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# A Study on the Relationship Between Online Learning Strategies and Learning Motivation Among College Students in the Internet Era

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**Abstract:** This study focuses on college students in the internet era to examine the relationship between online learning strategies and learning motivation, aiming to identify strategy preferences and motivational differences across genders and majors. A questionnaire survey was conducted, yielding 200 valid responses. Using a five-point Likert scale, the correlations between online learning strategies-namely resource management, reflective summarization, information literacy, collaborative communication, and self-regulation-and learning motivation, including intrinsic and extrinsic motivation, were analyzed. The results indicate that: (1) college students generally value online learning strategies, with information literacy strategies being used most frequently, and male students demonstrating significantly higher proficiency than female students; (2) STEM students outperform liberal arts students in overall online learning strategies, whereas liberal arts students exhibit slightly higher extrinsic motivation and STEM students display stronger intrinsic motivation; (3) online learning strategies and learning motivation are significantly positively correlated, with information literacy strategies showing the strongest correlation with intrinsic motivation; (4) partial correlation analysis reveals that intrinsic motivation exerts a more pronounced independent effect on information literacy strategies. Based on these findings, it is recommended that universities enhance students' online learning effectiveness by fostering autonomous learning motivation and optimizing the functionality of learning platforms as well as the quality of available resources.

**Keywords:** online learning strategies; learning motivation; college students; information literacy; internet era

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## 1. Introduction

### 1.1. Research Background

In September 2016, the Ministry of Education issued the Core Literacy for the Development of Chinese Students, emphasizing the "all-round development of people" as the central goal. The framework identifies six key competencies for contemporary Chinese students: humanistic grounding, scientific spirit, learning to learn, healthy living, responsibility, and practical innovation. Among these, the competency of "learning to learn" highlights that students should develop the ability to learn independently and cultivate the awareness and skills necessary for lifelong learning [1].

With the rapid advancement of information technology and its extensive application in education, online learning has become an essential mode of learning in the current "Internet+" era. The rise of massive open online courses (MOOCs) and other digital learning platforms has drawn significant attention from educators, making online learning a prominent research focus. Unlike traditional learning methods, online learning

is not constrained by time or space, offering flexible, repeatable, and resource-rich learning opportunities for both students and instructors. Leveraging advanced computing technologies and implementing open-access policies, online education simplifies enrollment processes and provides diverse teaching modalities tailored to learners' needs [2].

The COVID-19 pandemic in 2020 further accelerated the adoption of online education, pushing digital learning to the forefront of public and institutional attention. For contemporary college students, understanding and adopting effective learning strategies in online environments, along with strengthening self-directed learning capabilities, are critical steps toward achieving the competency of "learning to learn." By mastering these skills, students can better navigate the abundance of digital resources, optimize their learning processes, and cultivate lifelong learning habits.

### *1.2. Research Significance*

The rapid integration of intelligent devices and digital tools in education raises an important question: do the conclusions of traditional learning research remain valid for college students in the digital era? To answer this, it is necessary to examine the learning behaviors, motivations, and strategy usage of students in smart learning environments. Enhancing students' intrinsic motivation and awareness of self-directed learning strategies can significantly improve their engagement and autonomy in online learning settings [3].

Existing studies have provided theoretical foundations in learning motivation and strategy research, highlighting correlations between motivational drivers and learning behaviors. However, research specifically investigating the interplay between online learning strategies and learning motivation among contemporary college students remains limited. By exploring these relationships, this study aims to provide insights that can inform the design of more effective online learning environments, improve students' learning efficiency, and support personalized educational interventions.

### *1.3. Research Objectives*

This study focuses on the following research questions:

- 1) Do male and female students differ in their selection and use of online learning strategies?
- 2) What are the correlations between various online learning strategies and learning motivation, and how strong are these relationships?
- 3) Are there differences in learning motivation between liberal arts students and STEM students, and do these differences influence their preferences for specific online learning strategies?

## **2. Research Design**

### *2.1. Research Methods*

This study adopts a questionnaire survey method to investigate the relationship between online learning strategies and learning motivation among college students. The questionnaire is structured into three sections: basic information, learning strategies, and learning motivation. The basic information section collects demographic data, including gender, grade, and major [4].

