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Students' perception on the optimized e-commerce course in Zhumadian Vocational and Technical College based on ARCS incentive model

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Abstract: At present, students at vocational colleges usually lack good learning habits and autonomous learning ability. China's e-commerce industry has developed rapidly in recent years due to policy support, and thus the positioning and the curriculum design system of the e-commerce major urgently need to be improved and upgraded. This research aims to e. Applying the ARCS (attention, relevance, confidence, and satisfaction) motivation model, this research investigated the actual students' motivation at Zhumadian Vocational and Technical College to obtain a more effective classroom design of the e-commerce course. The four elements of the ARCS motivation model, as independent variables, will examine within a conceptual framework on whether they have an impact on students' motivation to sustain in the course, which is the dependent variable. According to the result of findings, these constructs have correlation each other, either strong, week or moderate.

Keywords: ARCS model; attention; relevance; confidence; satisfaction

1. Introduction

In recent decades, the rapid development of information technology has promoted the development of e-commerce, making it an important part of people's daily life. E-commerce means that the location of buyers and sellers no longer affects transactions. Ignoring the limitations of physical distance, people only need to click the mouse to buy and sell products (Gomez-Herrera, Martens, & Turlea, 2014). The public, especially consumers, in turn, have also placed higher demands on the e-commerce industries. These needs have promoted the upgrading of e-commerce business models and platforms, such as the gradual improvement of express delivery efficiency and security, the maturity of e-commerce payment systems, the larger number and richer variety of products provided (Qing & Cheng, 2019). In addition to the advancement of marketing management concepts and marketing systems, e-commerce has also led to the development of other industries (Qing & Cheng, 2019).

In order to study the above-mentioned problems, this paper used the ARCS (attention, relevance, confidence, and satisfaction) motivation model to specifically study this major in a vocational college in China. The reason for choosing a vocational college in China as the research object was mainly due to the development status of China's e-commerce and the development status of its vocational education. On one hand, China's e-commerce industry has developed rapidly in recent years due to policy support. In 2018, China's e-commerce transaction volume exceeded US$1,000 billion, an increase of 11.4% year-on-year. The development of e-commerce has directly or indirectly driven 15 million employees. China's e-commerce has achieved large-scale and industrialised development (Qing & Cheng, 2019). On the other hand, with such a high annual growth rate, even though graduates majoring in foreign languages, electronics, and international trade are already filling the talent gap, the industry still faces a huge talent shortage. In June 2019, the e-commerce major was officially included in the Supplementary Catalogue of Vocational Majors of the Ministry of Education of the People's Republic of China. However, the positioning and the curriculum design system of this major urgently need to be improved and upgraded (Jun et al., 2021). In this paper, through the study of a specific vocational college, the development status

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of the e-commerce major in China will be presented, and suggestions for improving the e-commerce major will also be carefully proposed.

1.1 Background of the Problem

The development of each vocational education curriculum is actually related to the continuous adjustment of the professional structure and the subdivision of the direction of professional training. The rapid development of e-commerce has led to the demand for talents in this industry, and so it is necessary to start the training of e-commerce talents in order to truly respond quickly to market demand (Yu et al., 2021). Stimulating learning motivation is an urgent need for vocational college students to change their current state of motivation. Students with strong learning motivation show high learning enthusiasm and initiative in learning activities (Gomez-Herrera et al., 2014). They are full of enthusiasm in the learning process and will solve problems when encountering difficulties. On the contrary, students without learning motivation show low performance and avoid problems in learning activities. Good learning motivation plays an important role in making clear the goal of the learning effort, in adopting a positive attitude, and in stimulating the development potential of students in the process of learning. At present, students at secondary vocational colleges lack good learning habits and autonomous learning ability (Jun et al., 2021). They have low knowledge mastery of their majors and courses, but their thinking is relatively active and they accept new knowledge quickly. Therefore, in the process of education, students' learning motivation and interest can be stimulated by paying attention to the cultivation of secondary vocational students' learning ability and vocational ability so that students can learn to give full play to their maximum potential and cultivate talents more suitable for social development (Qing & Cheng, 2019).

