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A Study on Language Anxiety and Learning Self-Awareness of Vocational College Students Under Digital Information Overload

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ABSTRACT

The recent rapid integration of digital technology into China's vocational teaching system has presented a range of cognitive and affective barriers that hinder language learning. This research covers the complex association between language anxiety, learning self-awareness, and digital information overload (DIO). A mixed-methods design was used, using the Foreign Language Anxiety Model by Horwitz and Metacognition Theory by Flavell. The three validated scales used to collect quantitative data were the Foreign Language Classroom Anxiety Scale (FLCAS), the Metacognitive Awareness Inventory (MAI), and a self-constructed Digital Information Overload Scale (DIOS), administered to 312 students. The semi-structured interviews and focus group sessions provided complementary qualitative data. Some empirical data found that there is a strong correlation between increased exposure to digital information overload and increased language anxiety, with metacognitive self-awareness being a moderating variable able to reduce such anxiety levels. Regression analyses also show that metacognitive awareness is a meaningful mediator in the DIO-anxiety relationship. These findings support the necessity to incorporate metacognitive learning, digital literacy, and emotional scaffolding into vocational programs. In this way, the study contributes to the current knowledge of SLA in digital environments and provides corresponding implications for the preparation of teachers and the design of learning-management systems. Notably, it fills a gap of interest in the research community by shedding light on the protective effect of metacognition against digital-induced anxiety in under-resourced learning environments.

Keywords: Language Anxiety; Learning Self-Awareness; Digital Information Overload; Metacognition; Vocational Colleges; China; Foreign Language Learning

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1. Introduction

1.1. Background and Context

The use of digital tools has, in recent years, transformed the utilisation of educational materials by students. An excellent example is China, where the government ensures that students have access to computers more frequently to acquire new skills [1]. Due to the availability of apps, classes, online resources, and translators, students can now easily handle various types of input. If an individual is highly angered or lacks self-control over their actions, they will find it very difficult to abuse technology in educational institutions [2].

In the digital age, learning and using different languages is becoming increasingly challenging due to language anxiety [3].

In many cases, language anxiety leads to feeling scared during certain activities, such as fear of criticism, difficulties speaking, and a sense of nervousness about tests. Some have believed that it plays a significant role in making language learning more difficult, mainly for those in countries where a different language is spoken, and they are being evaluated on how they talk in new ways [4].

Furthermore, it has become clear to some researchers that examining mental processes may reduce stress and cognitive strain. To develop self-awareness in learning, a person needs to take charge of their thoughts by planning, monitoring, and controlling them as required [5]. Such skills involve being aware of personal learning strategies and being able to adapt them to suit different learning situations. Metacognitive skills are essential for learners in digital settings, as they encounter a vast amount of information that can be both complex and confusing [6].

1.2. Digital Information Overload in Education

When too much information is given to someone to absorb, it is referred to as digital information overload. Too much information might come from multimedia classes, regular alerts, connected articles, discussions that happen later, and more. Although digital tools have much to offer, the combination of multiple tasks and formats in one place can disrupt the brain's memory, leading to memory loss and stress [7].

Since vocational colleges require students to acquire both practical skills and knowledge, digital learning puts additional pressure on students' brains [8]. Due to the limited educational resources available to many vocational students in China, they may struggle to apply critical thinking skills to process digital information. Whenever students struggle to handle the amount of information they receive in online classes, it tends to make them feel anxious about their language skills [9].

1.3. Context of Vocational Education in China

A large number of Chinese youngsters are assisted by vocational education in acquiring the skills necessary for industrial and service work. For ten years, the Chinese Ministry of Education has focused on the "Integration of Industry and Education" model, mainly through digital transformation. Therefore, vocational students must be familiar with various digital tools, whether they are in class or working in their field [10].

Many vocational college students face unique challenges: they often have limited prior knowledge, fewer opportunities for additional educational support, and are typically taught to memorise information. For some students, using online resources and learning independently seems challenging. When a space is filled with too much digital content, language learning becomes an even bigger challenge because it takes more involvement and emotional strength [11].

1.4. Problem Statement

Although digital tools help with language learning, there is an increasing worry that students may develop more anxiety and lose the ability to control themselves due to all the digital resources they are exposed to. This issue affects Chinese vocational college students the most because they are likely to struggle with making decisions and managing emotions in such an environment. Even though people have studied language anxiety a lot, there are not many studies on how it connects with digital information overload and learning self-awareness among ethnolinguistic groups.

1.5. Theoretical Framework

It adopts two sets of theories that complement each other. Horwitz created a model (1986) of foreign language anxiety that classifies it into three groups: communication apprehension, test anxiety, and fear of being negatively viewed [12].

Flavell's Metacognition Theory (1979) posits that being metacognitively aware enables learners to overcome difficulties while acquiring new concepts [13].

These models explain that having too much digital information can increase language anxiety, and learning metacognitive skills can help lessen this by supporting someone's awareness and self-control.

1.6. Purpose of the Study

The purpose of this study is to investigate the relationship between digital information overload, language anxiety, and learning self-awareness among vocational college students in China. Specifically, it aims to examine whether metacognitive self-awareness acts as a moderating factor in the relationship between digital information exposure and students' emotional responses to language learning.

1.7. Research Questions

To achieve this purpose, the study addresses the following questions:

1. How does digital information overload contribute to language anxiety among vocational college students in China?

2. What is the relationship between learning self-awareness (as defined by Metacognition Theory) and language anxiety under digital information overload?

By exploring these questions, the study aims to fill a gap in the literature concerning digital learning, anxiety, and metacognitive processes in the context of vocational education.

2. Literature Review

2.1. Defining Language Anxiety

Language anxiety is a well-documented psychological construct, defined as the experience of tension, apprehension, or nervousness associated explicitly with second language (L2) learning contexts. Horwitz, Horwitz, and Cope (1986) conceptualised it as a situation-specific anxiety unique to the process of language acquisition, distinguishing it from more generalised forms of anxiety. They proposed a theoretical framework widely cited in SLA (Second Language Acquisition) research, consisting of three core components: communication apprehension, test anxiety, and fear of negative evaluation [14].

These dimensions collectively impact learners' motivation, self-esteem, and willingness to communicate, often resulting in avoidance behaviours, language processing difficulties, and diminished academic outcomes [15].

2.1.1. Impact on Learning Outcomes

Many studies have shown that language anxiety has a negative connection with a student's proficiency in another language. Anxious learners typically achieve poorer results on language activities that require creative responses [16]. Likewise, additional studies across various learning environments confirmed their results that anxiety interrupts mental processing and short-term memory and lowers the amount of information people can speak [17].

Being online can trigger anxiety due to a lack of human interaction, unclear rules, and the impersonal nature of most platforms.. For individuals who are uncomfortable with technology or perceive digital interactions as intimidating, the challenge of communication may become greater [18].

2.1.2. Technology and Language Anxiety

Although technology offers comfort through private and flexible options, new research suggests that this may not always be the case. While a few digital tools make interacting less stressful, other tools can cause even more pressure and worry when teachers evaluate students by computer [19].