The full questionnaire consists of 34 items, comprising 24 items assessing online learning strategies and 7 items measuring online learning motivation. A five-point Likert scale is employed for scoring, with response options of "strongly agree, agree, neutral, disagree, strongly disagree" corresponding to scores of 5, 4, 3, 2, and 1, respectively. All items are single-choice, and the estimated completion time is approximately five minutes. The internal consistency reliability of each component ranges from 0.52 to 0.93, with the

majority exceeding 0.70, which satisfies the reliability requirements for research purposes and ensures the questionnaire's measurement stability.

## *2.2. Research Subjects*

The study targets contemporary college students in the internet era. A total of 226 questionnaires were distributed, with 200 considered valid, yielding an effective response rate of 88.5%. Participants were drawn from a diverse range of majors to capture potential differences in learning strategies and motivational characteristics across academic disciplines [5].

## *2.3. Scale Content and Structure*

The Online Learning Strategies Scale primarily measures learners' awareness and proficiency in employing different strategies to achieve learning objectives in online environments. This self-assessment scale contains 24 items grouped into five dimensions:

- 1) Resource Management Strategies (6 items) - evaluates students' ability to effectively manage online learning time, utilize diverse digital resources, and leverage human resources such as teachers or peers.
- 2) Reflection and Summary Strategies (5 items) - assesses learners' capacity to reflect on and synthesize learned content using prior knowledge, experience, and appropriate learning tools.
- 3) Information Literacy Strategies (4 items) - measures students' skills in retrieving, filtering, processing, and applying information effectively within online learning contexts.
- 4) Collaborative Communication Strategies (4 items) - evaluates proficiency in using online communication tools to interact with instructors or peers to support learning activities.
- 5) Self-Regulation Strategies (5 items) - assesses the ability to set and adjust learning plans, monitor learning progress, and regulate both the process and content of online learning activities.

The Online Learning Motivation Scale focuses on the intensity and nature of learners' motivation for participating in online learning. This self-assessment scale comprises 7 items divided into two dimensions:

- 1) Intrinsic Learning Motivation (4 items) - reflects internal driving forces, such as the desire to broaden personal horizons, acquire new knowledge, and pursue continuous self-development through online learning.
- 2) Extrinsic Learning Motivation (3 items) - captures external influences, including access to abundant online resources, convenience, and institutional incentives that encourage engagement in online learning.

By combining these two scales, the study aims to capture a comprehensive picture of both the strategic behaviors and motivational drivers that influence college students' online learning performance. This approach allows for the identification of specific strategies associated with higher intrinsic or extrinsic motivation and provides a basis for targeted interventions to enhance online learning effectiveness [6].

## **3. Research Process and Conclusions**

### *3.1. Basic Information of the Questionnaire*

This survey targeted college students, with a total of 226 questionnaires distributed and 200 valid responses collected, yielding an effective response rate of 88.9%. The distribution of respondents by gender, academic year, and major is summarized in Table 1.

**Table 1.** Frequency Analysis of Questionnaire Distribution Categories.

|               |                           | Frequency | Percent |
|---------------|---------------------------|-----------|---------|
| Gender        | Male                      | 87        | 43.5%   |
|               | Female                    | 113       | 56.5%   |
| Academic Year | Freshman                  | 10        | 5%      |
|               | Sophomore                 | 18        | 9.0%    |
|               | Junior                    | 95        | 47.5%   |
|               | Senior                    | 71        | 35.5%   |
|               | Master's degree and above | 6         | 3%      |
|               | Liberal arts              | 45        | 22.5%   |
| Major         | Science and engineering   | 129       | 64.5%   |
|               | Others                    | 26        | 13%     |
| Total         |                           | 200       | 100.0%  |

As shown in Table 1, among the valid responses, 87 (43.5%) were male students and 113 (56.5%) were female students. The distribution by academic year included 10 freshmen (5%), 18 sophomores (9%), 95 juniors (47.5%), 71 seniors (35.5%), and 6 graduate students or above (3%). Regarding academic majors, 45 students (22.5%) were from liberal arts, 129 students (64.5%) were from science and engineering, and 26 students (13%) belonged to other disciplines.

### 3.2. Reliability Analysis

This survey comprises two modules: online learning strategies and online learning motivation. Online learning strategies consist of five dimensions, while learning motivation consists of two dimensions. As shown in Table 2, Cronbach's alpha coefficients for all dimensions exceed 0.6, indicating good measurement reliability. Specifically, the coefficients for resource management strategies, reflective summary strategies, information literacy strategies, collaborative communication strategies, and self-regulation strategies range from 0.773 to 0.821, while intrinsic and extrinsic motivation coefficients are 0.873 and 0.770, respectively [7].

