

Online Learning Satisfaction and Self-Regulated Learning Skills among Chinese Vocational College Students: A Mixed-Methods Study

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Abstract

This study examined the relationship between online learning satisfaction and self-regulated learning (SRL) skills among vocational college students in China. A quantitatively driven mixed-methods design was used. Questionnaire data were obtained from 151 students, and semi-structured interviews were conducted with seven students. Online learning satisfaction was measured with six items covering content quality, instructor interaction, and platform usability; SRL was measured with six items covering time management, self-monitoring, and goal setting. Both scales showed high internal consistency (Cronbach's $\alpha = .886$ and $.931$). Students reported generally positive satisfaction ($M = 3.96$) and SRL skills ($M = 3.97$). Online learning satisfaction was positively correlated with SRL skills, $r = .567$, $p < .001$. Simple linear regression showed that satisfaction significantly predicted SRL skills, $B = .541$, $SE = .064$, $\beta = .567$, $t = 8.397$, $p < .001$, explaining 32.1% of the variance ($R^2 = .321$; adjusted $R^2 = .317$). Interviews indicated that clear content, timely feedback, and reliable platform functionality supported planning and monitoring, whereas unclear materials, limited interaction, and technical disruptions hindered study routines. The findings support integrating learning-environment quality with explicit SRL support in vocational online and blended education. The cross-sectional results indicate association rather than causation.

Keywords: Online Learning Satisfaction, Self-Regulated Learning, Vocational College Students, Mixed Methods, Correlational Analysis

Introduction

The rapid expansion of digital technologies has moved online and blended learning beyond an emergency response and into the routine architecture of higher and vocational education. Learning management systems, mobile applications, recorded demonstrations, digital assessment, and synchronous and asynchronous communication now shape how students access content, interact with instructors, and organize academic work. In China, the large-scale transition during the COVID-19 period accelerated institutional investment and normalized digitally mediated teaching after campuses reopened (Gu & Li, 2022). This

transition is especially consequential in vocational education, where students must integrate conceptual knowledge with practical procedures, project completion, and occupational performance standards. Face-to-face workshops normally provide fixed schedules, demonstrations, immediate clarification, peer observation, and direct supervision. When part of this learning moves online, students must interpret task requirements, select resources, schedule practice, monitor progress, and decide when to seek assistance more independently. Recent evidence shows that blended vocational education can improve flexibility and engagement, but its benefits depend on instructional design, technical support, learner readiness, and students' capacity to manage learning demands (Song & Lai, 2025). The central issue is therefore not simply whether digital platforms are available, but whether the environments built around them support effective and independent learning.

Online learning satisfaction is an important indicator of this educational quality. It refers to students' overall appraisal of whether an online course provides understandable content, accessible instructional support, meaningful interaction, manageable procedures, and reliable technology. Satisfaction has been associated with technology adoption, engagement, perceived learning, persistence, and willingness to continue using online environments (Jiang, Islam, Gu, & Spector, 2021; Alyoussef & Omer, 2023; Yalçın & Dennen, 2024). It should not, however, be reduced to whether students like a platform or find online learning convenient. In vocational education, satisfaction may reflect whether course expectations are transparent, resources are professionally relevant, feedback is timely, and technical systems allow practical tasks to be completed without unnecessary interruption. Evidence from another practice-oriented field similarly indicates that implementation quality and learner readiness are central to online learning satisfaction (Sharir, Norhisham, & Sabadri, 2026).

The growing dependence on digital delivery also increases the importance of self-regulated learning (SRL). SRL is a cyclical process through which learners set goals, manage time, select strategies, monitor understanding, evaluate progress, and adjust their actions in response to feedback (Artino, Simons, & Konopasky, 2022; Alvarez, Jivet, Perez-Sanagustin, Scheffel, & Verbert, 2022). A recent systematic review identified goal setting, time management, help seeking, monitoring, and reflection as central strategies in digitally mediated learning, while also showing that learning management systems, artificial intelligence, collaborative platforms, and learning analytics can support these processes when they are pedagogically integrated (Faza & Lestari, 2025). SRL is therefore not a fixed personality trait or a simple measure of discipline; it develops through the interaction of learner capabilities, instructional design, social support, and technological conditions. Consistent with this view, a 2025 systematic review and meta-analysis found a moderate positive association between digital literacy and SRL, although the strength of the relationship varied across measures, participant characteristics, and contexts (Lan, Liu, & Pan, 2025).

Online learning satisfaction and SRL may be related through several features of the learning environment. Clear and professionally relevant content can help students define goals, sequence tasks, and judge progress. Instructor interaction can make expectations visible, clarify difficult procedures, provide standards for self-evaluation, and guide strategy revision. Research has connected teacher-student interaction and instructor immediacy with motivation, self-efficacy, satisfaction, and perceived learning (Sun et al., 2022; Amoozegar, Abdelmagid, & Anjum, 2024), while more recent evidence indicates that online interactions

are positively associated with SRL and that technology proficiency helps students benefit from those interactions (Hashmi, Iqbal, Asghar, & Siming, 2026). Platform usability also matters because stable access and clear navigation protect study routines, whereas login failures, fragmented notifications, and technical disruptions consume time and interrupt task continuity. Research on adaptive and technology-enhanced environments likewise suggests that platform characteristics are associated with SRL and engagement (Sui, Yen, & Chang, 2024; Ouyang, 2025). Content quality, instructor interaction, and platform usability may therefore contribute to satisfaction while also providing conditions that support goal setting, time management, and self-monitoring.