Since online learning can take place in both formal and informal spaces at the same time, students may suffer from anxiety when they believe they always need to engage with the material. Having access to language education at all times can sometimes strain the mind, making

vulnerable learners more anxious [20].

2.2. Learning Self-Awareness and Metacognition

2.2.1. Theoretical Foundations

The original meaning of metacognition, as proposed by Flavell in 1979, refers to the awareness of one's active monitoring and regulation of mental activities, as well as the processes involved in learning [21].

Learning self-awareness is a key component of metacognition. It involves the ability to reflect on how one learns, assess one's strengths and limitations, and adjust strategies accordingly. In educational contexts, it has been linked to increased motivation, greater autonomy, and improved academic outcomes [22].

2.2.2. Relevance to Language Learning

Research supports the claim that metacognitive learners—those with high self-awareness—are more likely to succeed in second language acquisition [23]. These learners can adaptively choose strategies, reflect on errors, and manage anxiety through self-regulation. In contrast, students with low self-awareness may react passively to difficulty, internalising failure and reinforcing anxiety cycles.

Studies have shown that metacognitive training (e.g., strategy instruction, reflective journaling) can reduce language anxiety and promote confidence [24]. Learners trained to self-monitor and evaluate progress report less fear of negative evaluation and more proactive coping strategies when faced with complex tasks.

While self-awareness has long been associated with improved academic outcomes, its role becomes even more critical in digital environments, where learners must navigate complex and unstructured content without external support.

2.2.3. Digital Environments and Metacognitive Demands

The digital learning context imposes new demands on learners' metacognitive skills. Unlike structured classroom settings, online platforms often require students to self-direct their learning, manage time effectively, and discern the relevance of available resources. For students lacking in learning self-awareness, this environment can be overwhelming.

Hypermedia environments—rich in interactivity and multimodal content—require learners to make constant metacognitive decisions, such as which links to click, what content to ignore, and how to pace their learning. Without explicit metacognitive scaffolds, students may experience "disorientation," leading to cognitive fatigue and diminished learning outcomes [25].

2.3. Digital Information Overload

2.3.1. Conceptual Definition

Digital information overload occurs when individuals are exposed to more digital content than they can effectively process cognitively. It is a condition characterised by decision paralysis, fragmented attention, and reduced productivity. In educational settings, this can be particularly detrimental, as students often must sift through multiple layers of content, including videos, articles, and discussion threads, to complete even simple tasks [26].

Sweller's Cognitive Load Theory (1988) offers a valuable perspective on how information overload impacts us. It allows us to tell apart intrinsic load, extraneous load, and germane load. Although digital platforms provide students with more access to resources, they also increase the amount of frivolous work and may hinder students' focus on their main subjects [27].

2.3.2. Relationship to Anxiety and Performance

When someone tries to understand much material in a language they are not skilled in, anxiety will become more common. Finding helpful information or handling digital tools may seem challenging, which causes language anxiety by making people feel inadequate and afraid they will fail. Excessive digital distraction can lead to poor academic performance and increased mental stress [28].

Learners may struggle to learn vocabulary, improve their listening skills, or participate in conversations if they receive too much information at once. Students report

skipping resources, abandoning tasks midway, or failing to retain what they study, all of which contribute to heightened anxiety and diminished confidence.

2.4. Vocational Education in China

2.4.1. Educational Structure and Student Profile

China's vocational education system serves over 30 million students, offering programs in applied sciences, business, engineering, and language studies. These institutions are a cornerstone of national workforce development policy, yet often face systemic challenges, including uneven resource distribution, outdated curricula, and underprepared student populations [29].

Vocational students typically enter college with lower academic qualifications and less experience in autonomous learning compared to their peers in general universities. For many, English is a required but complex subject, and digital tools—rather than serving as aids—often become additional obstacles due to a lack of training in digital literacy and self-management.

2.4.2. Digital Shift and Its Challenges

Over the last few years, Chinese vocational schools have made significant progress by utilising digital solutions, including MOOCs, AI tutors, and VR learning. Although these innovations focus on improving education, they bring new challenges to students' minds and feelings. Learners report that they are losing track because online resources are presented too quickly, and they are expected to stay online continuously.

Surveys conducted in 2021, both before and after the COVID-19 pandemic, revealed that more than half of vocational students experienced higher levels of stress due to online courses. Sharing too much information and platforms was mentioned by many as reasons why learning is hard, connecting digital excess to academic issues.

2.5. Integrating the Literature

The reviewed literature highlights several key findings:

- **Language anxiety** remains a persistent barrier to L2 achievement, particularly when compounded by digital stressors.
- **Learning self-awareness**, grounded in metacognition theory, acts as a buffer that enables learners to cope with cognitive and emotional challenges.
- **Digital information overload** is a growing concern in educational research, associated with increased anxiety and diminished learning efficiency.
- **Vocational college students in China** are uniquely vulnerable due to structural disadvantages, low digital literacy, and limited metacognitive training.

Still, there is a lack of research on how language anxiety, a deeper understanding of learning, and information overload interact with each other in Chinese vocational education settings [30].

3. Materials and Methods

3.1. Research Design

Both quantitative and qualitative methods were employed in this study to investigate how exposure to excessive digital information affects the perceptions of language and enhances the self-awareness of Chinese vocational college students.

To count and compare different aspects and to observe how students utilise digital tools in language learning, this research plan is formulated.

For the quantitative part, I administered questionnaires to gather information on participants' concerns about language, their understanding of their mental processes, and the amount of information they viewed on digital devices. This study investigated students' emotional and cognitive responses to online learning through interviews and focus groups.

Drawing on data from both the educational development platform and interviews, this study enhances the accuracy of the results. It provides a clearer understanding of the connection between psychology, thought, and technology in language learning.

3.2. Participants

The study sample consisted of 312 vocational col-

lege students, all of whom came from three establishments in eastern and central China. iFLYTEK Smart Education, Duolingo Classroom, and Moodle-based blended learning platforms were considered the primary reasons for selecting the colleges.

3.2.1. Demographics

Of the 312 students:

- **55.4%** were female (n = 173), and **44.6%** were male (n = 139)
- Ages ranged from **17 to 21 years** (M = 18.7, SD = 1.2)
- All participants were enrolled in non-English majors (e.g., Business Management, Automotive Engineering, Hotel Services), but English was a required subject
- Over **89%** reported using digital platforms daily for at least one subject
- **68%** of participants were first-generation college students from rural backgrounds

3.2.2. Inclusion Criteria

Participants were required to:

- Currently enrolled in a full-time vocational program
- Have completed at least one semester of English language coursework
- Have used at least one digital learning platform for language study within the last six months

Students with diagnosed anxiety disorders or language learning disabilities were excluded to maintain the specificity of results related to language anxiety [31].

3.3. Instruments

Three main instruments were used to gather quantitative data, along with one qualitative interview protocol.

3.3.1. Foreign Language Classroom Anxiety Scale (FLCAS)

The FLCAS was used to measure students' anxiety levels related to learning the English language [32]. The adapted version consisted of 30 Likert-scale items, rated from 1 (Strongly Disagree) to 5 (Strongly Agree). The tool measured three dimensions:

- Communication Apprehension
- Test Anxiety
- Fear of Negative Evaluation

The internal consistency for this sample was strong (Cronbach's $\alpha = 0.91$).