1.2 Problem Statement

The course of e-commerce focuses on enabling students to develop key skills of e-commerce in a combination of work and study. It focuses on guiding students to discuss business models and technological innovation directions on the basis of understanding the frontier dynamics of e-commerce, so as to inspire and cultivate students' logical thinking ability, innovative thinking ability and entrepreneurial consciousness. The realization of the above goals needs to fully mobilize the enthusiasm, initiative and creativity of students, and also needs to give full play to the role of task-driven, action-oriented, theory and practice integration and other teaching methods.

In the process of education, students' learning motivation and interest can be stimulated by paying attention to the cultivation of secondary vocational students learning ability and vocational ability so that students can learn to give full play to their maximum potential and cultivate talents more suitable for social development (Qing & Cheng, 2019). The research on the above aspects will help to better find the positioning, talent training strategy, and specific teaching methods of the e-commerce major. Thus, it also leads to the core discussion and specific research questions of this study.

1.3 Research Objective

Curriculum designing never means acting blindly. From the discussion of the above three issues, the research goals can be attributed to the following aspects:

1. To determine the perception level of attention in ARCS motivation model.
2. To determine the perception level of relevance in ARCS motivation model.
3. To determine the perception level of confidence in ARCS motivation model.
4. To determine the perception level of satisfaction in ARCS motivation model.
5. To analyze the differences on attention, relevance, confidence and satisfaction in ARCS Model on gender and on year of study.

2. Methodology

The four elements (attention, relevance, confidence, and satisfaction) of the ARCS motivation model, as independent variables, were examined within a conceptual framework on whether they have an impact on the course performance of students, which was the dependent variable. The quantitative research method was implemented to evaluate how to use the ARCS motivation model to optimise the e-commerce course design at Zhumadian Vocational and Technical College.

2.1 Research Design

The research process used in this research work was designed with several steps (Survio, 2013). The first step identifies the situation of the specific problem by defining the research topic and choosing the relevant theory. In this study, various academic works on the ARCS motivation model were reviewed and compared, and arguments or perspectives that still need to be supplemented to provide solutions to specific problems were explored. The next step was to find a specific solution and form the research hypothesis based on the theories, which was crucial in determining the direction of the research work, requiring the search for viable solutions by evaluating and contrasting relevant theories and the dynamic development of the ARCS motivation model and the course design. Thirdly, an appropriate research plan was formulated

according to the subject setting. The fourth step was collecting the required data from respondents in accordance with the established research methodology and conduct data analysis to draw conclusions.

2.2 Population and sampling

There are 305 students majoring in e-commerce at Zhumadian Vocational and Technical College. Due to the time limitation, it was impossible to include all students as a sample. According to sample selection rules proposed by Krejcie and Morgan (1970), 175 valid questionnaire forms needed to be obtained. The number of freshmen, the number of sophomores, and the number of juniors were 92, 107, and 106, respectively. In order to analyse the differences in the effect of attention, relevance, confidence, and satisfaction on their course performance based on gender and the year of study, the sample needed to be separated into different groups. Hence, there were 28 male and 25 female first-year students, 33 male and 28 female second-year students, and 33 male and 28 female third-year students.

2.3 Instrument

The questionnaire was based on the four dimensions of the ARCS motivation model, namely attention, relevance, confidence, and satisfaction, to investigate the after-class experience of the e-commerce course at Zhumadian Vocational and Technical College. The questionnaire was divided into two sections to obtain diverse data from the respondents.The first section included demographic characteristics, which were gender, age and grade. The second section of the questionnaire contained five items, which include 30 questions, and it was used to assess the respondents' after-class experience of the e-commerce course. The questions in the questionnaire were developed based on Keller (2010). This section played an essential role in explaining the perception of the respondents as related to the four dimensions of the ARCS motivation model.

All answers involved in questions are measured using the Likert scale, representing strongly disagree, disagree, neutral, agree, and strongly agree. Each item will be ranked from 1 to 5, where 5 stands for agree strongly, 4 stands for agree, 3 stands for neutral, 2 stands for disagree, and 1 stands for disagree strongly. The total score of each respondent's attitude is the sum of his or her answers to each question, and this total score can indicate the strength of the respondent's attitude. The questionnaire forms were sent through e-mail for easy compilation and analysis of the completed forms.

