

Empirical Study on the Factors Influencing the Web-based Teaching Effect

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Received 20 November 2017 • Revised 21 December 2017 • Accepted 25 December 2017

ABSTRACT

Online teaching has become more and more popular in China, which has also become a widespread way of instructing in the field of mathematics, science, technology and other subjects. Based on the analysis of the characteristics of instructing, students and learning styles, a research on the influential factors of online teaching was conducted by methods of the integrated technology acceptance model and social cognitive theory from the cognitive point of view. Through questionnaire investigation, students were categorized according to different learning styles. Through the establishment of the structural equation that the significant influential factors of students with different learning styles on the effect of web-based teaching were identified. It was concluded that Utility Value possessed significant influence on online teaching for learners with whatever type of learning style. To people that provide online teaching service, individualized and customized teaching strategies can be established for students with different learning styles and cognitive characteristics. Meanwhile, the context further explored the online teaching strategies that were friendly and suitable to students with diverse learning styles.

Keywords: online teaching, integration, Unified Theory of Acceptance and Use of Technology (UTAUT), learning style, teaching effect, cognition

INTRODUCTION

Modern education has gradually has avoided time and space limitations of traditional teaching. As a new emerging teaching form of distance education, online teaching has attracted more and more attention and reputation among scholars due to its wide application in an array of education fields. Since information technology has matured, myriad teaching websites have emerged. However, with little effectiveness, many sites fail. While it's not said that these failures have been caused by the lack of students' learning objectives requested by users or technical problems. Instead, insufficient comprehension on the user's behavior and cognitive pattern for the service providers may be traced to the real root, leading to the inconformity between teaching service patterns and users' needs (e.g. Najah, 2014; Pollock & Wilson, 2005).

Due to the importance of students' behavior in online teaching, research involves analysis of students' behavior. For example, Connolly (2007) studied the online teaching effectiveness influencing factors based on students' cognitive behavior, and explored the extent through development and delivery of online teaching education. Compared with full-time or not full-time face-to-face teaching, this study focuses on students' apparent contrast in achievements, differences in courses assignments and quizzes and midway attrition rate of middle school students who focus on technology oriented modules, and differences of students' and teachers' degree of satisfaction. Chiu, Hsu, Sun, Lin, and Sun (2005) explored the effectiveness of online learning based on the integrated technology acceptance model that provides help and advice for online learning service providers. Furthermore, based on the expectancy value theory of social cognition theory, Hamburg and Lindecke (2003) studied influential factors of adopting and sustaining the use of online learning. In addition, some discussed the principles of multimedia teaching based on the theory of cognitive load, sorted out and summarized the research results related to teaching, and gave corresponding application suggestions to facilitate teachers. (Wu, 2016).

Contribution of this paper to the literature

- From the perspective of users' behavior, this paper explored that designing personalized learning content and enhancing the interactivity of a network teaching system can significantly improve teaching.
- By considering both Chao-Min Chiu and Wang's structure (2008) and Hamburg and Lindecke's reasoning scheme (2003), this study suggests a more comprehensive framework to analyze and evaluate the quality of argument in the context.
- This paper introduces the subjective task value into the Unified Theory of Acceptance and Use of Technology (UTAUT) model, and studies the influencing factors of the network teaching effect on students' cognition and information technology.

Although there have been studies on factors affecting online learning from the perspective of students, considering the particularity of network teaching, network teaching possesses certain mandatory and purposiveness compared with other online learning platforms (Chen, 2010). The bones of a perfunctory acknowledgement may appear from students who have to accomplish network curriculum in order to obtain a diploma. Therefore, the analysis on the influential factors of the cognitive perspective for network teaching necessarily deserves deep consideration.

Meanwhile, students with different personalities are taken into consideration in this paper, such as their learning styles and learning objectives. The influences of the learning performance vary greatly from individual to individual, so it is significant to research on the students' learning characteristics of network teaching. According to previous research, subjective task value in the theory, on the basis of a new theoretical model of influential factors of network teaching is put forward. As the taste in a new learning is a subjective matter, the study considering the differentiation of learning styles for students may improve the adaptability of network education as well as the online education system, making the web-based instruction more humanistic, more efficient and the performance of students more creditable.

Therefore, on the basis of the integrated technology acceptance model, social cognition theory and learning styles model, this article will adopt the questionnaire survey and empirical research to identify the students on the cognitive elements of network teaching, paying a strong accent on the influential factors that lead to the voluntary adoption of network teaching for students. Taking students from the Network Education College for example, a Methods Survey among them will be performed by questionnaires, along with an interview to investigate the influential factors on the behavior of voluntary adoption by students. Conclusively, according to the analysis on the particularity of students' cognitive characteristics and service mode, some suggestions and strategies on improving network teaching can be proposed.

The specific research questions that guided this study were:

- 1) Does the student's behavior really affect the effect of their online learning?
- 2) If the effect really exists, which factor dominates the most crucial position?