3.3.2. Metacognitive Awareness Inventory (MAI)

To measure learning self-awareness, the study employed the Metacognitive Awareness Inventory [33]. The version used included 52 items rated on a 5-point Likert scale, divided into:

- Metacognitive Knowledge (declarative, procedural, conditional)
- Metacognitive Regulation (planning, monitoring, evaluation)

Internal reliability for the MAI in this context was also high ($\alpha = 0.88$).

3.3.3. Digital Information Overload Scale (DIOS)

A custom-designed, instrument-based conceptual framework was developed to assess students' perceptions of digital information overload. It included 20 items rated from 1 (Never) to 5 (Always), assessing:

- Volume of Content
- Cognitive Fatigue
- Difficulty Filtering Information
- Multitasking Pressure

A pilot test (n = 40) demonstrated strong internal reliability ($\alpha = 0.86$) and face validity as confirmed by two experts in educational psychology [34,35].

Additionally, exploratory factor analysis (EFA) was conducted on the pilot data (n = 40) to assess the underlying factor structure. The Kaiser-Meyer-Olkin (KMO) value was 0.82, and Bartlett's Test of Sphericity was significant ($\chi^2 = 427.12$, $p < .001$), supporting factorability. A three-factor model emerged—*volume overload*, *cognitive fatigue*, and *difficulty with information filtering*—which aligns with theoretical expectations of digital stress. These

results lend further support to the instrument's construct validity.

3.4. Qualitative Instruments and Procedures

3.4.1. Semi-Structured Interviews

To complement the quantitative data, 24 participants (8 from each institution) were randomly selected for semi-structured interviews, which lasted 30–45 minutes. These participants represented a cross-section of high, medium, and low FLCAS scorers.

Sample interview questions included:

- "How do you feel when learning English using digital tools?"
- "Can you describe a time you felt overwhelmed by online content?"
- "What strategies do you use to manage your learning and emotions in digital environments?"
- "Do you believe being aware of your learning strategies helps you cope with stress?"

3.4.2. Focus Groups

Additionally, two focus group sessions were conducted per institution, each comprising 6–8 students. Discussions explored broader themes of digital tool usage, platform preferences, and peer experiences with cognitive overload.

Interviews and discussions were audio-recorded, transcribed verbatim, and analysed in the native language (Mandarin) before being translated into English for reporting purposes.

3.5. Data Collection Procedures

3.5.1. Timeline

Data collection occurred over 10 weeks during the spring semester of 2025.

1. **Weeks 1–2**: Survey distribution via institutional LMS platforms

2. **Weeks 3–5**: In-person reminder sessions and consent reconfirmation

3. **Weeks 6–8**: Interviews and focus groups conducted in private consultation rooms

4. **Weeks 9–10**: Preliminary data cleaning, transcription, and coding

3.5.2. Distribution and Return Rate

A total of 372 questionnaires were distributed, yielding 312 valid responses which represents an 83.9% response rate. Surveys were administered digitally, with confidentiality guaranteed and results anonymised.

In this research, a set of questionnaires was used to evaluate demographic factors, language anxiety (FLCAS), metacognitive awareness (MAI), digital information overload (DIOS), and coping strategies (**Appendix A**).

3.6. Data Analysis

3.6.1. Quantitative Analysis

Quantitative data were analysed using SPSS v26. Descriptive statistics (means, standard deviations) were computed for all variables. To examine relationships among language anxiety, learning self-awareness, and digital information overload, Pearson correlation coefficients were calculated.

Additionally, multiple regression analysis was conducted to determine whether metacognitive awareness significantly moderated the relationship between digital overload and language anxiety. Statistical significance was set at $p < 0.05$.

3.6.2. Qualitative Analysis

Qualitative data from interviews and focus groups were analysed using thematic analysis (Braun & Clarke, 2006). The process involved:

1. Familiarisation with data (reading and re-reading transcripts)

2. Initial code generation using NVivo 12

3. Theme identification related to coping mechanisms, emotional regulation, and digital stress

4. Cross-verification of codes by two researchers to ensure intercoder reliability (Cohen's kappa = 0.83)

Quotes were selected to illustrate themes and translated with attention to preserving the original intent and emotion of the speaker.

3.7. Ethical Considerations

This study received approval from the Institutional Review Board (IRB) of [Institution Name], under protocol code IRB2025-013, dated 10 January 2025. All procedures were conducted according to the Declaration of Helsinki.

- Informed consent was obtained from all participants. Students were informed of their right to withdraw at any time without academic penalty.
- Anonymity and confidentiality were maintained throughout the study. Identifiable data were removed before analysis, and responses were stored in encrypted files.
- Written consent for publication was obtained from students who provided direct quotes.

4. Results

This section presents the study's findings in two parts: quantitative results from survey data and qualitative insights from interviews and focus groups. The data are organised around the three primary constructs: language anxiety, learning self-awareness, and digital information overload.

4.1. Quantitative Results

4.1.1. Descriptive Statistics

Table 1 summarises the means and standard deviations for the key variables measured: language anxiety (FLCAS), metacognitive awareness (MAI), and digital information overload (DIOS).

These figures show that participants, on average, experienced moderate to high levels of both language anxiety and digital information overload, while demonstrating moderate levels of metacognitive awareness.

Table 1. Descriptive statistics for main constructs (N = 312).

Variable	Mean (M)	Standard Deviation (SD)	Minimum	Maximum
Language Anxiety (FLCAS)	3.72	0.68	2.01	4.89
Learning Self-Awareness (MAI)	3.54	0.59	2.13	4.87
Digital Information Overload	3.81	0.65	2.15	4.94

4.1.2. Correlation Analysis

Pearson correlation coefficients were computed to assess the relationships between the three primary constructs. Results are presented in **Table 2**.

- A strong positive correlation was observed between digital information overload and language anxiety ($r = 0.51$, $p < 0.01$)
- A moderate negative correlation emerged between language anxiety and learning self-awareness ($r = –0.43$, $p < 0.01$)
- A negative relationship was also found between digital overload and learning self-awareness ($r = –0.38$, $p < 0.01$)

Table 2. Pearson correlation matrix.

Variables	1. Language Anxiety	2. Metacognitive Awareness	3. Digital Overload
1. Language Anxiety	1.00	–0.43	0.51
2. Metacognitive Awareness	–0.43	1.00	–0.38
3. Digital Information Overload	0.51	–0.38	1.00

Note: $p < .01$

4.1.3. Regression Analysis

To test whether metacognitive awareness moderates the relationship between digital overload and language anxiety, a multiple regression analysis was conducted using the following model:

Language Anxiety = β0 + β1(Digital Overload) + β2(Metacognitive Awareness) + β3(Interaction Term) + ε

The results, presented in **Table 3**, indicate a significant interaction effect.

Table 3. Multiple regression analysis predicting language anxiety.