2.4 Pilot Study

In this research work's pilot study, in order to evaluate the effectiveness of the course offered, the user questionnaire was first verified by three e-commerce instructors at Zhumadian Vocational and Technical College, and then the forms were distributed to 30 students majoring in e-commerce at Zhumadian Vocational and Technical College.

The result of reliability for pilot research. The Cronbach's Alpha coefficient is adopted for the reliability analysis. It is known that the Cronbach's Alpha coefficient is 0.902, which indicates high reliability of the research data.the KMO value of sampling appropriateness for the entire scale is 0.778, and the index value is between 0.7 and 0.8, which indicates that the factor analysis can be carried out and the measurement term has a good convergence validity.

Based on the above analysis, the chosen 30 pilot sample is in line with the actual situation of college, and the result of the test is valid. At the same time, the result of reliability of these 30 participants indicates high reliability of the research data, and the result of validity test is in a good convergence validity level. Thus, the design of questionnaire can be used for next formal research.

2.5 Data Analysis

This study collected data and conducted a quantitative analysis based on the data collected from a questionnaire survey of 175 respondents purposely selected from students majoring in e-commerce at Zhumadian Vocational and Technical College so as to explore the following aspects: (1) the current situation of e-commerce professional education; (2) the level of attention, relevance, confidence, and satisfaction on student's performance in the e-commerce course; and (3) the effects of these elements in order to find future improvement. This study used the SPSS software to quantitatively analyse the statistical data obtained by the questionnaire and used statistical methods of Cronbach alpha test, t-test analysis, correlation analysis, and linear regression analysis to achieve the objectives of this research.

3. Results

Attention is the concentration of human mental activities on certain objects, which is the prerequisite for learners to carry out learning activities. Learners' attention must be aroused and maintained in order to stimulate their learning motivation. According to the data collected from 175 respondents, the mean value is 4.348 among male students while the value is 4.185 among female students (Table 1), which means that the level of attention among males is higher than females. At the same time, the mean value is 4.249 among students in grade 1, 4.197 among students in grade 2 and 4.369 among students in grade 3(see Table 2), which means that students in grade 3 have the highest level of attention. Additionally, according to the result of regression coefficient analysis, the regression coefficient of attention standardization is 0.530(see Table 3). The t-value of attention reached the significance level at $P<0.001$, which indicates that attention

positively affects course performance of students. Thus, it can be seen that the student perception is at positive level on attention of ARCS model.

Table 1: The outcome of average value of attention based on gender

	Measure	N	Minimum	Maximum	Mean	Std.
Male	Q1	94	3.0	5.0	4.255	.6548
	Q2	94	1.0	5.0	4.298	.7307
	Q3	94	3.0	5.0	4.319	.6084
	Q4	94	2.0	5.0	4.362	.6367
	Q5	94	3.0	5.0	4.404	.5740
	Q6	94	3.0	5.0	4.447	.5209
	Valid N (listwise)	94		Average	4.348	
Female	Q1	81	3.0	5.0	4.148	.5270
	Q2	81	2.0	5.0	3.988	.6981
	Q3	81	3.0	5.0	4.111	.5701
	Q4	81	3.0	5.0	4.309	.5622
	Q5	81	3.0	5.0	4.235	.5067
	Q6	81	3.0	5.0	4.321	.4957
	Valid N (listwise)	81		Average	4.185	

Table 2: The outcome of average value of attention based on grade

	Measure	N	Minimum	Maximum	Mean	Std.
Grade 1	Q1	53	3.0	5.0	4.170	.6119
	Q2	53	1.0	5.0	4.057	.8641
	Q3	53	3.0	5.0	4.208	.6894
	Q4	53	3.0	5.0	4.453	.5740
	Q5	53	3.0	5.0	4.245	.5514
	Q6	53	3.0	5.0	4.358	.5580
	Valid N (listwise)	53		Average	4.249	
Grade 2	Q1	61	3.0	5.0	4.131	.5315
	Q2	61	2.0	5.0	4.066	.6550
	Q3	61	3.0	5.0	4.148	.5111
	Q4	61	3.0	5.0	4.180	.5325
	Q5	61	4.0	5.0	4.328	.4733
	Q6	61	4.0	5.0	4.328	.4733
	Valid N (listwise)	61		Average	4.197	
Grade 3	Q1	61	3.0	5.0	4.311	.6466
	Q2	61	3.0	5.0	4.328	.6512
	Q3	61	3.0	5.0	4.311	.5928
	Q4	61	2.0	5.0	4.393	.6653
	Q5	61	3.0	5.0	4.393	.6132
	Q6	61	4.0	5.0	4.475	.5035
	Valid N (listwise)	61		Average	4.369	