This relationship is theoretically grounded in social cognitive theory and self-determination theory. Social cognitive theory explains learning through reciprocal interactions among environmental conditions, personal beliefs, and behavior. In an online course, content organization, instructor responsiveness, and platform usability constitute environmental conditions; satisfaction reflects students' appraisal of those conditions; and goal setting, time management, and self-monitoring represent regulatory behavior. Self-determination theory provides a complementary motivational account: understandable content can support competence, usable technology can support autonomy, and responsive interaction can support relatedness (Guay, 2022). Together, the theories explain why supportive online environments may encourage active regulation without implying a one-way causal relationship. Students with stronger SRL may also use resources more effectively and consequently report greater satisfaction.

Despite rapid growth in digital-learning research, four gaps justify the present study. First, satisfaction and SRL are often examined in parallel rather than directly as related constructs. Satisfaction research commonly emphasizes perceived quality, readiness, engagement, or continued use, whereas SRL research frequently focuses on academic performance, technology-supported interventions, or learner profiles (Faza & Lestari, 2025; Lan et al., 2025; Sharir et al., 2026). Second, much of the evidence comes from general universities, MOOCs, language courses, adaptive platforms, or other specific disciplines; comparatively less is known about Chinese vocational college students whose learning combines technical knowledge with practice-oriented tasks. Third, recent studies establish the importance of interaction, digital competence, and platform features but provide less evidence about how vocational students connect these conditions with everyday planning, monitoring, and task completion (Hashmi et al., 2026; Ouyang, 2025). Fourth, the continuing reliance on cross-sectional self-report data creates risks of common method bias, social desirability, and causal overinterpretation. A context-specific mixed-methods investigation is therefore needed to connect statistical patterns with students' accounts of their learning routines and difficulties.

The present study examines online learning satisfaction and SRL skills among students at a technology-oriented vocational college in southeastern China. The quantitative component estimates the levels and statistical relationship of the two constructs, while semi-structured interviews clarify how students experience content quality, instructor interaction, platform usability, time management, goal setting, and self-monitoring. This quantitatively driven mixed-methods approach does not eliminate the limitations of cross-sectional measurement, but it enables questionnaire findings to be interpreted alongside examples of students' routines, difficulties, and support needs. The study is educationally relevant because a

meaningful association would suggest that institutions should develop course quality, interaction, technical reliability, and explicit SRL support as connected rather than separate improvement priorities.

The study was guided by three research questions: (1) What are the overall levels of online learning satisfaction and SRL skills among the participating vocational college students? (2) Is online learning satisfaction significantly associated with SRL skills, and how much variance in SRL skills is statistically explained by satisfaction? (3) How do students describe the relationships between online learning conditions and their goal setting, time management, and self-monitoring? Consistent with the correlational design, the quantitative hypothesis was that online learning satisfaction would be positively associated with SRL skills. The study did not assume that satisfaction caused SRL; instead, it examined whether the two constructs were meaningfully related within the specified vocational education context.

Literature Review and Theoretical Framework

Online Learning Satisfaction

Online learning satisfaction is a multidimensional evaluation formed when learners compare their expectations with their actual experiences in a digital learning environment. It includes cognitive judgments about course quality and learning value as well as affective reactions to interaction, support, convenience, and technological performance. Yalçın and Dennen (2024) identified multiple factors that shape learners' satisfaction, including course design, learner support, communication, instructor practices, and the functionality of the online environment. These factors are interdependent. A technically advanced system may still produce a poor experience when course expectations are unclear, whereas a well-designed course may be undermined by unstable access or delayed support.

Research on technology-enhanced learning has consistently emphasized that technology does not improve learning automatically. Learning management systems and digital tools contribute to engagement only when they are aligned with pedagogical goals, meaningful tasks, and feedback processes (Veluvali & Suriseti, 2022). Similarly, Agbo, Olaleye, Bower, and Oyelere (2023) showed that students' perceptions of technology, pedagogy, and cognition are interconnected. These findings challenge technological determinism and support a broader view of satisfaction as an evaluation of the complete learning system rather than of the interface alone.

In the present study, online learning satisfaction was operationalized through three dimensions. The first dimension, content quality, concerns whether course materials are clearly structured, understandable, relevant, and useful for completing learning tasks. The second dimension, instructor interaction, concerns responsiveness, feedback, guidance, and the perceived availability of the instructor. The third dimension, platform usability, concerns ease of navigation, access to resources, stability, and the absence of unnecessary technical barriers. Together, these dimensions represent students' answers to three fundamental questions: Is the material understandable and worthwhile? Is instructional help available when needed? Can the system be used efficiently and reliably?

Instructor interaction deserves particular attention because online environments can weaken the social visibility of teaching. Sun et al. (2022) found that teacher-student

interaction was related to online learning outcomes through a serial mediating process. Amoozegar, Abdelmagid, and Anjum (2024) likewise highlighted the relationships among instructor immediacy, motivation, self-efficacy, self-regulated learning, course satisfaction, and perceived learning. Such findings suggest that interaction contributes not only to satisfaction but also to students' ability to interpret expectations, correct errors, and maintain effort. For vocational students, whose courses may include technical procedures and performance standards, delayed or vague feedback can create substantial uncertainty.

