

Effects of a Digital Literacy Package on Knowledge and Technology Skills Among Students with Overload Anxiety

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Abstract

Against the backdrop of China's comprehensive education digitalization strategy, digital literacy has become an indispensable core competency for higher vocational college students. However, these students commonly face a dual predicament of weak digital skills and digital task overload anxiety, which mutually reinforce each other and form a vicious cycle. Existing interventions tend to separate skills training from psychological support, yielding limited effectiveness. This study aims to develop and validate a systematic "Digital Literacy Package" that integrates skills cultivation with anxiety management, and to examine its effects on vocational college students' digital knowledge, technical skills, and overload anxiety levels. A one-group pretest-posttest quasi-experimental design was adopted. Using simple random sampling, 30 third-year computer science majors from Quanzhou Light Industry Vocational College were selected as participants. A structured two-week course (totaling 8 hours) was implemented. Self-developed instruments, including a Digital Literacy Self-Efficacy Scale, a Digital Task Overload Anxiety Questionnaire, and a Course Satisfaction Survey, were administered before and after the intervention, supplemented by qualitative analysis of open-ended questions. Results showed that after the intervention, students' digital literacy self-efficacy scores significantly increased from 57.20 to 82.80 ($t=28.47$, $p<0.001$, Cohen's $d=3.21$); technical skills scores rose from 53.73 to 84.27 ($t=28.93$, $p<0.001$, $d=3.89$); digital task overload anxiety scores dropped from 78.80 to 52.20 ($t=-35.47$, $p<0.001$, $d=4.12$); and overall course satisfaction reached a mean of 4.62 out of 5, with 97% of students expressing satisfaction. Qualitative feedback further confirmed the effectiveness and acceptability of the "skills-psychology integration" instructional design. The findings indicate that this Digital Literacy Package can significantly enhance vocational students' digital knowledge and skills, substantially alleviate their overload anxiety, and receive high student approval, providing a replicable, lightweight intervention model for higher vocational institutions.

Keywords: Digital Literacy Package; overload anxiety; vocational college students; skills improvement; quasi-experimental study

1. Background and Significance of the Problem

Currently, China is vigorously implementing the digitalization strategy for education. Digital technology has deeply integrated into the entire process of education and teaching, reshaping the forms of teaching and learning. "Digital literacy" has risen from an additional skill to a core competence that college students must possess, encompassing digital awareness, technology application, information identification, innovation and creation, and safety and ethics (Cao & Zhang, 2025; Zhou & Zhu, 2023). For higher vocational colleges, enhancing students' digital literacy directly affects their employment competitiveness, career development potential, and adaptability to the digital transformation of society.

However, the rapid development of educational technology brings both opportunities and challenges. Numerous studies (Gao, 2025; Liu & Cong, 2025) have shown that current vocational colleges face numerous problems in cultivating digital literacy: the curriculum system is outdated; practical teaching is severely lacking; and the cultivation of digital literacy is separated from professional courses, resulting in fragmented educational effects. At the same time, college students face particularly severe psychological challenges. The information overload in the digital environment, social comparison, and algorithm recommendations can easily trigger and exacerbate their anxiety, especially overload anxiety and fear of missing out (Niu et al., 2025; Song, 2025).

As a college counselor, the researcher has observed that many students fall into a vicious cycle of "insufficient digital skills → low learning efficiency and task backlog → increased anxiety → further suppression of learning motivation and cognitive functions" (Zhang et al., 2025). Current research has revealed the crucial role of emotional regulation self-efficacy (Zhang, 2025) and time management tendencies (Zhang et al., 2025) in alleviating anxiety, but most intervention measures still separate skills training from psychological support. Therefore, developing an intervention scheme integrating skills and emotions has become an urgent need.

2. Research Objectives

2.1 To compare the knowledge level and technical skills of students before and after using the digital literacy package.

2.2 To compare the changes in anxiety coping ability of students before and after using the digital literacy package.

2.3 To study students' satisfaction with the usage of the digital literacy package.

3. Research Hypotheses

3.1 After using the digital literacy package, students' knowledge level and technical skills will be significantly improved.

3.2 After using the digital literacy package, students' anxiety levels will be significantly reduced.

3.3 Students show high satisfaction with the digital literacy courses.

4. Scope of the Research

Population and Sample: The population of this study consists of third-year computer major students enrolled in a higher vocational college in Fujian Province, China, totaling 170 students. Using simple random sampling, 30 students were randomly selected as the research sample. The sampling criteria were: (1) voluntary participation in this study; (2) self-reporting a moderate to high level of digital task overload anxiety.

Variables: The independent variable is the intervention of the "Digital Literacy Package." The dependent variables include: (1) students' digital literacy self-efficacy; (2) students' level of digital task overload anxiety; and (3) students' satisfaction with the Digital Literacy Package.

Geographical Area and Timeframe: The study was conducted at Quanzhou Light Industry Vocational College in Fujian Province, China, during the third academic year, lasting for 2 weeks.