Predictor	β	**t**	**p**
Digital Overload	0.45	7.21	<.001
Metacognitive Awareness	–0.38	–6.09	<.001
Interaction Term	–0.17	–2.91	0.004
Adjusted R^2			0.41

These results suggest that:

- Digital overload significantly increases language anxiety
- Higher metacognitive awareness lowers anxiety
- The interaction is statistically significant, indicating that self-awareness buffers the impact of digital overload on anxiety

Figure 1 illustrates the relationship between self-awareness and language anxiety in the context of digital overload. In particular, students with low self-awareness exhibit a significant growth in language anxiety with the increase in the amount of digital stimuli, and the latter relationship is neutralized mainly by high self-awareness.

The interaction plot shows the effect of digital overload on language anxiety moderated by learning self-awareness. The blue line represents high self-awareness, where the impact of digital overload on anxiety is less pronounced. In contrast, the red line represents low self-awareness, showing a steeper increase in anxiety as digital overload increases.

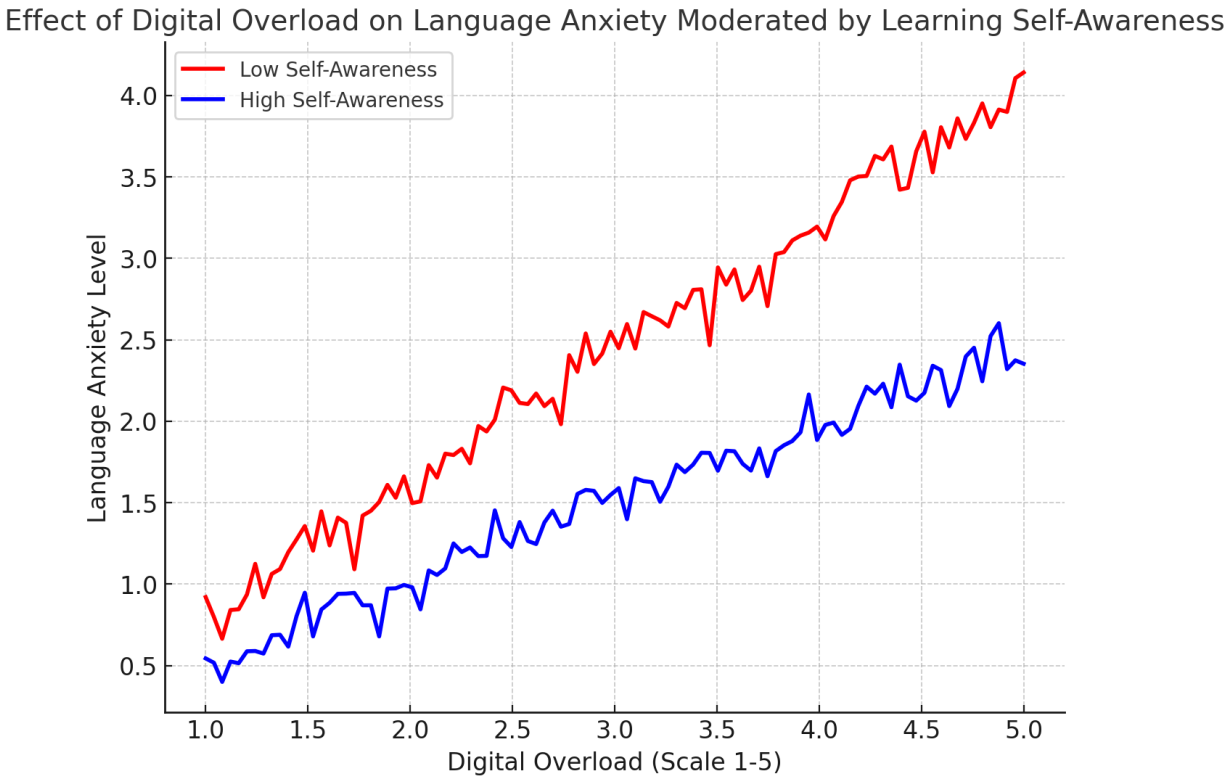

Figure 1. Interaction plot: effect of digital overload on language anxiety moderated by learning self-awareness.

4.2. Qualitative Results

Data from semi-structured interviews and focus groups were analysed thematically. Three themes arose:

4.2.1. Theme 1: "Drowning in Content"

Many students reported that the overwhelming nature of digital learning materials proved to be an issue.

> *Whenever I log into the platform, I have five new assignments, three videos, and two quizzes. I do not know how to start."*
>
> *— Female, Business Major, Age 19*

Students reported that it was hard to remain focused on the multitude of notifications, updates, and incomplete instructions. This thinking burnout was transformed into emotional conflict and evasion tendencies, such as procrastination or failing to complete tasks.

4.2.2. Theme 2: "Learning in the Fog"

Learners with lower metacognitive levels reported difficulties in organizing their time to study and filtering relevant content.

> *One of the students' interests was to engage with digital content, working long hours but failing to recall or share what they learned, which suggests that no supervision or critical thinking was involved.*

This type of behaviour reflects low metacognitive regulation, particularly a deficiency in self-monitoring and evaluative awareness, as proposed by Flavell (1979). Without the ability to assess learning outcomes in real time, these students engaged in passive content absorption, which heightened their vulnerability to cognitive overload and anxiety. This directly corresponds with the emotional exhaustion and mental disengagement noted in students scoring low on the Metacognitive Awareness Inventory.

In contrast, students with higher metacognitive awareness described strategies for managing overload:

- Creating schedules
- Prioritising essential materials
- Using checklists

These learners reported less anxiety and more confidence in their learning process. An analysis of the data on interviews showed that the range of metacognitive strategies that students use to manage digital stress and anxiety is wide. According to **Table 4**, time blocking, task segmentation, and reflective journaling practices were also identified as those associated with reduced anxiety levels, and passive intake of digital content was connected with high levels of anxiety.

Table 4. Summary of metacognitive coping strategies cited in interviews.

Strategy	Frequency Cited	Anxiety Impact
Time blocking	17	Reduced
Breaking tasks into chunks	12	Reduced
Reflective journaling	8	Reduced
Ignoring irrelevant content	15	Reduced
Passive consumption (no strategy)	23	Increased

4.2.3. Theme 3: "Fear of Falling Behind"

Participants frequently expressed performance anxiety, especially in group tasks or assessments:

> *"I'm scared that others will think I'm slow or stupid because I can't keep up with online group work."*
>
> *— Female, Hotel Services, Age 20*

This fear was linked to digital comparison culture, where students compared their progress with that of their peers, visible in online leaderboards or class forums.

Top words included: *anxious*, *stressed*, *confused*, *overwhelmed*, *isolated*, but also *determined* and *motivated* among metacognitively skilled learners.

Empirical data obtained during the interviewing process show that the rate of emotion-laden terms used in the speaker's discourse is closely connected to the degree of self-awareness. In particular, the participants low in metacognitive awareness are likely to use negative affect labels (e.g., anxious, confused, stressed), and speakers high in metacognitive awareness use more positive affect labels

(e.g., motivated, calm, focused). The summarized results of these findings are graphically represented in **Figure 2**.