Platform usability is equally important but should be understood as an educational condition rather than a purely technical feature. A stable platform allows students to retrieve resources, submit work, check deadlines, and monitor progress in accordance with their plans. Conversely, login failures, slow loading, unclear notifications, and uncertain submission status consume time and interrupt study routines. Sui, Yen, and Chang (2024) demonstrated that a perceived technology-enhanced environment was associated with self-regulated learning, supporting the view that digital affordances can either enable or constrain regulatory behavior.

Self-Regulated Learning in Online and Vocational Education

Self-regulated learning describes the processes through which learners become active agents in their own learning. Rather than depending entirely on external supervision, self-regulated learners establish goals, organize time and resources, monitor their understanding, evaluate their progress, and modify strategies when necessary. Artino et al. (2022) described SRL as a foundational educational process involving planning, performance, and reflection. In online learning, these processes become especially visible because students often have greater flexibility and fewer immediate external cues.

The literature has identified multiple components of SRL, including motivation, metacognition, behavioral control, environmental structuring, help seeking, and strategic action. Zhu and Doo (2022) found close relationships among motivation, self-monitoring, self-management, and learning strategies among MOOC learners. Zhu, Bonk, and Berri (2022) further emphasized that self-directed learning in MOOCs depends on the interaction of motivation, learning strategies, and instructional support. These studies show that SRL is neither purely internal nor independent of teaching. Learners regulate more effectively when the environment provides understandable goals, usable information, and opportunities for feedback.

The present study focused on three dimensions of SRL: time management, self-monitoring, and goal setting. Time management refers to allocating study periods, maintaining a workable schedule, and completing tasks on time. Self-monitoring refers to checking progress, judging understanding, and recognizing when strategies need to change. Goal setting refers to defining intended outcomes, breaking large tasks into manageable steps, and deciding the order in which work should be completed. These dimensions are particularly relevant to vocational courses that combine conceptual learning, software operation, technical practice, and project deadlines.

Vocational education creates a distinctive context for SRL. Students are frequently expected to demonstrate competence through practical products or performances rather

than through knowledge recall alone. Online delivery can make this more difficult when demonstrations are less immediate, feedback is delayed, or hands-on practice is difficult to reproduce digitally. Cigdem and Oncu (2024) showed that SRL plays an important role in academic success in blended vocational education. Held and Mejeh (2024) also indicated that motivational trajectories in vocational education are affected by self-regulated learning environments. These studies suggest that vocational students may benefit from explicit scaffolds that connect planning and monitoring to authentic professional tasks.

Measurement remains a challenge. Many studies use self-report scales because they are efficient and can capture students' beliefs about their typical behavior. However, self-reports may not correspond perfectly with actual behavior. Learners may know that they should set goals or manage time and therefore endorse such statements, even when their real study patterns are inconsistent. Cleary and Russo (2024) advocated a multilevel approach to SRL assessment, and Hadwin, Rostampour, and Winne (2025) emphasized the importance of distinguishing beliefs, practices, and challenges. For this reason, the present study combined questionnaire scores with interview evidence about procrastination, scheduling, feedback use, and task completion.

Relationship Between Satisfaction and Self-Regulated Learning

Several mechanisms may explain a positive relationship between online learning satisfaction and SRL skills. First, satisfaction may indicate that the learning environment is coherent and predictable. When course materials are organized and requirements are transparent, students can form realistic goals and allocate time more effectively. Second, satisfaction may reflect access to feedback. Instructor comments help students compare current performance with expected standards and decide how to adjust their strategies. Third, satisfaction may reflect technological reliability, which protects attention and task continuity. Finally, positive evaluations of the environment may support motivation and self-efficacy, both of which are important for persistence.

Empirical studies provide support for these mechanisms. Dinh and Phuong (2024) reported that learner characteristics and self-regulated learning strategies were associated with satisfaction and academic performance in MOOCs. Zheng and Xiao (2024) modeled relationships among self-efficacy, informal digital learning, SRL, and course satisfaction. Apridayani, Han, and Waluyo (2023) showed that students' SRL and anxiety were important in online English courses. Tzimas and Demetriadis (2024) further demonstrated that learning analytics guidance was related to students' SRL skills, performance, and satisfaction. Together, these studies suggest that satisfaction and regulation develop within a shared system of motivation, support, feedback, and technology use.

At the same time, the relationship should not be oversimplified. Motivation does not automatically produce effective planning, and satisfaction does not guarantee strategic behavior. A student may enjoy a course but still procrastinate, while another student may regulate effectively despite moderate satisfaction. Moreover, strong self-regulators may create more satisfying experiences for themselves by seeking help, organizing resources, and completing tasks on time. This possibility of reciprocal influence means that cross-sectional regression can identify statistical prediction but cannot establish temporal or causal precedence. Diener et al. (2022) argued for careful interpretation beyond experimental

designs, and Doebel and Frank (2024) similarly emphasized the importance of sampling and design choices for theoretical progress.

Theoretical Framework

The study was informed primarily by social cognitive theory and self-determination theory. Social cognitive theory explains learning through the reciprocal interaction of personal factors, behavior, and environment. In an online course, content quality, instructor interaction, and platform usability are environmental conditions that shape students' experiences. These conditions may influence self-efficacy, outcome expectations, and strategic choices. Time management, self-monitoring, and goal setting represent behavioral manifestations of students' attempts to regulate learning. Almulla and Al-Rahmi (2023) applied an integrated social cognitive perspective to learning performance, and Chou, Hsieh, and Pan (2024) used social cognitive theory to explain the role of self-regulation in perceived learning outcomes. The theory therefore provides a useful explanation for why students' evaluations of the environment may be associated with regulatory behavior.