**Table 2.** Reliability Analysis of Survey Dimensions.

| Primary dimension          | Secondary Dimension                    | Cronbach's Alpha | Number of Items |
|----------------------------|----------------------------------------|------------------|-----------------|
|                            | Overall                                | 0.922            | 24              |
| Online Learning Strategies | Resource Management Strategies         | 0.786            | 6               |
|                            | Reflective Summary Strategies          | 0.773            | 5               |
|                            | Information Literacy Strategies        | 0.792            | 4               |
|                            | Collaborative Communication Strategies | 0.789            | 4               |
|                            | Self-Regulation Strategies             | 0.821            | 5               |
|                            | Overall                                | 0.900            | 7               |
| Learning Motivation        | Intrinsic motivation                   | 0.873            | 4               |
|                            | Extrinsic motivation                   | 0.770            | 3               |

### 3.3. Descriptive Analysis of Online Learning Strategies and Motivation

As shown in Table 3, among online learning strategies, information literacy strategies received the highest mean score (3.996), indicating that students place particular emphasis on their ability to access, process, and apply information in online learning. In terms of motivation, extrinsic motivation scored slightly higher (4.045) than intrinsic motivation (4.033). All five dimensions of online learning strategies had mean scores above 3,

suggesting that students generally adopt all types of strategies to some extent. Skewness values for both strategy and motivation dimensions are negative, indicating a higher frequency of positive evaluations, while kurtosis analysis reveals that information literacy strategies have more concentrated responses compared to other strategy dimensions.

**Table 3.** Descriptive analysis of questionnaire survey dimensions. Descriptive Statistics.

|                                        | N   | Minimum | Maximum | Mean  | Std. Deviation |
|----------------------------------------|-----|---------|---------|-------|----------------|
| Resource Management Strategies         | 200 | 2.17    | 5.00    | 3.859 | 0.583          |
| Reflective Summary Strategies          | 200 | 2.00    | 5.00    | 3.731 | 0.588          |
| Information Literacy Strategies        | 200 | 2.25    | 5.00    | 3.996 | 0.586          |
| Collaborative Communication Strategies | 200 | 1.75    | 5.00    | 3.555 | 0.725          |
| Self-Regulation Strategies             | 200 | 1.80    | 5.00    | 3.582 | 0.659          |
| Intrinsic motivation                   | 200 | 2.00    | 5.00    | 4.033 | 0.681          |
| Extrinsic motivation                   | 200 | 2.33    | 5.00    | 4.045 | 0.626          |
| Valid N (listwise)                     |     |         |         |       |                |

### 3.4. Online Learning Strategy Usage by Gender, Academic Year, and Major

As shown in Table 4, male students generally scored higher than female students across all five online learning strategies and both dimensions of motivation. Regarding academic year, freshmen showed the highest overall use of strategies and motivation, followed by juniors and sophomores. Junior students displayed stronger reflective summary, collaborative communication, and self-regulation strategies compared to seniors. In terms of majors, STEM students outperformed liberal arts students in all five strategy dimensions, whereas liberal arts students demonstrated slightly higher extrinsic motivation [8].

**Table 4.** Descriptive Analysis of Different Groups in Questionnaire Survey Dimensions.

|               |                           | Resource Management Strategies | Reflective Summary Strategies | Information Literacy Strategies | Collaborative Communication Strategies | Self-Regulation Strategies | Intrinsic motivation | Extrinsic motivation |
|---------------|---------------------------|--------------------------------|-------------------------------|---------------------------------|----------------------------------------|----------------------------|----------------------|----------------------|
|               |                           | Mean                           | Mean                          | Mean                            | Mean                                   | Mean                       | Mean                 | Mean                 |
| Gender        | Male                      | 3.91                           | 3.78                          | 4.10                            | 3.64                                   | 3.65                       | 4.12                 | 4.10                 |
|               | Female                    | 3.81                           | 3.69                          | 3.91                            | 3.48                                   | 3.52                       | 3.96                 | 4.00                 |
| Academic Year | Freshman                  | 3.86                           | 3.72                          | 4.10                            | 3.70                                   | 3.80                       | 4.17                 | 4.10                 |
|               | Sophomore                 | 3.75                           | 3.71                          | 3.79                            | 3.54                                   | 3.48                       | 3.87                 | 3.74                 |
|               | Junior                    | 3.84                           | 3.77                          | 3.98                            | 3.59                                   | 3.73                       | 4.03                 | 4.02                 |
|               | Senior                    | 3.88                           | 3.65                          | 4.01                            | 3.44                                   | 3.45                       | 4.02                 | 4.10                 |
|               | Master's degree and above | 4.19                           | 4.03                          | 4.41                            | 4.08                                   | 4.20                       | 4.41                 | 4.50                 |
|               | Liberal arts              | 3.78                           | 3.56                          | 3.93                            | 3.35                                   | 3.48                       | 4.06                 | 4.16                 |
| Major         | Science and               | 3.91                           | 3.82                          | 4.04                            | 3.66                                   | 3.67                       | 4.07                 | 4.06                 |