Table 3: Test results of attention and course performance of students

Index		Course performance of students
Attention	Pearson correlation	0.530**
	Significance (bi-variate)	0.000
	N	175

***stands for significant correlation under 0.01 (bi-variate) level*

Relevance means that learners connect learning activities with existing knowledge background, personal needs and life experience. According to the data collected from 175 respondents, the mean value is 4.394 among male students while the value is 4.259 among female students (see Table 4), which means that the level of relevance among males is higher than females. At the same time, the mean value is 4.327 among students in grade 1, 4.284 among students in grade 2 and 4.382 among students in grade 3(see Table 5), which means that students in grade 3 have the highest level of relevance. According to the result of regression coefficient analysis, the regression coefficient of relevance standardization is 0.404(see Table 6). The t-value of relevance reached the significance level at P<0.001, which indicates that relevance positively affects course performance of students. Thus, it can be seen that the student perception is at positive level on relevance of ARCS model.

Table 4: The outcome of average value of relevance based on gender

	Measure	N	Minimum	Maximum	Mean	Std.
Male	Q7	94	2.0	5.0	4.404	.5924
	Q8	94	3.0	5.0	4.351	.5812
	Q9	94	3.0	5.0	4.372	.5284
	Q10	94	3.0	5.0	4.457	.5219
	Q11	94	2.0	5.0	4.383	.6410
	Q12	94	3.0	5.0	4.394	.5721
	Valid N (listwise)	94		Average	4.394	
Female	Q7	81	3.0	5.0	4.247	.5131
	Q8	81	3.0	5.0	4.284	.5058
	Q9	81	3.0	5.0	4.160	.5352
	Q10	81	3.0	5.0	4.296	.5110
	Q11	81	3.0	5.0	4.222	.5916
	Q12	81	4.0	5.0	4.346	.4786
	Valid N (listwise)	81		Average	4.259	

Table 5: The outcome of average value of relevance based on grade

	Measure	N	Minimum	Maximum	Mean	Std.
Grade 1	Q7	53	3.0	5.0	4.321	.5468
	Q8	53	3.0	5.0	4.245	.5514
	Q9	53	3.0	5.0	4.208	.5320
	Q10	53	4.0	5.0	4.434	.5004
	Q11	53	3.0	5.0	4.377	.6272
	Q12	53	4.0	5.0	4.377	.4894
	Valid N (listwise)	53		Average	4.327	
Grade 2	Q7	61	3.0	5.0	4.311	.5014
	Q8	61	3.0	5.0	4.311	.5014
	Q9	61	3.0	5.0	4.230	.5289
	Q10	61	3.0	5.0	4.295	.4948
	Q11	61	3.0	5.0	4.246	.5673
	Q12	61	3.0	5.0	4.311	.5014

continued

	Measure	N	Minimum	Maximum	Mean	Std.
	Valid N (listwise)	61		Average	4.284	
Grade 3	Q7	61	2.0	5.0	4.361	.6333
	Q8	61	3.0	5.0	4.393	.5853
	Q9	61	3.0	5.0	4.377	.5527
	Q10	61	3.0	5.0	4.426	.5615
	Q11	61	2.0	5.0	4.311	.6718
	Q12	61	3.0	5.0	4.426	.5905
	Valid N (listwise)	61		Average	4.382	

Table 6: Test results of relevance and course performance of students

Index		Course performance of students
Relevance	Pearson correlation	0.404**
	Significance (bi-variate)	0.000
	N	175