Self-determination theory adds a motivational explanation. It proposes that autonomy, competence, and relatedness are basic psychological needs that support high-quality motivation (Guay, 2022). In online learning, platform usability can strengthen autonomy by giving students a sense of control over access and navigation. Clear and appropriately challenging content can support competence by enabling students to understand and complete tasks. Instructor interaction can support relatedness by communicating that help and recognition are available. Alturki and Aldraiweesh (2024) and Yang, Zheng, Wang, and Sun (2024) showed that motivation, engagement, and self-regulation are meaningfully related in technology-mediated educational contexts.

The two theories are complementary. Social cognitive theory explains how environmental perceptions, personal beliefs, and regulatory behavior interact, whereas self-determination theory explains why supportive conditions may increase autonomous motivation. Based on this combined framework, the study treated online learning satisfaction as students' overall appraisal of environmental support and SRL skills as their reported capacity to plan, manage, and monitor learning. The empirical analysis tested the association between the two constructs. It did not test mediation or causal pathways, and the theoretical model was therefore used for interpretation rather than as a fully specified structural model.

Methodology

Research Design

A quantitatively driven mixed-methods design was adopted. The quantitative component used a cross-sectional correlational approach to describe the levels of online learning satisfaction and SRL skills and to examine their statistical relationship. Pearson product-moment correlation was used to estimate the direction and strength of the association, and simple linear regression was used to estimate the proportion of variance in SRL skills statistically explained by online learning satisfaction. The qualitative component consisted of semi-structured interviews and thematic analysis. It was included to clarify how students experienced course content, instructor interaction, platform use, time management, goal setting, and self-monitoring.

The design was quantitatively dominant because the primary research question concerned the relationship between two measured constructs. The interviews were not used to generate a separate theory or to establish causal mechanisms. Instead, they provided contextual evidence that helped interpret why satisfaction and SRL might be related in students' everyday learning experiences. Integration occurred during interpretation, where qualitative themes were compared with descriptive and inferential quantitative findings.

Participants and Sampling

Participants were recruited from a technology-oriented vocational college in southeastern China using convenience sampling. The final quantitative sample consisted of 151 students who had experience with online learning. There were 29 male students (19.2%) and 122 female students (80.8%). One participant was aged 18-20 years (0.7%), 38 were aged 21-23 years (25.2%), 56 were aged 24-26 years (37.1%), and 56 were older than 26 years (37.1%). In terms of disciplinary background, 10 participants studied software technology or computer science (6.6%), 73 studied information technology (48.3%), 30 studied engineering or other technical fields (19.9%), and 38 studied other vocational education programs (25.2%). Most participants reported frequent online learning: 116 studied online daily (76.8%), 22 did so several times per week (14.6%), and 13 did so once per week (8.6%). Seven students also participated in semi-structured interviews.

The sample reflected the institution available to the researcher and was not intended to represent all vocational college students in China. The concentration of female participants, older students, and students in information technology-related programs was treated as an important limitation when interpreting generalizability. Participant characteristics are summarized in Table 1.

Instruments

The questionnaire used a five-point Likert response scale ranging from 1 (strongly disagree) to 5 (strongly agree). Online learning satisfaction was assessed with six items. Two items measured content quality, two measured instructor interaction, and two measured platform usability. Representative items included: 'The online course materials are clear, well organized, and easy to understand'; 'The instructor responds quickly and provides helpful feedback during online learning'; and 'The online learning platform is simple and easy to navigate.' A composite score was calculated by averaging the six satisfaction items. Higher scores indicated higher online learning satisfaction.

SRL skills were assessed with six items covering time management, self-monitoring, and goal setting, with two items per dimension. Representative items included: 'I can manage my time effectively to complete online learning tasks'; 'I regularly check my learning progress on the online platform'; and 'Before beginning online learning, I set clear goals.' The six items were averaged to form an overall SRL score, with higher scores indicating stronger reported SRL skills.

The questionnaire focused on the two central constructs without introducing additional predictors. Because the number of items within each subdimension was small, the analysis did not estimate separate predictive effects for content quality, instructor interaction, and

platform usability. Subdimension scores were used descriptively, while the overall six-item satisfaction score was used in correlation and regression analyses.

The interview guide addressed four areas: students' evaluations of the clarity and relevance of online course content; the role of instructor communication, feedback, and presence; experiences of platform navigation, resource access, and technical problems; and students' approaches to time management, goal setting, progress monitoring, and common difficulties. Participants were identified by anonymous codes rather than by name.

Data Collection and Ethical Considerations

Questionnaire participation was voluntary and anonymous. Students were informed of the purpose of the study and that their responses would be used for research. No identifying information was included in the quantitative dataset used for analysis. Interview participation was also voluntary, and the transcripts were anonymized. These procedures were intended to reduce pressure on students and to protect confidentiality.

The study relied on self-reported perceptions and behaviors rather than platform logs or achievement records. The measurement strategy focused on students' evaluations of their online learning environment and their perceived capacity to regulate learning. The implications of self-report measurement are considered in the limitations section.

Data Analysis

Quantitative data were analyzed using SPSS. Frequencies and percentages were used to describe participant characteristics. Means and standard deviations were calculated for questionnaire items and composite variables. Internal consistency was assessed using Cronbach's alpha and corrected item-total correlations. These statistics were interpreted as evidence of reliability and item consistency, not as a complete test of construct validity.