|          |      |      |      |      |      |      |      |  |
|----------|------|------|------|------|------|------|------|--|
| engineer |      |      |      |      |      |      |      |  |
| ring     |      |      |      |      |      |      |      |  |
| Others   | 3.67 | 3.53 | 3.84 | 3.38 | 3.30 | 3.81 | 3.76 |  |

### 3.5. One-Sample t-Test Against Benchmark Score of 3

As shown in Table 5, one-sample t-tests were conducted to compare the mean scores of all five online learning strategy dimensions and two motivation dimensions against the theoretical midpoint of 3. All dimensions exhibited statistically significant differences ( $P < 0.001$ ), indicating that students' use of online learning strategies and their motivation levels are significantly above average.

**Table 5.** One-sample t-test of online learning strategies (N = 200, test value = 3).

| Variable                               | M    | SD    | t        |
|----------------------------------------|------|-------|----------|
| Resource Management Strategies         | 3.85 | 0.58  | 20.81*** |
| Reflective Summary Strategies          | 3.73 | 0.588 | 17.57*** |
| Information Literacy Strategies        | 3.99 | 0.586 | 24.02*** |
| Collaborative Communication Strategies | 3.55 | 0.725 | 10.82*** |
| Self-Regulation Strategies             | 3.58 | 0.659 | 12.47*** |
| Intrinsic motivation                   | 4.03 | 0.681 | 21.41*** |
| Extrinsic motivation                   | 4.04 | 0.626 | 23.58*** |

Note: \* indicates significance at the 0.05 level; \*\* indicates significance at the 0.01 level; \*\*\* indicates significance at the 0.001 level.

### 3.6. Gender Differences in Information Literacy Strategy Usage

As shown in Table 6, independent samples t-tests revealed that male students scored significantly higher than female students in information literacy strategies ( $P = 0.019 < 0.05$ ), indicating a notable gender difference in this dimension.

**Table 6.** Independent Samples t-Test on Information Literacy Strategy Usage Among Students of Different Genders (N = 200).

| Variable                        | Gender | SD   | t     |
|---------------------------------|--------|------|-------|
| Information Literacy Strategies | Male   | 0.54 | 2.36* |
|                                 | Female | 0.60 |       |

Note: \* indicates significance at the 0.05 level; \*\* indicates significance at the 0.01 level; \*\*\* indicates significance at the 0.001 level.

### 3.7. Correlation Analysis

As shown in Table 7, Pearson correlation analysis indicates significant positive correlations among all five online learning strategy dimensions and both motivation dimensions ( $P < 0.01$ ). Notably, information literacy strategies have the strongest correlation with online learning motivation, highlighting their central role in students' learning engagement.

**Table 7.** Variable Correlation Analysis.

|                                        | Resource Management Strategies | Reflective Summary Strategies | Information Literacy Strategies | Collaborative Communication Strategies | Self-Regulation Strategies | Online Learning Strategies | Intrinsic Learning Motivation | Extrinsic Learning Motivation | Online Learning Motivation |
|----------------------------------------|--------------------------------|-------------------------------|---------------------------------|----------------------------------------|----------------------------|----------------------------|-------------------------------|-------------------------------|----------------------------|
| Resource Management Strategies         | 1                              |                               |                                 |                                        |                            |                            |                               |                               |                            |
| Reflective Summary Strategies          | .646**                         | 1                             |                                 |                                        |                            |                            |                               |                               |                            |
| Information Literacy Strategies        | .552**                         | .540**                        | 1                               |                                        |                            |                            |                               |                               |                            |
| Collaborative Communication Strategies | .488**                         | .561**                        | .393**                          | 1                                      |                            |                            |                               |                               |                            |
| Self-Regulation Strategies             | .543**                         | .605**                        | .509**                          | .668**                                 | 1                          |                            |                               |                               |                            |
| Online Learning Strategies             | .821**                         | .837**                        | .721**                          | .779**                                 | .839**                     | 1                          |                               |                               |                            |
| Intrinsic Learning Motivation          | .483**                         | .380**                        | .630**                          | .325**                                 | .472**                     | .536**                     | 1                             |                               |                            |
| Extrinsic Learning Motivation          | .426**                         | .338**                        | .535**                          | .268**                                 | .377**                     | .478**                     | .758**                        | 1                             |                            |
| Online Learning Motivation             | .489**                         | .386**                        | .629**                          | .321**                                 | .461**                     | .562**                     | .959**                        | .912**                        | 1                          |