***stands for significant correlation under 0.01 (bi-variate) level*

As for confidence, teachers need to enhance students' learning confidence through various ways and maintain students' desire for success. Only learners with enough self-confidence can have the initiative to explore problems, challenge the courage. According to the data collected from 175 respondents, the mean value is 4.181 among male students while the value is 3.928 among female students (see Table 7), which means that the level of attention among males is higher than females. At the same time, the mean value is3.969 among students in grade 1, 4.049 among students in grade 2 and 4.161 among students in grade 3(see Table 8), which means that students in grade 3 have the highest level of confidence. According to the result of regression coefficient analysis, the regression coefficient of confidence standardization is 0.506(see Table 9). The t-value of confidence reached the significance level at $P<0.001$, which indicates that confidence positively affects course performance of students. Thus, it can be seen that the student perception is at positive level on confidence of ARCS model.

Table 7: Correlation between the total satisfaction and satisfaction subscales among influencing factors

	Measure	N	Minimum	Maximum	Mean	Std.
Male	Q13	94	1.0	5.0	3.457	.6963
	Q14	94	2.0	5.0	4.298	.6159
	Q15	94	3.0	5.0	4.426	.5955
	Q16	94	3.0	5.0	4.383	.5885
	Q17	94	2.0	5.0	4.266	.6587
	Q18	94	2.0	5.0	4.255	.6548
	Valid N (listwise)	94		Average	4.181	
Female	Q13	81	1.0	5.0	2.728	.6230
	Q14	81	3.0	5.0	4.086	.6928
	Q15	81	3.0	5.0	4.358	.5317
	Q16	81	2.0	5.0	4.383	.6035
	Q17	81	2.0	5.0	4.049	.6500
	Q18	81	3.0	5.0	3.963	.5798
	Valid N (listwise)	81		Average	3.928	

Table 8: The outcome of average value of confidence based on grade

	Measure	N	Minimum	Maximum	Mean	Std.
Grade 1	Q13	53	1.0	5.0	2.736	.5323
	Q14	53	2.0	5.0	4.038	.6835
	Q15	53	3.0	5.0	4.453	.5394
	Q16	53	3.0	5.0	4.396	.6306
	Q17	53	3.0	5.0	4.113	.6096
	Q18	53	3.0	5.0	4.075	.7030
	Valid N (listwise)	53		Average	3.969	
Grade 2	Q13	61	1.0	5.0	3.246	.5248
	Q14	61	3.0	5.0	4.246	.5673
	Q15	61	4.0	5.0	4.311	.4669
	Q16	61	2.0	5.0	4.262	.5447
	Q17	61	2.0	5.0	4.115	.6082
	Q18	61	3.0	5.0	4.115	.4864
	Valid N (listwise)	61		Average	4.049	
Grade 3	Q13	61	1.0	5.0	3.328	.6025
	Q14	61	2.0	5.0	4.295	.6604
	Q15	61	3.0	5.0	4.426	.6698
	Q16	61	3.0	5.0	4.492	.5951
	Q17	61	2.0	5.0	4.262	.7506
	Q18	61	2.0	5.0	4.164	.7113
	Valid N (listwise)	61		Average	4.161	

Table 9: Test results of confidence and course performance of students

Index		Course performance of students
Confidence	Pearson correlation	0.506**
	Significance (bi-variate)	0.000
	N	175

***stands for significant correlation under 0.01 (bi-variate) level*

As for satisfaction, teachers should let students experience the happiness and value of learning, get enough satisfaction. According to the data collected from 175 respondents, the mean value is 4.312 among male students while the value is 4.103 among female students (see Table 10), which means that the level of attention among males is higher than females. At the same time, the mean value is 4.094among students in grade 1, 4.235 among students in grade 2 and 4.301 among students in grade 3(see Table 11), which means that students in grade 3 have the highest level of satisfaction. According to the result of regression coefficient analysis, the regression coefficient of satisfaction standardization is 0.768(see Table 12). The t-value of satisfaction reached the significance level at $P<0.001$, which indicates that satisfaction positively affects course performance of students. Thus, it can be seen that the student perception is at positive level on satisfaction of ARCS model.