Pearson product-moment correlation was used to assess the linear association between online learning satisfaction and SRL skills. A two-tailed significance level of $p < .05$ was adopted. Simple linear regression was then conducted with SRL skills as the dependent variable and online learning satisfaction as the predictor. For the one-predictor model, the regression sum of squares was 26.439 and the total sum of squares was 82.305, yielding $R^2 = .321$. The standardized coefficient was $\beta = .567$, $t = 8.397$, and $F = 70.518$. Model statistics were examined together to ensure consistent reporting.

Interview data were analyzed thematically. The transcripts were read repeatedly, initial codes were assigned to meaningful segments, related codes were grouped into categories, and four themes were developed: content quality, instructor interaction and engagement, platform usability and technical challenges, and SRL behavior. The qualitative findings were then compared with the quantitative results to identify areas of convergence, elaboration, and tension.

Table 1

Participant Characteristics (N = 151)

Variable	Category	n	%
Gender	Male	29	19.2
Gender	Female	122	80.8
Age	18-20 years	1	0.7
Age	21-23 years	38	25.2
Age	24-26 years	56	37.1
Age	Older than 26 years	56	37.1
Program	Software technology and computer science	10	6.6
Program	Information technology	73	48.3
Program	Engineering and technical fields	30	19.9
Program	Other vocational programs	38	25.2
Online learning frequency	Daily	116	76.8
Online learning frequency	Several times per week	22	14.6
Online learning frequency	Once per week	13	8.6

Results*Descriptive Statistics for Online Learning Satisfaction and SRL Skills*

The six online learning satisfaction items had mean scores ranging from 3.78 to 4.23, and the overall mean item score was 3.96. This pattern indicated a generally positive evaluation of the online learning experience. The highest-rated item was the ease of navigating the online platform ($M = 4.23$, $SD = 0.694$), followed by the clarity and organization of course materials ($M = 4.10$, $SD = 0.798$). The lowest-rated item concerned instructors' rapid responses and helpful feedback ($M = 3.78$, $SD = 0.791$). When the two items within each conceptual dimension were averaged, content quality and platform usability both had means of approximately 4.04, whereas instructor interaction had a lower mean of 3.81. Thus, students evaluated the basic content and technical environment positively but perceived comparatively weaker instructional interaction. Table 2 summarizes the descriptive statistics for the principal constructs and dimensions.

The six SRL items had mean scores ranging from 3.85 to 4.10, and the overall mean item score was 3.97. The highest-rated behavior concerned arranging fixed study time for online course tasks ($M = 4.10$, $SD = 0.764$). Regularly checking learning progress was also rated highly ($M = 4.09$, $SD = 0.743$). The comparatively lowest item concerned managing time effectively to complete tasks ($M = 3.85$, $SD = 0.769$). The approximate dimension means were 3.98 for time management, 4.00 for self-monitoring, and 3.94 for goal setting. The pattern suggested that students held generally positive views of their regulatory capacity, while practical execution and systematic reflection remained areas for improvement.

Table 2

Descriptive Statistics for the Main Constructs and Dimensions

Construct/Dimension	Measurement Focus	Item Mean Range	Composite/Dimension Mean
Online learning satisfaction	All six items	3.78-4.23	3.96
Content quality	Clarity, organization, and understanding	3.97-4.10	4.04
Instructor interaction	Responsiveness, feedback, and communication	3.78-3.83	3.81
Platform usability	Navigation and stable access	3.84-4.23	4.04
Self-regulated learning	All six items	3.85-4.10	3.97
Time management	Scheduling and task completion	3.85-4.10	3.98
Self-monitoring	Progress checking and reflection	3.91-4.09	4.00
Goal setting	Goal clarity and task planning	3.91-3.97	3.94

Internal Consistency of the Scales

The online learning satisfaction scale produced a Cronbach's alpha coefficient of .886. Corrected item-total correlations ranged from .622 to .794, and deleting any single item did not produce a meaningful improvement in alpha. The SRL scale produced a Cronbach's alpha coefficient of .931, with corrected item-total correlations ranging from .724 to .854. These results indicated satisfactory to high internal consistency for the two overall scales in the present sample. Table 3 presents the reliability and item-analysis results.

The reliability results should be interpreted within appropriate limits. Corrected item-total correlations provide evidence about whether items are consistent with the overall scale, but they do not by themselves demonstrate factorial or construct validity. Because each conceptual subdimension contained only two items and exploratory or confirmatory factor analysis was not conducted, reliability is reported for the overall scales without claiming that the three subdimensions were independently validated.

Table 3

Reliability and Item Analysis

Scale	Number of Items	Cronbach's Alpha	Corrected Item-Total Correlation Range
Online learning satisfaction	6	.886	.622-.794
Self-regulated learning skills	6	.931	.724-.854

Correlation Between Online Learning Satisfaction and SRL Skills

Pearson correlation analysis showed a statistically significant positive relationship between online learning satisfaction and SRL skills, $r = .567$, $p < .001$, $N = 151$. The coefficient

represented a moderately strong association. Students who reported higher satisfaction with their online learning environment also tended to report stronger time management, self-monitoring, and goal-setting skills.