Note: \* indicates significant correlation at the 0.05 level (two-tailed); \*\* indicates significant correlation at the 0.01 level (two-tailed).

### 3.8. Partial Correlation Analysis

As shown in Table 8, after controlling for extrinsic motivation, intrinsic motivation remains significantly positively correlated with information literacy strategies ( $r = 0.408$ ,  $P < 0.01$ ), while extrinsic motivation does not show a significant independent correlation. This suggests that intrinsic motivation plays a more critical role in influencing students' engagement with information literacy strategies.

**Table 8.** partial correlation analysis of internal motivation and information literacy strategies after controlling for external motivation.

| Control Variable     |                      | Information Literacy Strategies |
|----------------------|----------------------|---------------------------------|
| Extrinsic motivation | Intrinsic motivation | 0.408**                         |

Note: \* indicates significance at the 0.05 level; \*\* indicates significance at the 0.01 level.

## 4. Conclusions and Recommendations

### 4.1. Conclusions

This study demonstrates several key findings regarding college students' online learning strategies and motivations in the internet era. Overall, students commonly employ all five categories of online learning strategies, with information literacy strategies emerging as the most frequently used and preferred approach among both male and female students. A significant gender difference exists in the use of information literacy strategies, with male students demonstrating higher proficiency and more frequent utilization than female students [9].

Analysis of academic majors revealed that liberal arts students exhibit higher levels of extrinsic learning motivation compared to science and engineering students, reflecting a greater sensitivity to external incentives such as course requirements, online resources, and social recognition. Conversely, science and engineering students display stronger intrinsic motivation, suggesting a higher tendency toward self-driven exploration and mastery of knowledge. Despite these differences, both groups prioritize information literacy strategies, underscoring the central role of information acquisition, evaluation, and application in effective online learning.

Partial correlation analysis further clarified the relationship between motivation and strategy use. After controlling for extrinsic motivation, intrinsic motivation remained significantly positively correlated with information literacy strategies ( $r = 0.408$ ,  $P < 0.01$ ), whereas the correlation between extrinsic motivation and information literacy strategies was not significant when controlling for intrinsic motivation. This finding highlights that intrinsic motivation is the primary driving force behind students' engagement in effective online learning behaviors [10].

Overall correlation analysis indicates a significant positive relationship between online learning strategies and learning motivations, with the strongest associations observed between information literacy strategies and intrinsic motivation. This suggests that fostering intrinsic motivation may not only enhance the adoption of effective strategies but also strengthen overall learning engagement and achievement in online learning contexts.

### 4.2. Recommendations

Based on the findings, several practical recommendations can be proposed to enhance online learning effectiveness among college students:

#### 4.2.1. Enhance Students' Active Role and Self-Directed Learning Motivation

Universities should focus on stimulating students' intrinsic learning motivation as a prerequisite for effective autonomous learning. In practice, many college students spend a substantial portion of their online time on recreational activities, reflecting limitations in self-discipline, self-monitoring, and goal-directed learning behaviors. To address this, students should be guided to set clear, specific, and achievable learning goals before engaging in online study. Strategies such as goal-setting exercises, self-reflection prompts, and progress tracking tools can help students monitor their learning, cultivate self-regulatory skills, and strengthen their autonomous learning drive. Furthermore, integrating motivational interventions such as peer recognition, gamification elements,

and personalized feedback can enhance engagement and sustain intrinsic motivation over time [11].

