Research on the Influencing Factors of College Students’ Use of Online Learning Platform from the Perspective of Customer Perception

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Abstract: [Aim] With the increasing number of users of the internet learning platform, in order to explore the influence factors (perceived usefulness, perceived ease of use, and the learning environment) of the internet learning platform from the perspective of customer perception, the impact of college students using the internet learning platform is the learning platform provides corresponding guidance. [Method] Based on the data of college students’ questionnaires, this research integrated technology acceptance model (TAM) model with customer perception theory to construct the structural equation model to evaluate the impact of perceived ease of use, and learning environment on college students’ use of online learning platform. [Conclusion] The study found that factors of the internet learning platform including perceived usefulness, perceived ease of use, and the learning environment of college students would have a significant impact on its use.

1. Introduction
With the advent of the “Internet +” era, and the learning patterns and methods of colleges and universities have undergone unprecedented changes. The online learning platform has become an important channel for learners to acquire knowledge, and factors of the learning platform affecting user behavior have diversified, for example, Sean B. Eom (2010) studied the factors of the various aspects of the learning platform affecting the users[1]. Moore MG (2011) designed online teaching from different perspectives, including the latest technology, learner characteristics, organizational structure, and current policies [2]. Allen IE (2010) studied online education from the perspective of class differences and maintained that differentiated education should be used [3]. However, the research found that there were still some problems: (1) the over-simplification of influencing factors, (2) the over-broadened research objects. Therefore, this research selected the main users of the online learning platform (college students) and applied the customer perception theory to comprehensively study both the individual personal perception and the external influence environment. This research methodology is conducive to the understanding of the real needs of users, providing a basis for improving the internet learning platform.

2. Research design and data collection

2.1 Research Design
Based on the TAM model, this research studied college students who used the internet learning platform. The TAM is an important theory for studying the degree of users’ acceptance and usage of information systems. In his study, Gefen added variables such as willingness to use, and confirmed that perceived usefulness and ease of use have a significant positive impact on the users’ willingness to use, and the willingness to use has a significant positive impact on the usage behavior; Tian Yang et al. studied education-based internet learning environment and discovered the important role and functions that the various elements in the design of the learning environment played to facilitate learning.

This study has reviewed the previous researches and theoretical hypotheses related to TAM model, and identified the individual perception factors containing two aspects (perceived usefulness and perceived ease of use), and external influence factors (the learning environment), so as to study the factors’ influence on the college students’ willingness to use and their usage behavior of online learning platform. A research model was constructed, as shown in Figure 1.

![Research model](image)

**Figure 1. Research model**

Based on the existing literature and interviews with college students, this research determined a variable system including the four factors (including perceived usefulness, perceived ease of use, usage behavior and willingness to use), and 21 observed variables. The following hypotheses were proposed:

- **H1**: Perceived usefulness has a significant positive impact on the willingness to use
- **H2**: Perceived ease of use has a significant positive impact on the willingness to use
- **H3**: The learning environment has a significant positive impact on usage behavior
- **H4**: Willingness to use has a significant positive impact on usage behavior

**2.2 Data collection**

The data of this study were mainly collected through questionnaires. Except for questions about respondents’ demography, the questionnaire uses the five-point scale of the Likert. For the pilot research, 50 questionnaires were distributed and recovered, and 26 questionnaire questions were deemed valid with others being deleted. A total of 300 questionnaires were distributed online and offline, and 257 valid questionnaires were returned. The effective rate of the questionnaire was 85.66%. The descriptive statistical analysis data of the questionnaire are shown in Table 1.

| Demographic variables | Categorical variables | Frequency (%) | Effective percentage (%) | Cumulative percentage (%) |
|-----------------------|-----------------------|---------------|--------------------------|--------------------------|
| Gender                | Male                  | 83            | 32.3                     | 32.3                     |
|                       | Female                | 174           | 67.7                     | 100                      |
| Age                   | < 18 y/o              | 12            | 4.7                      | 4.7                      |
|                       | 18-25 y/o             | 225           | 87.5                     | 92.2                     |
|                       | 26-30 y/o             | 16            | 6.2                      | 98.4                     |
|                       | 31 y/o or older       | 4             | 1.6                      | 100                      |
3. Empirical analysis

3.1 Reliability analysis
This research conducted a reliability analysis and a validity test on the questionnaire data to further explore the rationality of the data. In this study, SPSS21.0 was used to analyze the questionnaire data, and the overall scale Alpha coefficient value was 0.956 > 0.90, which indicates that the internal consistency of the questionnaire was excellent. The reliability values of the dimensions/factors (including the perceptual usefulness 0.885 and perceived ease of use 0.871, the learning environment 0.784) were all greater than 0.6 and lower than the overall reliability value. Therefore, the internal consistency of the measurement data of the research scale is considered to be high.

| Table 2. Reliability test |
|---------------------------|
| Survey scale | Cronbach’s Alpha | item count |
| PU | 0.885 | 5 |
| PEOU | 0.871 | 4 |
| AE | 0.784 | 4 |
| UI | 0.906 | 4 |
| UB | 0.887 | 4 |