The coefficient indicates that satisfaction and SRL skills shared a meaningful amount of variance while remaining conceptually distinct. In a one-predictor regression, the standardized regression coefficient corresponds to the zero-order correlation and R^2 corresponds to the squared correlation; the reported values of $r = .567$, $\beta = .567$, and $R^2 = .321$ are therefore internally consistent. The result should be interpreted as an association rather than as evidence that satisfaction causes SRL skills.

Simple Linear Regression

A simple linear regression was conducted with SRL skills as the dependent variable and online learning satisfaction as the predictor. The overall model was statistically significant, $F(1, 149) = 70.518$, $p < .001$. The model correlation was $R = .567$, with $R^2 = .321$ and adjusted $R^2 = .317$. The standard error of the estimate was approximately .612. Table 4 presents the complete simple regression results.

Online learning satisfaction was a statistically significant positive predictor of SRL skills, $B = .541$, $SE = .064$, $\beta = .567$, $t = 8.397$, $p < .001$. The estimated regression equation was: $SRL\ skills = 1.901 + .541(\text{online learning satisfaction})$. Thus, a one-unit increase in the satisfaction score was associated with an average .541-unit increase in the predicted SRL score. The model explained 32.1% of the observed variance in SRL skills. This proportion was educationally meaningful, while also indicating that most of the variance remained attributable to other learner, instructional, and contextual factors.

Table 4

Simple Linear Regression Predicting SRL Skills

Model Statistic	Value	Predictor Statistic	Value
R	.567	Unstandardized B	.541
R^2	.321	Standard Error of B	.064
Adjusted R^2	.317	Standardized β	.567
Standard error of estimate	.612	t	8.397
$F(1, 149)$	70.518, $p < .001$	p	$< .001$
Intercept	1.901	Sample size	151

Qualitative Findings

Content Quality: Clear Structure Supported Learning Direction

Most interview participants reported that online learning was easier to sustain when materials were clearly structured, key points were visible, and examples were directly related to vocational tasks. A consistent module sequence helped students decide what to learn first, what to complete next, and how to divide a large assignment into manageable steps. When materials were excessively theoretical, poorly layered, or unsupported by examples, students spent additional time searching for explanations. Several participants described postponing

unclear tasks until deadlines became urgent. These experiences suggest that content quality provides information needed for goal formulation, task sequencing, and progress monitoring.

Instructor Interaction: Timely Feedback Strengthened Control and Motivation

Instructor interaction was widely described as a critical part of the online learning experience. Rapid responses reduced uncertainty about task requirements, while specific feedback helped students identify errors and revise their approaches. Participants particularly valued explanations of assessment standards, concrete suggestions for improvement, and visible instructor participation in online discussion spaces. When interaction was limited, students felt that they were responsible for resolving all difficulties alone and were more likely to lose momentum. This theme converged with the lower quantitative mean for instructor interaction and indicated that responsiveness and feedback quality remained areas requiring improvement.

Platform Usability: Stability as a Condition for Self-Management

Participants generally found the basic navigation and resource access functions acceptable. Nevertheless, they reported slow loading during peak periods, login difficulties, system crashes, unclear notifications, and uncertainty about whether assignments had uploaded successfully. Such technical disruptions interfered directly with planned study periods and shifted attention from learning to troubleshooting. Platform usability was therefore experienced not as a neutral background feature but as a condition that could protect or disrupt time management, task continuity, and perceived control.

SRL Behavior: Positive Awareness but Contextually Unstable Execution

Students generally understood that online learning required stronger self-discipline and could describe strategies such as setting small goals, planning weekly tasks, and checking completion status. However, these strategies were often informal. Goals were not always written down, and monitoring frequently depended on external signals such as grades, instructor reminders, deadlines, or examinations. Some participants acknowledged procrastination, uneven study schedules, and concentrated revision shortly before assessment. The interview data therefore did not directly contradict the relatively high questionnaire scores. The questionnaire reflected students' general self-evaluations, whereas the interviews revealed that actual regulatory behavior varied across tasks and situations. Table 5 summarizes the qualitative themes and their connections with SRL.

Table 5

Interview Themes and Their Connections With SRL

Theme	Main Experiences	Connection With SRL
Content quality	Clear, organized, and professionally relevant materials; some content was overly theoretical or lacked examples	Supported goal decomposition, task understanding, and progress monitoring
Instructor interaction	Timely responses, specific feedback, and clear standards were valued; limited interaction increased isolation	Supported motivation, strategy adjustment, and self-efficacy
Platform usability	Basic navigation was acceptable, but loading, login, crashes, and unclear notifications occurred	Affected scheduling, task continuity, and perceived control
SRL behavior	Students set simple goals and checked progress, but procrastination and deadline-driven study remained	Indicated that regulation was contextual and variable

Discussion*Generally Positive Evaluations With Relatively Weak Interaction Support*

The participating students reported relatively high levels of both online learning satisfaction ($M = 3.96$) and SRL skills ($M = 3.97$). Because most participants engaged in online learning daily, frequent exposure may have increased their familiarity with platform navigation, digital course routines, and common task procedures. High ratings for platform navigation and content clarity suggest that basic technological access and resource organization were adequate for everyday learning. This pattern is consistent with research emphasizing the roles of convenience, content organization, and platform acceptance in technology-enhanced education (Alyoussef & Omer, 2023; Veluvali & Suriseti, 2022).