#### 4.2.2. Optimize Learning Platform Functionality and Resource Quality

While online learning platforms and resources are increasingly abundant, their support for effective self-directed learning remains limited due to issues such as slow system response, incomplete functional modules, insufficient high-quality resources, poor video production, and monotonous presentation formats. Universities and educational authorities should prioritize upgrading platform functionalities, enhancing user experience, and enriching resource diversity. Collaboration with external partners, including educational technology providers and content developers, can facilitate the creation of more systematic, comprehensive, and high-quality learning platforms tailored to students' needs. Specifically, interactive course materials, multimedia content, adaptive learning pathways, and practical application exercises should be developed to foster active engagement, skill development, and knowledge retention [12].

#### 4.2.3. Promote Integrated Support for Motivation and Strategy Development

Efforts to improve online learning outcomes should integrate motivational and strategic support. For instance, interventions that combine training in information literacy skills with guidance on setting intrinsic learning goals can amplify the positive impact of both factors. Universities should encourage instructors to incorporate explicit instruction on strategy use into online courses, demonstrate effective application of learning strategies, and provide continuous feedback to reinforce both motivation and strategic competencies. By aligning motivational enhancement with strategic skill development, students are more likely to sustain effective online learning behaviors and achieve higher academic performance [13].

In summary, fostering intrinsic motivation, optimizing online learning platforms and resources, and integrating strategy instruction are critical for improving college students' online learning effectiveness. Implementing these recommendations can help cultivate autonomous learners who are capable of actively managing their learning processes, applying appropriate strategies, and achieving long-term academic and personal growth in the digital learning era.

## References

1. M. S. McClintic-Gilbert, J. Henderlong Corpus, S. V. Wormington, and K. Haimovitz, "THE RELATIONSHIPS AMONG MIDDLE SCHOOL STUDENTS' MOTIVATIONAL ORIENTATIONS, LEARNING STRATEGIES, AND ACADEMIC ACHIEVEMENT," *Middle Grades Research Journal*, vol. 8, no. 1, 2013.
2. M. F. Al-Qahtani, "Relationship between English Language, Learning Strategies, Attitudes, Motivation, and Students' Academic Achievement," *Education in medicine journal*, vol. 5, no. 3, 2013. doi: 10.5959/eimj.v5i3.124
3. R. Rong, and H. Yang, "Study on the influencing factors of digital literacy among normal students under the background of big data," In *Proceedings of the 2024 International Conference on Big Data and Digital Management*, August, 2024, pp. 121-126. doi: 10.1145/3696500.3696520
4. D. F. Dansereau, "Learning strategy research," In *Thinking and learning skills*, 2014, pp. 209-239.
5. P. Xia, and Z. Wang, "Construction of learner group characteristics model based on network learning data perception and mining," In *International Conference on Applications and Techniques in Cyber Security and Intelligence*, June, 2021, pp. 441-447. doi: 10.1007/978-3-030-79197-1\_63
6. Z. Wei, "A Case Study of Primary School Chinese Reading Teaching Based on Core Literacy," *Frontiers in Educational Research*, vol. 4, no. 1, 2021.
7. Z. Wang, and B. He, "A Study on the Causes, Negative Effects and Countermeasures of Mobile Phone Use in College Students," In *2017 International Conference on Management, Education and Social Science (ICMESS 2017)*, June, 2017, pp. 587-589. doi: 10.2991/icmess-17.2017.138
8. Q. Jing, and S. Tahir, "Research on Influencing Factors and Countermeasures of College Students' Autonomous Learning," .
9. A. Sönmez, L. Göçmez, D. Uygun, and M. Ataizi, "A review of current studies of mobile learning," *Journal of Educational Technology and Online Learning*, vol. 1, no. 1, pp. 12-27, 2018.

10. L. Ke, "Research on the Cultivation of Socialist Core Values in Rural Areas," . doi: 10.54691/fhss.v2i9.2112
11. Y. Du, "Study on Cultivating College Students' English Autonomous Learning Ability under the Flipped Classroom Model," *English Language Teaching*, vol. 13, no. 6, pp. 13-19, 2020.
12. X. Lei, C. Liu, and H. Jiang, "Mental health of college students and associated factors in Hubei of China," *PLoS One*, vol. 16, no. 7, p. e0254183, 2021. doi: 10.1371/journal.pone.0254183
13. K. Zhampeissova, I. Kosareva, and U. Borisova, "Collaborative mobile learning with smartphones in higher education," 2020. doi: 10.3991/ijim.v14i21.18461

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