3.2 Validity test

3.2.1 KMO and Bartlett Spherical Tests. The data obtained from the survey were tested by KSS and sphere test using SPSS software. The results are shown in Table 3. The KMO value of the sample was 0.955, and the degree of correlation between the items was good, which was suitable for analysis. The significance probability value was 0.000, less than 0.05, so the null hypothesis was rejected, which also indicates that it was suitable for factor analysis.

| Table 3. KMO and Bartlett test |
|-------------------------------|
| KMO and Bartlett test |  |
| Sampling a sufficient Kaiser-Meyer-Oklin metric. | 955 |
| Approximate chi-square | 3893.923 |
| Bartlett ‘s sphericity test |  |
| Df | 210 |
| Sig. | 0.000 |

3.2.2 Factor analysis. The cumulative explanatory power of the common factors extracted in the factor analysis was above 70%, and the load of each item in the questionnaire was greater than 0.6. The scale had a good structural validity. It can be seen from Table 4 that the extraction of 5 common factors had a cumulative explanatory power of 73.773%, which was greater than 60%, indicating that the extraction of these five factors was effective and feasible.
Table 4. The total variance explained

| Components | Initial eigenvalue | Extract square sum loading | Rotation square sum loading |
|------------|--------------------|-----------------------------|-----------------------------|
|            | Total | Variance % | Accumulation % | Total | Variance % | Accumulation % | Total | Variance % | Accumulation % |
| 1          | 11.347 | 54.034 | 54.034 | 11.347 | 54.034 | 54.034 | 4.930 | 23.477 | 23.477 |
| 2          | 1.338 | 6.371 | 60.405 | 1.338 | 6.371 | 60.405 | 3.560 | 16.953 | 55.875 |
| 3          | 1.164 | 5.544 | 65.949 | 1.164 | 5.544 | 65.949 | 3.243 | 15.445 | 55.875 |
| 4          | .906 | 4.316 | 70.265 | .906 | 4.316 | 70.265 | 2.542 | 12.107 | 67.982 |
| 5          | .736 | 3.506 | 73.772 | .736 | 3.506 | 73.772 | 1.216 | 5.790 | 73.772 |
| 6          | .625 | 2.975 | 76.747 |   |     |     |   |     |     |
| 7          | .563 | 2.682 | 79.429 |   |     |     |   |     |     |
| 8          | .516 | 2.458 | 81.888 |   |     |     |   |     |     |
| 9          | .446 | 2.126 | 84.013 |   |     |     |   |     |     |
| 10         | .415 | 1.974 | 85.988 |   |     |     |   |     |     |
| 11         | .358 | 1.707 | 87.695 |   |     |     |   |     |     |
| 12         | .338 | 1.609 | 89.304 |   |     |     |   |     |     |
| 13         | .321 | 1.530 | 90.833 |   |     |     |   |     |     |
| 14         | .298 | 1.417 | 92.250 |   |     |     |   |     |     |
| 15         | .283 | 1.346 | 93.596 |   |     |     |   |     |     |
| 16         | .268 | 1.276 | 94.872 |   |     |     |   |     |     |
| 17         | .255 | 1.216 | 96.088 |   |     |     |   |     |     |
| 18         | .243 | 1.155 | 97.244 |   |     |     |   |     |     |
| 19         | .215 | 1.024 | 98.268 |   |     |     |   |     |     |
| 20         | .184 | .876 | 99.144 |   |     |     |   |     |     |
| 21         | .180 | .856 | 100.000 |   |     |     |   |     |     |

Note: Extraction method: principal component analysis.

Table 5. Rotation component matrix

| Component | 1  | 2  | 3  | 4  | 5  |
|-----------|----|----|----|----|----|
| PU1       | .721 | .419 | .319 | .101 | .175 |
| PU2       | .638 | .158 | .309 | .274 | .304 |
| PU3       | .713 | .156 | .203 | .241 | .314 |
| PU4       | .704 | .166 | .299 | .332 | .228 |
| PU5       | .702 | .241 | .363 | .264 | .131 |
| PEOU1     | .191 | .363 | .198 | .219 | .669 |
| PEOU2     | .132 | .523 | .103 | .076 | .601 |
| PEOU3     | .201 | .278 | .223 | .273 | .657 |
| PEOU4     | .122 | .351 | .198 | .056 | .729 |
| AE1       | .202 | .164 | .163 | .627 | .356 |
| AE2       | .273 | .175 | .087 | .841 | .047 |
| AE3       | .177 | .241 | .159 | .759 | .185 |
| AE4       | .234 | .196 | .286 | .734 | .734 |
| UI1       | .357 | .769 | .163 | .214 | .124 |
| UI2       | .362 | .629 | .442 | .187 | .026 |
| UI3       | .357 | .704 | .330 | .229 | .083 |
| UI4       | .189 | .721 | .313 | .306 | .111 |
| UB1       | .238 | .423 | .701 | .166 | .156 |
| UB2       | .300 | .486 | .712 | .170 | .134 |
| UB3       | .004 | .453 | .784 | .180 | .131 |
| UB4       | .030 | .412 | .783 | .167 | .172 |

3.3 Hypothetical model test

3.2.1 Establishment of structural equation model. In this research, the structural equation model was used to process the data of the variables, and the path coefficients and saliency of each path were calculated, so as to analyze the causal relationship between the variables and to construct the path relationship diagram between the variables. In this study, the software package AMOS was used to perform structural equation modeling operations, and the results as shown in Figure 2 were obtained.
The evaluation of the model is shown in Table 6. It can be seen that the ratio of the chi-square value to the degree of freedom, the absolute fitting index, the relative fitting index, and the information index were basically qualified.