Instructor interaction was evaluated less positively than content quality and platform usability. This finding suggests that the main quality challenge in online education may no longer be limited to whether students can enter a platform. It increasingly concerns whether they can obtain continuous, specific, and instructionally useful support while learning. In vocational programs, such support is especially important because technical tasks often require demonstration, clarification of performance criteria, and feedback on procedural errors. Sun et al. (2022) demonstrated that teacher-student interaction can shape online learning through multiple psychological mechanisms, while Amoozegar et al. (2024) linked instructor immediacy with satisfaction and perceived learning. The present findings therefore support embedding interaction into the regular workflow of a course rather than treating it as a reactive service offered only after students ask for help.

The qualitative results add detail to the descriptive pattern. Students did not merely request more messages from instructors. They valued timely clarification, visible presence, specific explanations of errors, and actionable suggestions. These forms of interaction reduce ambiguity and help students decide what to do next. In this sense, interaction contributes simultaneously to satisfaction and to self-regulatory information processing.

A Substantive Association Between Satisfaction and SRL Skills

The correlation of $r = .567$ indicated a stable and educationally meaningful positive relationship between online learning satisfaction and SRL skills. The magnitude was sufficiently large to show that the constructs were substantially related but not so large as to suggest that they measured the same phenomenon. The regression model explained 32.1% of the variance in SRL skills. This is a notable proportion for a single perceptual predictor, yet it also shows that approximately two thirds of the variance was not explained by satisfaction. Other influences may include prior academic ability, motivation, digital literacy, task difficulty, family environment, employment responsibilities, instructor practices, and access to learning resources.

The result is compatible with social cognitive theory. Positive evaluations of content, interaction, and technology imply that students perceive the environment as supportive and manageable. Such perceptions may strengthen self-efficacy and outcome expectations, making students more willing to plan, monitor, and persist (Almulla & Al-Rahmi, 2023; Chou et al., 2024). The result is also compatible with self-determination theory. Usable technology may support autonomy, understandable content may support competence, and responsive instructors may support relatedness. Satisfaction of these needs can improve the quality of motivation and create conditions favorable to self-regulation (Guay, 2022; Alturki & Aldraiweesh, 2024).

The finding also aligns with research connecting SRL to course satisfaction and perceived performance. Dinh and Phuong (2024) reported links among learner characteristics, SRL strategies, satisfaction, and performance in MOOCs. Zheng and Xiao (2024) placed SRL and course satisfaction within a broader structural relationship involving self-efficacy and informal digital learning. Tzimas and Demetriadis (2024) showed that guidance based on learning analytics can affect regulation, performance, and satisfaction. The present study extends this line of research to a Chinese vocational college context.

Nevertheless, the regression term predictor must not be interpreted as proof of a causal effect. The cross-sectional design did not establish temporal order. Strong self-regulators may experience greater satisfaction because they use platforms effectively, seek help, and complete tasks successfully. Common method bias may also inflate the relationship because both constructs were measured through the same self-report questionnaire at the same time. A cautious conclusion is therefore that satisfaction is an important correlate and statistical predictor of SRL skills, not an experimentally confirmed cause.

Different Learning Conditions Supported Regulation Through Different Pathways

Although the available data did not support a multivariable comparison of the three satisfaction dimensions, the descriptive and qualitative findings suggested distinct functional pathways. Content quality primarily provided cognitive structure. When materials were hierarchically organized and task requirements were explicit, students could identify goals, sequence activities, and judge progress. Poorly organized content increased the mental effort required simply to understand what a task involved, leaving fewer resources for strategic planning.

Instructor interaction primarily provided social and feedback support. Timely responses corrected misunderstandings before they became embedded, and specific feedback allowed students to compare current performance with expected standards. Interaction also communicated that help was available, which could protect motivation during difficult tasks. These functions are consistent with research showing that instructor immediacy and teacher-student interaction are closely related to the quality of online learning experiences (Sun et al., 2022; Amoozegar et al., 2024).

Platform usability primarily provided execution conditions. A stable platform enabled students to access resources according to schedule, submit work with confidence, and monitor deadlines. Technical disruptions directly undermined planned behavior by consuming time and breaking task continuity. This interpretation is consistent with Sui et al. (2024), who emphasized the relationship between perceived technology-enhanced environments and SRL.

The interviews also revealed a tension between positive self-evaluation and unstable execution. Students understood the importance of planning and monitoring, yet their behavior often remained deadline driven and dependent on external reminders. This pattern supports the view that SRL is a context-sensitive process rather than a fixed trait. Cleary and Russo (2024) recommended multilevel assessment of SRL, while Hadwin et al. (2025) emphasized the need to distinguish students' beliefs, practices, and challenges. Vocational colleges should therefore avoid interpreting procrastination solely as a failure of individual discipline. Course structure, feedback timing, platform design, and task clarity can either scaffold or weaken regulatory behavior.

Theoretical and Contextual Contributions

The study makes three theoretical contributions within the boundaries of its design. First, it examines online learning satisfaction and SRL skills in a Chinese vocational education context, extending a literature dominated by general university and MOOC populations. Vocational learning includes practical and occupational demands that can intensify the importance of instructional clarity, feedback, and time management.

Second, the study integrates social cognitive theory and self-determination theory to interpret the relationship between environmental appraisal and regulatory behavior. Social cognitive theory explains the reciprocal interaction of environment, beliefs, and behavior, whereas self-determination theory explains how autonomy, competence, and relatedness may sustain motivation. Together, they clarify why students' satisfaction with the learning environment may be associated with planning, monitoring, and persistence without implying that satisfaction is the only or necessarily causal determinant.