Table 10: The outcome of average value of satisfaction based on gender

	Measure	N	Minimum	Maximum	Mean	Std.
Male	Q19	94	2.0	5.0	4.266	.6748
	Q20	94	2.0	5.0	4.266	.6906
	Q21	94	3.0	5.0	4.298	.6016
	Q22	94	2.0	5.0	4.255	.7175
	Q23	94	3.0	5.0	4.436	.5784
	Q24	94	3.0	5.0	4.351	.5624
	Valid N (listwise)	94		Average	4.312	

continued

	Measure	N	Minimum	Maximum	Mean	Std.
Female	Q19	81	2.0	5.0	3.914	.6928
	Q20	81	2.0	5.0	4.037	.6791
	Q21	81	3.0	5.0	4.099	.5832
	Q22	81	3.0	5.0	4.062	.5989
	Q23	81	3.0	5.0	4.272	.5003
	Q24	81	3.0	5.0	4.235	.5067
	Valid N (listwise)	81		Average	4.103	

Table 11: The outcome of average value of satisfaction based on grade

	Measure	N	Minimum	Maximum	Mean	Std.
Grade 1	Q19	53	2.0	5.0	3.981	.8202
	Q20	53	2.0	5.0	4.038	.7586
	Q21	53	3.0	5.0	4.075	.6460
	Q22	53	2.0	5.0	3.962	.7586
	Q23	53	3.0	5.0	4.302	.5401
	Q24	53	3.0	5.0	4.208	.6000
	Valid N (listwise)	53		Average	4.094	
Grade 2	Q19	61	3.0	5.0	4.148	.5427
	Q20	61	2.0	5.0	4.197	.5721
	Q21	61	3.0	5.0	4.213	.5201
	Q22	61	3.0	5.0	4.180	.5630
	Q23	61	4.0	5.0	4.377	.4887
	Q24	61	4.0	5.0	4.295	.4599
	Valid N (listwise)	61		Average	4.235	
Grade 3	Q19	61	2.0	5.0	4.164	.7344
	Q20	61	2.0	5.0	4.230	.7392
	Q21	61	3.0	5.0	4.311	.6202
	Q22	61	2.0	5.0	4.328	.6512
	Q23	61	3.0	5.0	4.393	.6132
	Q24	61	3.0	5.0	4.377	.5527
	Valid N (listwise)	61		Average	4.301	

Table 12: Test results of satisfaction and course performance of students

Index		Course performance of students
Satisfaction	Pearson correlation	0.768**
	Significance (bi-variate)	0.000
	N	175

***stands for significant correlation under 0.01 (bi-variate) level*

3.2 Discussion

It is concluded that the level of all items involved in ARCS model is higher among male students than female students, and the level is also higher among seniors than juniors. This results indicate that more focus should be paid on the motivation of study among female students and students in the lower grades. In addition, this research also identifies the relationship between the four items and course performance of students. According to the result of findings, the correlation coefficient between the four items (attention, relevance, confidence and satisfaction) and course performance of students at the level of 0.01 (bi-variate) is 0.530, 0.404, 0.506 and 0.768 respectively. It means that the degree of correlation with course performance of students is satisfaction > attention > confidence > relevance.

4. Conclusion

Stimulating learning motivation is an urgent need for vocational college students to change their current state of motivation. They have low knowledge mastery of their majors and courses, but their thinking is relatively active and they accept new knowledge quickly. Therefore, in the process of education, students' learning motivation and interest can be stimulated by paying attention to the cultivation of secondary vocational students' learning ability and vocational ability so that students can learn to give full play to their maximum potential and cultivate talents more suitable for social development. In order to reached the goals of this research, five research questions have been raised and answered.

1. The student perception is at positive level on attention of the ARCS model and its mean value is 4.273.
2. The student perception is at positive level on relevance of the ARCS model and its mean value is 4.331, which is the highest level among the four items.
3. The student perception is at positive level on confidence of the ARCS model and its mean value is 4.064, which is the lowest level among the four items.
4. The student perception is at positive level on confidence of the ARCS model and its mean value is 4.215.
5. The level of the four items involved in the ARCS model is higher among male students than female students, and the level is also higher among seniors than juniors.

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