4 presents the mean and standard deviation (SD) of the two study variables, SRL practices and SRL challenges. The respondents' SRL practices got an average score of 4.00 with a SD of 0.80 while their SRL challenges obtained an average score of 3.95 with a SD of 0.80. This may suggest that Chinese vocational and technical students utilize SRL practices in their learning process while experiencing academic challenges.

Table 4. Descriptive Statistics of the SRL Practices and SRL Challenges

Variables	Mean	SD
SRL Practices	4.00	0.80
SRL Challenges	3.95	0.78

Correlation and Internal Consistency

Table 5 shows the results of the correlation and Cronbach' alpha of the total sample of the study variables. All scales revealed good internal reliabilities (see Table 6). Also, Pearson correlation analysis was conducted to determine the relationship between the SRL practices and SRL challenges of Chinese vocational and technical students (see Table 5). SRL practice and SRL challenges are positively related (r=0.96, p=.001). The observed relation of the variables may imply the Chinese vocational and technical students tend to regulate their learning processes and experiences even there are academic challenges.

Table 5. Correlations of SRL Practices and SRL Challenges

	r	p
SRL Practices and SRL Challenges	0.96	<.001

Note. * p < .05, ** p < .01, *** p < .001; N=598

Table 6. Cronbach Alpha of SRL Practices and SRL Challenges

	SRL Practices	SRL Challenges
Cronbach Alpha	0.995	0.989

Relationship between SRL Practices and Challenges

The results of this study underscore the significant relationship between SRL practices and challenges among Chinese vocational and technical students. SRL, as conceptualized by Zimmerman (2000), entails a cyclical process of goal setting, self-monitoring, strategic planning, and adaptive adjustment of learning strategies in response to academic challenges. Moreover, the presence of challenges can impede the effective enactment of these

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strategies, thereby affecting learning outcomes (Cleary et al., 2012). However, the effectiveness of these SRL strategies can be influenced by the presence of various challenges experienced by the learners. These challenges may stem from internal factors such as low self-efficacy, lack of motivation, or cognitive limitations, as well as external factors such as environmental distractions, inadequate resources, or competing demands on students' time and energy (Cleary et al., 2012).

For Chinese vocational and technical students, challenges related to the nature of their educational environment may include high workload, rigid instructional methods, and limited autonomy or independence in learning decisions (Ting, 2013). These factors can create barriers to effective SRL by impeding students' ability to set and pursue meaningful goals, monitor their progress, and adapt their strategies in response to changing demands in the context of education.

Moreover, cultural factors may also play a role in shaping students' SRL practices and challenges. Confucian cultural values emphasizing diligence, obedience, and respect for authority may influence students' perceptions of academic success and their approach to learning tasks (Hau & Salili, 1996). This cultural context may contribute to heightened pressure to perform academically, fear of failure, and reluctance to seek help or take risks in learning.

Therefore, the significant relationship between SRL practices and challenges underscores the need for a holistic understanding of the learning process, considering both the strategies students employ to regulate their learning and the obstacles they face in doing so. Addressing these challenges requires a multifaceted approach that includes providing students with the necessary cognitive and metacognitive skills, fostering a supportive learning environment that promotes autonomy and intrinsic motivation, and addressing systemic issues within the educational system that may hinder students' ability to engage in effective SRL.

The interplay between SRL practices and challenges among Chinese vocational and technical students highlights the complexity of the learning process and underscores the importance of addressing both the facilitators and barriers to effective SRL to promote optimal learning outcomes. The identification of prevalent SRL practices among these students aligns with the broader literature on SRL. Pintrich (2000) emphasizes the role of goal setting, self-monitoring, time management, and task strategies as foundational components of SRL. The proactive engagement of students in goal-directed behavior reflects their awareness of the strategic nature of academic achievement and their commitment to self-improvement (Zimmerman & Schunk, 2011).

SCT of Bandura

Bandura's SCT posits that learning occurs through the reciprocal interaction between cognitive, behavioral, and environmental factors (Bandura, 1986). According to this theory, individuals learn by observing the behavior of others (modeling), interpreting and processing information about the consequences of those behaviors (cognition), and adjusting their own behavior accordingly (reciprocal determinism). In the context of SRL, Bandura's SCT highlights the role of observational learning and self-efficacy beliefs in shaping students' learning behaviors and outcomes. Students with high self-efficacy are more likely to set challenging goals, persevere in the face of obstacles, and use effective learning strategies to attain their goals.

The significant relationship between SRL practices and challenges among Chinese vocational and technical students can be understood through the lens of Bandura's social cognitive theory. Students' SRL practices, such as goal setting, self-monitoring, and strategic planning, are influenced by their perceptions of self-efficacy and their observations of others' successful learning behaviors (Zimmerman, 2000). Conversely, challenges encountered in the learning process can undermine students' confidence in their ability to regulate their learning effectively. These challenges may arise from various sources, including personal experiences, social comparisons, and feedback from teachers and peers (Bandura, 1986).

Bandura's SCT provides a valuable theoretical framework for understanding the relationship between SRL practices and challenges among Chinese vocational and technical students. By recognizing the reciprocal interaction between cognitive, behavioral, and environmental factors, educators and stakeholders can implement targeted interventions to foster students' SRL abilities and empower them to become autonomous and lifelong learners.

Conclusion

The findings of this study contribute to our understanding of the relationship between SRL practices and challenges among Chinese vocational and technical students. By identifying prevalent SRL practices and acknowledging challenges through the lens of Bandura's SCT, this research informs the development of targeted interventions aimed at empowering students with the necessary skills and strategies to become autonomous and lifelong learners.

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Educational practitioners and policymakers can draw upon the findings of this study to inform intervention strategies aimed at enhancing the SRL skills of Chinese vocational and technical students. By integrating explicit instruction on SRL strategies into the curriculum and providing opportunities for guided practice and feedback, educators can scaffold students' development of metacognitive awareness and adaptive learning behaviors (Zimmerman, 2000). Moreover, fostering a supportive learning environment that promotes autonomy, competence, and relatedness is crucial for nurturing self-regulated learners (Deci & Ryan, 2000). Educators can cultivate a growth mindset and resilience among students by reframing challenges as opportunities for growth and emphasizing the value of persistence and effort in achieving academic success.

Recommendations

It is essential to acknowledge the limitations of the present study, which may have implications for the generalizability of the findings. Future research could employ a mixed-methods approach, incorporating qualitative interviews and observations to provide a wider understanding of the lived experiences and contextual factors influencing SRL among Chinese vocational and technical students. Longitudinal studies are warranted to examine the developmental trajectory of SRL skills over time and investigate the efficacy of intervention programs in promoting adaptive SRL behaviors. Additionally, comparative studies across different cultural contexts could elucidate the influence of cultural values and educational systems on SRL practices and challenges among vocational and technical students.

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