### Table 6. Evaluation of the model

| Index                | Evaluation standard     | The value of this model |
|----------------------|-------------------------|-------------------------|
| Chi-Square/df ratio  | 1-3 Very good, 3-5 Good, 5-8 Acceptable | 2.268                   |
| Absolute fit index   | GFI: [0/7, 0.9) >0.9     | 0.868                   |
|                      | AGFI: [0/7, 0.9) >0.9    | 0.833                   |
|                      | RMSEA <0.01, <0.08       | 0.070                   |
| Relative fit index   | NFI: [0/7, 0.9) >0.9     | 0.897                   |
|                      | TLI: [0/7, 0.9) >0.9     | 0.930                   |
|                      | CFI: [0/7, 0.9) >0.9     | 0.939                   |
| Information index    | AIC: The smaller, the better | 510.818               |
|                      | CAIC: The smaller, the better | 733.723               |

Regardless of the influence of the control variables, it can be seen from the significance results in Table 7 that the relationship between the variables was significant (P < 0.05). The proposed hypotheses H1, H2, H3, and H4 were all accepted.

### Table 7. Related indicators of structural equations

| variable | Influencing factor | Estimate | SE  | CR  | P    | STD |
|----------|-------------------|----------|-----|-----|------|-----|
| UI       | PU                | 0.536    | 0.27| 1.983 | 0.037 | 0.507 |
| UI       | PEOU              | 0.42     | 0.298| 1.409 | ***  | 0.36 |
| UB       | UI                | 0.693    | 0.069| 9.968 | ***  | 0.766 |
| UB       | AE                | 0.175    | 0.086| 2.035 | 0.042 | 0.137 |
| PU5      | PU                | 1        |     |      |      | 0.805 |
| PU4      | PU                | 0.981    | 0.073| 13.405 | ***  | 0.753 |
| PU3      | PU                | 0.93     | 0.065| 14.228 | ***  | 0.787 |
| PU2      | PU                | 0.829    | 0.059| 14.149 | ***  | 0.784 |
| PU1      | PU                | 0.875    | 0.062| 14.166 | ***  | 0.784 |
| PEOU4    | PEOU              | 1        |     |      |      | 0.8   |
| PEOU3    | PEOU              | 1.002    | 0.07 | 14.314 | ***  | 0.801 |
It can be seen from Table 7 that based on the research model of the influencing factors of college students using the internet learning platform, the load value of each factor was greater than 0.5, indicating that the basic fit of the model was good, having a high structural validity.

Figure 3. Research model of influencing factors of college students using online learning platform

From the above analysis, it is known that perceived usefulness, perceived ease of use, learning environment, and attitude of use could directly or indirectly affect the attitude of college students toward the use of the internet learning platform, and thus indirectly affect the user's usage behavior, but the learning environment did not affect the usage behavior significantly.

Since the usage behavior was only directly affected by the attitude of use, and the usage behavior was directly or indirectly affected by each variable, the direct or indirect effect of each variable on the use intention was calculated based on the calculated path coefficient between the variables. The results are shown in Table 8.

| variable | Direct effect | Indirect effect | Total effect |
|----------|---------------|----------------|-------------|
| PU       | Null          | 0.51*0.77=0.3927 | 0.393       |
| PEOU     | Null          | 0.36*0.77=0.2772 | 0.277       |
| AE       | 0.14          | Null            | 0.140       |
| UI       | 0.77          | Null            | 0.770       |

According to the results of this study, the two factors influencing the willingness to use are (from a high degree of influence to low): perceived useful, and perceived easy of use. Through the calculation of the path coefficient, the variables that had an influence on the usage behavior were sorted as follows (with the influence effect from large to small): use attitude, perceived usefulness, perceived ease of use, and learning environment.
4. Conclusions and implications
According to the research results, this research put forward the following suggestions for designing an internet learning platform: (1) Improve the platform quality of the internet learning platform, thereby improving the user’s perceived usefulness and perceived ease of use; (2) Improve the hardware and software facilities of the internet platform, establish a standardized management system for the platform content, and ensure the quality of the platform; (3) Create a good platform image and establish a good reputation.

This research used the original TAM model to explore the factors influencing users of the e-learning platform. It has identified the influencing factors on college students’ use of e-learning platform. According to the influence degree of different factors, the related improvement strategies were discussed. However, this study still has the following shortcomings: (1) It mainly focuses on the research of college students, and the college students can be further divided, so that the influence of different factors can be explored more specifically; (2) Although the influence of internal and external factors was explored in this study, other factors may exist due to the complexity of perception.

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