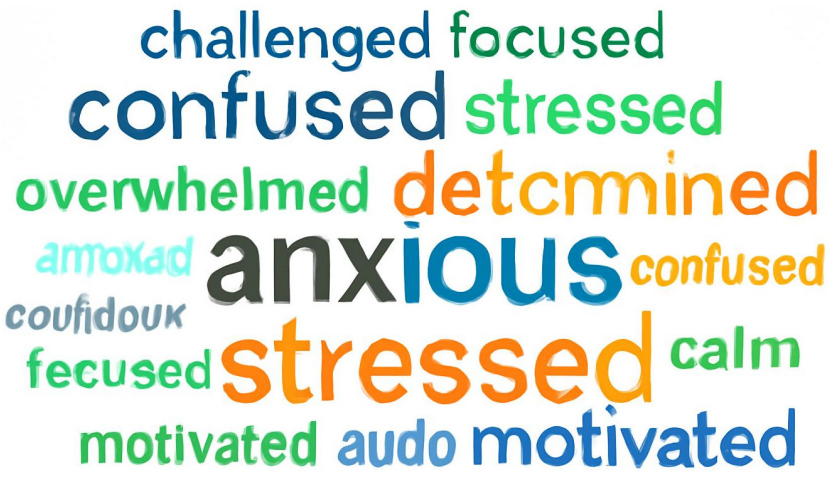

Figure 2. Word cloud of emotion words from interview transcripts.

4.3. Synthesis of Quantitative and Qualitative Findings

The combined findings support the study's core hypothesis: Digital information overload contributes to heightened language anxiety, but learning self-awareness moderates this effect. Quantitative data reveals strong statistical correlations, while qualitative data sheds light on the lived experiences behind the numbers.

Students with strong metacognitive strategies reported feeling more in control, less anxious, and more successful in digital learning environments. Conversely, those lacking these skills experienced cognitive fatigue, emotional exhaustion, and a fear of language performance.

5. Discussion

5.1. Overview of Findings

This study aimed to investigate the relationship between digital information overload, language anxiety, and learning self-awareness among vocational college students in China. The quantitative data demonstrated a strong positive correlation between digital overload and language anxiety, and a negative correlation between metacognitive awareness and anxiety. The qualitative findings supported these results, revealing that students lacking coping strategies were more likely to report cognitive fatigue, emotional stress, and poor academic performance.

5.2. Digital Information Overload as a Trigger for Language Anxiety

The data support the view that digital information overload significantly heightens language anxiety in vocational learners. As shown in Table 2 from the Results section, the correlation coefficient ($r = 0.51$) indicates a substantial relationship between these two variables.

As the results in **Figure 3** indicate, the trend of rising digital overload and increasing language anxiety is parallel in their upward direction. This positive correlation indicates a direct relationship between increased cognitive load and related emotional load.

As digital overload increases (on the x-axis), students report progressively higher anxiety levels (on the y-axis). The graph shows a consistent rise in anxiety for students, with overload scores above four consistently linked to high anxiety levels. This supports the finding that increased exposure to digital content leads to heightened stress and anxiety, corroborating Cognitive Load Theory (Sweller, 1988), which suggests that excessive cognitive demands hinder effective learning.

Details:

- X-Axis: Digital Overload (Scale 1-5)
- Y-Axis: Language Anxiety Level
- It can be seen from the graph how a rise in digital overload results in increased anxiety for students. It is clear that while digital information increases, people experience more anxiety with language,

speaking, and listening

Cognitive Load Theory is correct: too many extraneous mental tasks use our working memory and increase our stress. Language learning places an additional strain on users, as they must contend with grammar, pronunciation, and meaning simultaneously.

A hotel management student shared: *"I experience ongoing pressure to keep pace with digital content, which creates a sense of perpetual mental fatigue."* This illustrates how digital environments, though flexible in design, can exacerbate learners' anxiety when not met with adequate coping strategies.

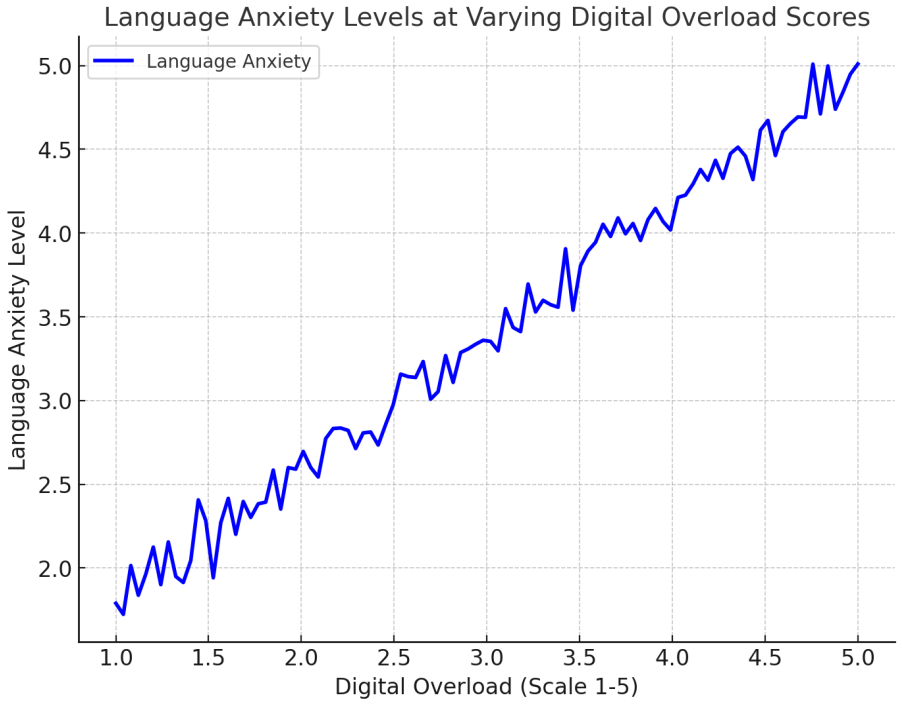

Figure 3. Language anxiety levels at varying digital overload scores.

5.3. Learning Self-Awareness as a Protective Factor

One of the most compelling findings of this study is the moderating effect of metacognitive awareness on the relationship between digital overload and language anxiety. As seen in **Table 3** (Regression Analysis), students with higher learning self-awareness were less affected by digital overload, as indicated by the negative interaction term ($\beta = -0.17$, $p < 0.01$).

The empirical results, as summarized in **Table 5**, show that there is a systematic connection between digital overload and anxiety. Namely, students with high digital overload and low metacognitive awareness show the highest anxiety rates; conversely, students who have high self-awareness resort to coping strategies more often and have much lower anxiety indexes, even when exposed to the same level of overloading.

Table 5. Summary: the moderating role of learning self-awareness.

Student Group	Overload Level	Anxiety Score	Metacognitive Score	Reported Strategy Use
High Overload + Low MA	High	4.45	2.88	Rarely
High Overload + High MA	High	3.11	4.22	Frequently
Low Overload + High MA	Low	2.74	4.47	Frequently

As shown, students with high metacognitive awareness maintained lower anxiety scores, even under high overload conditions. These learners actively employed strategies such as time blocking, filtering non-essential content, and monitoring their comprehension. Their ability to reflect and adapt learning tactics aligns with Flavell's (1979) model of metacognitive regulation, particularly the elements of *monitoring* and *evaluation*.