5. Research Methodology

This study adopted a one-group pretest-posttest quasi-experimental design ($O_1 \rightarrow X \rightarrow O_2$). O_1 represents the pretest measuring the dependent variables before the intervention. X represents the treatment, referring to the two-week "Digital Literacy Package" intervention. O_2 represents the posttest measuring the same dependent variables immediately after the intervention.

6. Research Instruments

Four research instruments were used:

Digital Literacy Intervention Materials: A systematic online learning package covering digital knowledge, technical skills (information retrieval, tool usage, safety ethics), and anxiety management modules (task decomposition, Pomodoro Technique, positive affirmations), delivered through an LMS.

Digital Literacy Self-Efficacy Scale: A 5-point Likert scale with 20 items (range 20-100), with higher scores indicating stronger self-efficacy (Cronbach's $\alpha = .89$).

Digital Task Overload Anxiety Questionnaire: A 5-point Likert scale with 20 items (range 20-100), with higher scores indicating more severe anxiety (Cronbach's $\alpha = .91$).

Course Satisfaction Survey: A self-designed questionnaire with 20 Likert items and 2 open-ended questions.

All instruments were validated by three experts in education, psychology, and information technology.

7. Data Collection

The study lasted two weeks with four sessions (8 hours total). In the pre-test phase (Week 1, Session 1), students completed the scales as baseline data (O_1). In the intervention phase (Sessions 2-4), the Digital Literacy Package was implemented through instructor explanations, group discussions, and practical exercises on four themes: digital fundamentals and planning; information and focus;

creation and mindset; safety and integration. In the post-test phase (Session 4), students completed the post-test (O₂) and satisfaction survey.

8. Data Analysis

The collected data were analyzed using SPSS 26.0 software through: (1) descriptive statistics (means and standard deviations); (2) paired-samples t-tests to compare pre-test and post-test scores; (3) Cohen's d effect size calculations; and (4) qualitative content analysis of open-ended questions. The significance level (α) was set at .05.

9. Research Findings

Participants: Among 30 participants, 18 were male (60%) and 12 female (40%), mean age 20.3 years ($SD = 1.2$). All were full-time students without prior systematic training in digital literacy and anxiety management integration.

Digital Literacy Self-Efficacy: Scores significantly increased from 57.20 to 82.80 ($t(29)=28.47$, $p<0.001$, $d=3.21$). The most improved skills were "setting complex passwords," "using the Pomodoro technique," and "decomposing complex projects."

Technical Skills: Scores significantly increased from 53.73 to 84.27 ($t(29)=28.93$, $p<0.001$, $d=3.89$). Safety protection and task management technologies showed the largest gains.

Anxiety Reduction: Anxiety scores significantly decreased from 78.80 to 52.20 ($t(29)=-35.47$, $p<0.001$, $d=4.12$). Anxieties related to "learning new software," "not knowing where to start complex tasks," and "falling behind peers" showed the greatest relief.

Student Satisfaction: Overall satisfaction was 4.62 out of 5, with 97% expressing satisfaction. The "skill-mind integration" teaching method received 100% recognition. Qualitative feedback confirmed the course's practicality, psychological safety, and targeted content. The lowest-rated item was platform stability ($M=4.2$), suggesting need for technical optimization.

10. Discussion

The results provide strong empirical support for the effectiveness of the "skill-mind integration" Digital Literacy Package. The significant improvement in digital literacy self-efficacy ($d=3.21$) and technical skills ($d=3.89$) aligns with González-Cabrera et al. (2022) and confirms that systematic training can significantly enhance digital literacy. The most substantial gains in safety skills, information identification, and task management validate the course design's emphasis on practical applications.

The substantial anxiety reduction ($d=4.12$) is consistent with Arslan et al. (2022) and Chen and Wang (2023), confirming that digital literacy serves as a protective factor against digital anxiety. The mechanisms can be explained through Cognitive Behavioral Theory: "task decomposition" serves as cognitive restructuring of catastrophic thinking, while the "Pomodoro Technique" functions as a behavioral experiment breaking the feeling of powerlessness. These strategies simultaneously achieve

skill improvement and anxiety relief. The results also echo Social Cognitive Theory (Bandura, 1997): students gained mastery experiences through "small-step, fast-paced" practices, enhancing self-efficacy and forming a virtuous cycle of "skill mastery → efficacy improvement → anxiety reduction → greater willingness to try."

However, limitations include the lack of a control group, small sample from a single institution, reliance on self-report measures, and absence of long-term follow-up.

11. Suggestions

Practical Recommendations:

11.1 Higher vocational colleges should integrate anxiety management strategies into digital literacy curricula rather than separating skills from psychological support.

11.2 Counselors can implement this 8-hour intervention model for freshman adaptation, pre-exam stress management, or group counseling for students with digital learning difficulties.

11.3 Basic safety skills (password management, information verification) should be prioritized in digital literacy education.

Future Research:

- 1) Adopt randomized controlled trial designs with control groups.
- 2) Conduct multi-center, large-sample studies across different institution types and majors.
- 3) Include delayed post-tests (1, 3, 6 months) to assess long-term effects.

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