Third, the mixed-methods design revealed a dual feature of SRL. Students evaluated their general regulatory capability positively, but their actual execution varied with task difficulty, feedback availability, technical stability, and external deadlines. This distinction would have been less visible from questionnaire data alone. The qualitative findings therefore provide an important interpretive caution: high self-reported SRL does not mean that regulatory behavior is equally stable across all tasks and situations.

Practical Implications

First, online course content should be structured to support planning. Instructors can divide course objectives into weekly outcomes and task lists, explicitly identify required resources, specify operational steps, state completion criteria, and estimate the time needed. A consistent module sequence such as learning objectives, core resources, practical task, self-check, feedback, and reflection question can reduce ambiguity and give students a usable framework for setting goals and monitoring completion.

Second, institutions should establish routine interaction mechanisms. Courses can specify expected response times, schedule regular consultation periods, provide staged feedback, and publish explanations of common problems. Feedback should go beyond scores by identifying the nature of an error, suggesting a strategy for improvement, and indicating the next action. Students who show prolonged inactivity, delayed submission, or sudden performance decline can receive early support through platform alerts and individualized communication.

Third, platform stability and information transparency should be treated as educational quality issues. Institutions should reduce repeated logins and unnecessary switching among platforms, optimize mobile access, and make submission status, deadlines, and course notifications clearly visible. Technical support should be responsive during peak periods, and concise troubleshooting guidance should be available for common problems. Progress dashboards, task calendars, and staged reminders can transform platform functions into direct support for time management and self-monitoring.

Fourth, SRL strategies should be taught explicitly. Instructors can use goal templates, weekly planning sheets, task-priority tools, learning logs, and reflection checklists to demonstrate how to manage learning rather than merely telling students to be self-disciplined. Online learning readiness and SRL can be assessed at the beginning of a course, followed by short targeted training for students who need support. External scaffolds can then be reduced gradually so that students move from dependence on reminders toward independent planning.

Finally, vocational course design should connect SRL support to authentic professional tasks. Students may find planning and monitoring more meaningful when goals are expressed in terms of completing a product, mastering a technical procedure, meeting an industry standard, or producing evidence for a portfolio. Such task authenticity can strengthen the perceived relevance of course content while also making regulatory strategies more concrete.

Limitations and Directions for Future Research

Several limitations should guide interpretation. First, participants came from a single vocational college and were recruited through convenience sampling. Female students, participants older than 24 years, and information technology students were overrepresented. The results should therefore not be generalized automatically to other institutions, disciplines, age groups, or national contexts. Broader multi-institutional sampling would improve external validity.

Second, the cross-sectional design prevented causal or temporal conclusions. Correlation and regression showed that satisfaction and SRL skills varied together, but they did not establish whether satisfaction preceded regulation, regulation preceded satisfaction, or both were influenced by other variables. Longitudinal tracking, cross-lagged panel analysis, or instructional interventions would provide stronger evidence about directionality and change over time.

Third, both constructs were measured through student self-report. The findings may therefore be affected by social desirability, acquiescence, recall error, and common method bias. Future studies should combine questionnaires with platform login frequency, resource access patterns, task submission times, achievement data, learning diaries, and observational evidence. These indicators could reveal whether reported regulation corresponds with actual learning behavior.

Fourth, each satisfaction subdimension contained only two items. The overall satisfaction scale showed satisfactory internal consistency, but the available data were insufficient for stable independent inference about content quality, instructor interaction, and platform usability. Future research should expand the item pool, test the factor structure using exploratory or confirmatory factor analysis, and then use multiple regression or structural equation modeling to compare the relative contribution of each dimension.

Fifth, the qualitative sample consisted of seven students. Their accounts helped explain the quantitative pattern but could not represent the full diversity of programs, years of study, online learning frequency, or achievement levels. Future qualitative sampling could use high-low combinations of satisfaction and SRL scores to compare different learner profiles and identify distinctive regulatory pathways.

Finally, the study did not include academic performance as an outcome. It therefore cannot determine whether satisfaction and SRL were associated with grades, task quality, course completion, or practical competence. Future work could test whether SRL mediates the relationship between learning environment satisfaction and academic or vocational performance, while maintaining an appropriately longitudinal or experimental design.

Conclusion

Using questionnaire data from 151 students and interview data from seven students, this study examined the relationship between online learning satisfaction and SRL skills in a Chinese vocational college. Students generally evaluated online learning positively. Platform navigation and content clarity were comparatively strong, whereas instructor interaction was less highly rated. Students also reported relatively high SRL skills, although interviews revealed continuing difficulties with time execution, sustained reflection, and consistency across tasks.

Online learning satisfaction was significantly and positively associated with SRL skills, $r = .567$, $p < .001$. The simple regression model explained 32.1% of the variance in SRL skills. The qualitative findings suggested that clear content, timely feedback, and stable technology were connected with goal setting, time management, and self-monitoring through cognitive structure, social support, and reliable execution conditions. Because the evidence was cross-

sectional and based largely on self-report, these relationships should not be interpreted causally.

The central implication is that student satisfaction and student self-regulation should not be treated as separate goals in vocational online and blended education. A more effective approach is to design satisfaction-producing conditions that also support regulation: structured content can reduce planning difficulty, sustained interaction can provide feedback scaffolds, reliable technology can preserve learning continuity, and explicit strategy instruction can help students gradually manage their learning independently.

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