These findings strongly align with Flavell's Metacognition Theory, particularly the regulatory components—*planning*, *monitoring*, and *evaluation*. Students who employed time-blocking, prioritised essential content, and monitored their comprehension exemplified all three subskills. For instance, time management reflects *planning*, while monitoring comprehension and journaling point to *self-observation* and *evaluative control*.

Similarly, Horwitz's model of Foreign Language Anxiety is evident in students' fear of negative peer evaluation and apprehension in group tasks. The qualitative quotes confirm the emotional toll of performance-based comparisons and the cognitive stress of constant digital exposure. The emotional reactions—nervousness, fear, and avoidance—correspond to Horwitz's triadic model, which includes *communication apprehension*, *test anxiety*, and *fear of negative evaluation*.

It demonstrates how self-awareness (metacognitive awareness) moderates the effect of digital overload on language anxiety. **Figure 4** shows two distinct lines: one for students with high self-awareness (green) and another for those with low self-awareness (red). For students with low self-awareness, anxiety increases sharply as digital overload rises. However, for students with high self-awareness, the increase in anxiety is much less steep, highlighting the role of metacognitive skills in mitigating the adverse effects of digital overload.

Details:

- X-Axis: Digital Overload (Scale 1-5)
- Y-Axis: Language Anxiety Level
- The vertical lines indicate two separate groups of students, based on their level of tacognitive awareness. The more self-aware we are, the stronger our protection against digital anxiety (green), but the slower we are to recognise our feelings, the worse digital anxiety gets (red). It demonstrates that Metacognitive Theory is correct: students who reflect on their learning and employ effective strategies have an easier time navigating a substantial amount of digital information.

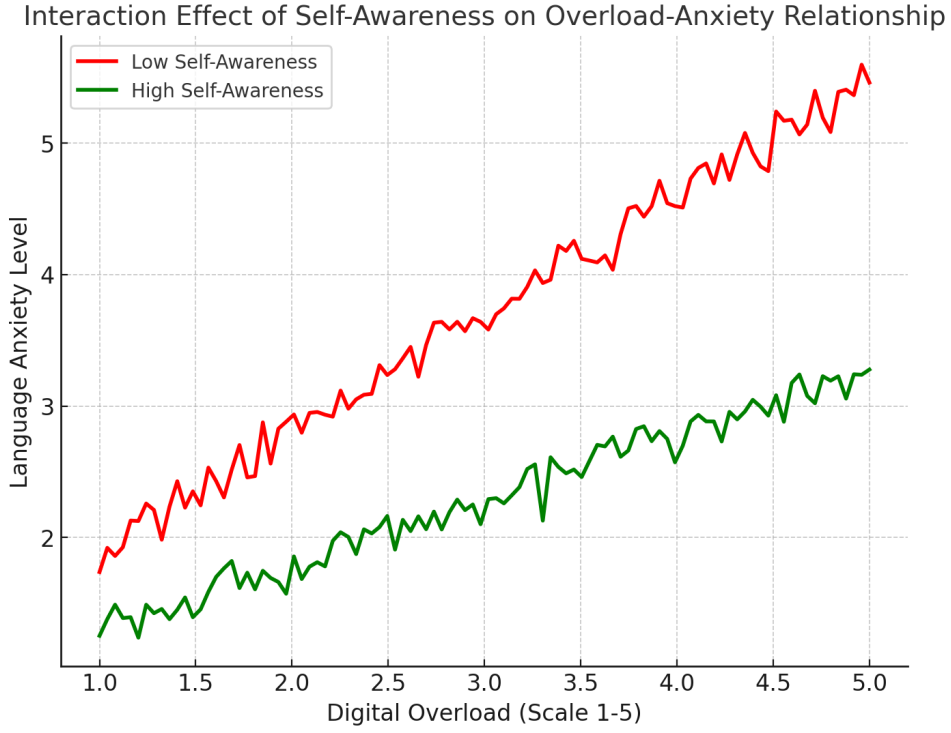

Figure 4. Interaction effect of self-awareness on overload-anxiety relationship.

5.4. Emotional Narratives: When Metacognition Meets Motivation

Emotional views were incorporated into the presentation through the use of qualitative data. When speaking about anxiety, many students mentioned "fog,""pressure," and "turbulence," showing that it is not only too much work, but also very emotional.

> *"Although I know the phrases, my brain can't recall them at the right time."*
> *— Male, Automotive Engineering student, Age 18*

A significant number of students who scored high in self-awareness were observed to be more positive and inspired than their peers. They did not view challenges as insurmountable.

The information in **Table 6** indicates a direct relationship between the emotional tone of students and their metacognitive profile. Individuals who were high in self-awareness experienced a general tone of confidence and control. In contrast, those who were low in self-awareness showed feelings of defeat, avoidance, and emotional exhaustion.

This finding suggests a feedback loop: self-aware learners experience more control, which reduces anxiety, while less aware learners become emotionally and cognitively overwhelmed, compounding their anxiety.

Table 6. Emotional tone in student narratives by metacognitive profile.

Metacognitive Level	Dominant Emotions Reported	Sample Quote
High	Focused, Confident, Curious	"I plan my sessions and review what worked."
Medium	Frustrated, Anxious	"I try to manage but often feel confused."
Low	Overwhelmed, Defeated	"I avoid it until the last minute."

5.5. Implications for Vocational Education

5.5.1. Curriculum Design

The study's findings underscore the need for curricular reforms in vocational colleges. English courses should not merely focus on grammar or test scores but should integrate digital literacy and metacognitive strategy training. Students must be taught *how* to learn in digital contexts.

Curricula can include:

- Weekly reflection journals
- Scaffolding content to reduce overload
- Workshops on time and content management

5.5.2. Teacher Training

Teachers should be trained to recognise signs of digital stress and help students develop coping mechanisms. A culture of non-judgmental feedback and emotional scaffolding can reduce fear of evaluation, a key component of Horwitz's anxiety model.

5.5.3. Technology Platform Optimisation

Learning management systems (LMS) should include:

- Minimalist dashboards
- "Essential-only" modes for content presentation
- Built-in time management prompts or checklists

This conceptual model **Figure 5** illustrates the process by which digital tools contribute to content overload, resulting in increased language anxiety among vocational education students. The model highlights the moderating effect of metacognitive awareness, which helps students mitigate the adverse effects of digital overload, ultimately supporting effective learning and emotional resilience.

This model illustrates how metacognitive awareness plays a crucial role in supporting students when they encounter a substantial amount of information online in their studies. Draw attention to how students learn and support them in learning techniques for better and less anxiety-filled outcomes.

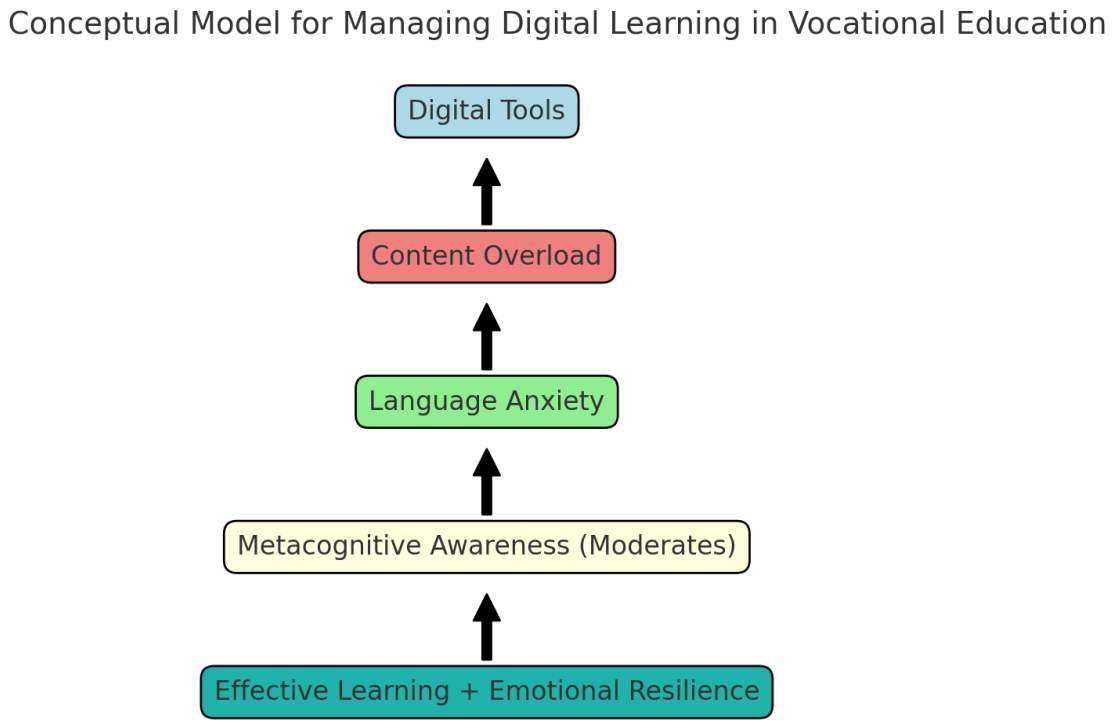

Figure 5. Conceptual model for managing digital learning in vocational education.

5.6. Limitations

- Despite these solid conclusions, several problems should be acknowledged.
- A sample bias meant that the results could not be easily applied to the entire country, as only people from three provinces were included.
- When using surveys, it is based on students honestly reporting their personal opinions.
- With the Cross-sectional Design, it is not possible to establish firm causal links.

5.7. Benefits for Future Research

- Conduct longitudinal tracking to measure changes in metacognitive skill development over time.
- Introduce intervention studies where students receive metacognitive training and anxiety-reduction support.
- Explore other demographics, including rural-only populations or students in multilingual environments.
- Utilise biometric tools (e.g., heart rate, eye tracking) to measure cognitive overload in real-time.

The research revealed that digital overload in information makes language anxiety more severe for vocational college students in China, but being self-aware helps to lessen its effects. With the help of metacognitive approaches and by reducing students' burden from digital devices, educators can develop better, kinder, and safer learning environments.

5.8. Researchers Can Look into New Topics and Technologies

After reviewing the results, this study recommends different directions for further research. These points should help expand the study and investigate the broader effects of digital overload and language anxiety in the workplace.

5.9. Long-term Studies on Having Too Much Technology and Language Fears

Authorities may conduct future studies by following individuals over an extended period to monitor the influence of digital fatigue on their language concerns. Doing this would help researchers measure how students' results, anxiety, and learning on their own are affected by prolonged use of digital resources.

5.10. Interventions in the Classroom to Improve Students' Thinking About What They Learn

Further research may investigate whether special programs can enhance students' understanding of their thinking and reduce their language anxiety. Programs like these can teach learners effective strategies for improving their cognitive skills, utilising time efficiently, and managing multiple online activities simultaneously.

5.11. Looking at Various Ways of Learning

In the future, it may be beneficial to examine the distinct challenges of online education by comparing online and traditional classroom settings. It would be possible to determine whether online learning exacerbates language anxiety in vocational students more than in-person classes do.

5.12. Looking at People from Different Backgrounds and Cultures

If we include students from various countries and academies, we can observe how different countries address issues such as digital overload and language anxiety. This would enable us to examine differences and similarities in education between East Asian and Western countries.

5.13. Use of Biometric Tools to Check the Level of Cognitive Load

It would be helpful for future studies to integrate tools such as eye trackers and pulse monitors to monitor a student's cognitive load from the start of their digital radiance learning session. Using this approach, people would get a more precise, objective assessment of their struggles with digital media and the effect it has on their anxiety and how much they can learn.

5.14. Looking at the Part of Peer Support in Digital Classrooms

It would be essential to find out if using technology to study with peers relieves language anxiety. Examining how online study groups and virtual forums can foster emotional strength and effective learning would be beneficial for vocational education.

6. Conclusion

The study investigated the interplay between digital information overload, language anxiety, and metacognitive awareness in the learning experiences of vocational college students in China. The result points to the same trend, namely that students with excessive exposure to digital information feel much more language anxiety, especially when they have low self-regulatory capacity. The research supports the Cognitive Load Theory proposed by Sweller, showing that an overload of unfiltered online information negatively affects working memory and increases emotional distress.

Qualitatively, it was found that students tend to be disoriented, tired, and emotionally overwhelmed by the amounts and speed of online content. Such emotional reactions often correspond with the three factors of the Horwitz model, namely communication apprehension, test anxiety, and fear of negative evaluation, particularly in cases where digital tools are unclear or not personalised. On the other hand, students who had high levels of metacognitive awareness reported feeling in control, confident, and thriving in handling complex learning situations. Their capacity to plan, monitor, and evaluate their learning turned out to be a significant buffer against anxiety.

These findings provide good reasons to incorporate metacognitive strategy teaching in vocational language programs. Digital cognitive overload and the lack of emotional resilience can be partially addressed through practical steps, including reflective journaling, scaffolded content, a minimalist learning platform, and targeted teacher training.

Although the research is constrained by a small sample of three institutions and the use of self-reported data, it presents significant opportunities for future research. Longitudinal studies and experimental studies can be conducted to examine the long-term effects of metacognitive training on anxiety and academic performance. It would also be interesting to introduce biometric instruments to assess real-time cognitive load, as well as to focus on cross-cultural or multilingual learner groups, thereby further enriching the domain.

Finally, this study highlights the importance of teachers being aware of the emotional and cognitive stressors that vocational students may encounter while studying in digital environments. Guided approaches and strategies to support students and nurture metacognition awareness are the primary necessities for establishing balanced, practical, and anxiety-free learning experiences in the digital era.

6.1. Metacognition Can Help Protect from Mental Problems

Although becoming anxious about language was related to receiving much information online, mastering self-awareness was shown to protect people from anxiety. Those with a greater MA were better equipped to deal with the consequences of being immersed in digital information and manage the corresponding increase in mental demand. Having metacognitive skills helped a lot in controlling feelings of anxiety.

Results from the study's regression analysis revealed that individuals with high self-awareness exhibited lower anxiety levels, even in the presence of a significant amount of digital input. Several of these students tackled their tasks by organising their time, filtering out unnecessary information, and verifying that they understood what they were learning. The results align with Flavell's concept of metacognitive regulation, specifically highlighting the use of planning, monitoring, and evaluation during the learning process.

Students with lower metacognitive awareness struggled to manage their education. During our interviews, some students with lower MA scores reported that their study times were difficult to schedule, they found it challenging to ignore unnecessary information, and paid less attention to the progress they had made through their research. Much of the feedback from students mentioned being disoriented and confused, so it is essential to help them learn how to manage overloaded cognitive tasks. As a result, developing metacognition must become a primary intervention for students in online classes.

6.2. How Vocational Education Changes

As a result of the study, several important insights have emerged regarding digital learning environments in vocational education in China. Since vocational colleges frequently have less prepared students who may easily overload their minds, the study suggests that their curricula and teachers' training should include digital literacy and skills in using thinking strategies.

6.3. Curriculum Design

A good vocational education curriculum, among other learning activities, should have reflective journaling, progressively delivered lessons, and lessons on time management. The curriculum must direct students' attention to learning both the subject content and the skills necessary for digital learning. If students undergo metacognitive training, they will manage digital information more effectively and achieve better results in learning a new language.

6.4. Teacher Training

Those who teach should be prepared to recognise symptoms of digital stress and language anxiety and employ strategies to support students. They should create an atmosphere where students are free to express their worries and get advice without fear of criticism. People should help students develop self-control by regularly asking them to reflect on their learning and achievements.

6.5. Technology Optimisation

A good LMS reduces the stress placed on learners due to overload. With minimal dashboards, selected views, and reminders to schedule their time, students are better able to manage the amount of work they have. The tools should help students access information in an organised way and identify what is most important.

6.6. Essential Limitations and Possible Topics for Further Study

This research provides valuable insights into the relationship between excessive digital information, language anxiety, and metacognitive awareness. Still, some limitations should be highlighted. Only students from three vocational colleges in China were tested; therefore, the

findings cannot be applied with confidence outside this specific setting. Additionally, survey respondents supplied the language anxiety scores, which means that their reports may be biased. Expand research by studying students after metacognitive training to determine if they can still manage multiple sources of digital information and feel less anxious around language. Additionally, utilising biometric tools to measure cognitive overload during online learning could provide more accurate insights into students' experiences.

Consequently, digital information overload tends to lead to language anxiety among vocational college students in China, but being metacognitively aware limits the negative results. The research reveals that strengthening a student's learning awareness and teaching them metacognitive skills can ease their experiences in digital learning. When students learn to manage their knowledge and stress, educators can create a more balanced and successful classroom environment. Such interventions are needed most in vocational education because students face unique struggles and more challenging situations. Applying these studies to teaching can significantly enhance students' learning and well-being when they utilise technology.

Author Contributions

Conceptualization, YC; methodology, YC.; software, YC.; validation, MK; formal analysis, MN.; investigation,MN.; resources, YC.; data curation, YC.; writing—original draft preparation, YC.; writing—review and editing, MN.; visualization, MN.; supervision, MK.; project administration,MK.; funding acquisition, YC. All authors have read and agreed to the published version of the manuscript.

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Informed Consent Statement

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Data Availability Statement

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Conflicts of Interest

The authors declare no conflict of interest.

Appendix A

Questionnaire for Study on Language Anxiety, Learning Self-Awareness, and Digital Information Overload

Section 1: Demographics

Please provide the following demographic information:

1. **Age**: _____
2. **Gender**:
   - Male
   - Female
   - Other (Please specify): _____
3. **Educational Program**: _____

_____

4. **Year of Study**:
   - First Year
   - Second Year
   - Third Year
   - Other (Please specify): _____
5. **Prior Experience with Digital Learning Tools (e.g., mobile apps, online platforms)**:
   - Less than 1 year
   - 1-2 years
   - 2-3 years
   - More than 3 years

Section 2: Language Anxiety (Based on FLCAS)

Please describe how strongly you agree with the following statements about your emotions toward learning English:

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I get nervous when I have to speak in English.	[ ]	[ ]	[ ]	[ ]	[ ]

Cont.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
2. I worry about making mistakes while speaking English.	[ ]	[ ]	[ ]	[ ]	[ ]
3. I feel uneasy when I'm required to speak English in front of the class.	[ ]	[ ]	[ ]	[ ]	[ ]
4. I feel anxious when I have to take a language test.	[ ]	[ ]	[ ]	[ ]	[ ]
5. I fear being evaluated negatively because of my language skills.	[ ]	[ ]	[ ]	[ ]	[ ]
6. I feel embarrassed when I make errors in English.	[ ]	[ ]	[ ]	[ ]	[ ]

Section 3: Metacognitive Awareness (Based on MAI)

Please describe how often the following statements apply to you when learning English:

Statement	Never	Rarely	Sometimes	Often	Always
1. I know when I don't understand something in English.	[ ]	[ ]	[ ]	[ ]	[ ]
2. I plan my study time before learning English.	[ ]	[ ]	[ ]	[ ]	[ ]
3. I employ various strategies to enhance my understanding of English texts.	[ ]	[ ]	[ ]	[ ]	[ ]
4. I monitor my progress while studying English.	[ ]	[ ]	[ ]	[ ]	[ ]
5. I reflect on my learning strategies after finishing English assignments.	[ ]	[ ]	[ ]	[ ]	[ ]
6. I evaluate language learning process to do my best.	[ ]	[ ]	[ ]	[ ]	[ ]

Section 4: Digital Information Overload

How frequently do you happen to experience the following when you use digital tools to learn English?

Statement	Never	Rarely	Sometimes	Often	Always
1. I feel overwhelmed by the amount of digital content I need to process.	[ ]	[ ]	[ ]	[ ]	[ ]
2. I struggle to filter out irrelevant information while learning English online.	[ ]	[ ]	[ ]	[ ]	[ ]
3. I find it difficult to focus on my learning due to constant digital distractions.	[ ]	[ ]	[ ]	[ ]	[ ]
4. I feel stressed when I have to keep up with numerous digital learning platforms.	[ ]	[ ]	[ ]	[ ]	[ ]
5. I experience cognitive fatigue after using digital tools for English learning.	[ ]	[ ]	[ ]	[ ]	[ ]
6. After a prolonged period of digital language learning, I often feel mentally drained.	[ ]	[ ]	[ ]	[ ]	[ ]

Section 5: Coping Strategies and Learning Strategies

What are the strategies that you employ in learning English in an online space?:

Statement	Never	Rarely	Sometimes	Often	Always
1. I plan my learning time carefully to avoid overload.	[ ]	[ ]	[ ]	[ ]	[ ]
2. I break down large learning tasks into smaller, manageable parts.	[ ]	[ ]	[ ]	[ ]	[ ]
3. I use time management techniques (e.g., time blocking) to manage my study schedule.	[ ]	[ ]	[ ]	[ ]	[ ]
4. I focus on key information and ignore irrelevant content while learning.	[ ]	[ ]	[ ]	[ ]	[ ]
5. I take regular breaks to avoid cognitive fatigue while learning.	[ ]	[ ]	[ ]	[ ]	[ ]
6. I reflect on my learning progress and adjust my strategies if necessary.	[ ]	[ ]	[ ]	[ ]	[ ]

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