CONSTRUCTION OF RESEARCH MODEL

UTAUT was proposed by Venkatesh, Morris, Davis, and Davis (2003) and the technology acceptance model where there are four dimensions that have influence on behavior intention, namely, performance expectations, ease expectation, social influence and conditions for help, which are affected respectively by gender, age, experience, and willingness. The theory holds that performance expectations, ease expectation and social impacts have conducted a direct and straight-forward tangible influence on willingness for application, while conditions and willingness for help possess a direct and visible influence on the application of behaviors. Performance expectation refers to the degree to what the system can do for their work individually, including PU (perceived usefulness), extrinsic motivation, job suitability, relative merits and expected results. Ease expectation is the degree to which the individual has to do for the utility of the system, including the perceived ease of use, system complexity, and simple operation; Social influence implies the extent to which individuals are affected by the people around, including subjective norms, social factors and public appearance. The condition for help is the degree of support in the relevant technical equipment of organization for individuals, including perceived behavioral control, system support, and compatibility.

In addition, cost can be defined from negative aspects when engaging in the task. These negative aspects act as an kind of anxiety and fear on success and failure, and efforts we should take on the condition to miss opportunities and success, namely, anxiety, social isolation, response latency, and randomness.

Since this paper aims at the study on the influential factors of network teaching, the research sample is particularly for students from website colleges who have a good command of computers and the Internet, who

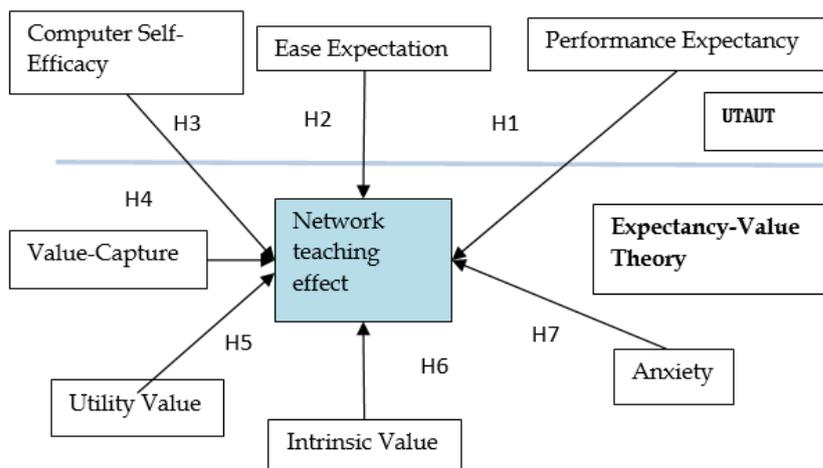


Figure 1. Influence Factor Model on Network Teaching Effect

have enrolled in the network school for resources and diplomas. Nevertheless, gender has not proven to be a vital segment in the Jr (2003) study, so, age, gender, experience, and voluntariness will not be taken into consideration on a new theoretical model. In the meanwhile, the study of the Chiu and Wang (2008) has shown that the UTAUT model of social impact and conditions for help had no significant influence on intention to continue using online teaching.

Meanwhile, Hamburg and Lindecke (2003) and Petrides (2002) found that, despite the anxiety about the cost in the expectation valve of social cognitive theory, the other three negative factors namely, social isolation, response latency and randomness, also remained toothless and ineffectual on whether or not to continue using online learning. As to the influence on the intention of usage behavior by using one of them, many empirical researches were conducted to prove its remarkable and indispensable effect. Therefore, in this article, intention is adopted to imply the utility of behavior. Accordingly, the model of network teaching influencing factors is put forward in this paper (As showed in [Figure 1](#)).

- H1:** Venkatesh et al. (2003) found that performance expectation could be used to predict the willingness of accepting information systems for individuals. Ong (2004), Mahmud (2005), Saadé (2007), etc. also have verified the significant relationships among perceived usefulness and the application of online learning and online teaching systems.
- H2:** Ease expectation possesses a positive influence on network teaching effect. Ease expectation is deemed to determine how much effort the student should make when using the system. It belongs to the perceptive usability of the technology acceptance model (TAM), which represents how applicable the system is. In addition, some researchers have demonstrated that PEOU (perceived ease of use) of online learning systems is related to perceived usefulness and behavioral intention by empirical research (e.g. Ong, 2004; Saadé, 2007).
- H3:** Computer self-efficacy has a positive effect on network teaching results. Computer self-efficacy is a sort of perceiving the ability of the individual to accomplish important tasks by using the system, which belongs to a self-assessment. People with lower computer self-efficacy have less possibility of continuous using. Gong, Xu, and Yu (2004) and Ong (2004) insist that computer self-efficacy has a significant impact on the PEOU (perceived ease of use) of network teaching systems.
- H4:** Acquisition value owns a positive impact on network teaching effect. When students reckon that tasks are of great importance, they will be more willing to participate in tasks and work hard to achieve a high performance. Parsons, Adler, and Meece (1984) and Wigfield (1994) and others suppose that acquisition value is supposed to predict the continuous use of the network teaching system.
- H5:** Utility value has a positive influence on the effectiveness of network instruction, representing the relationship between future career goals and performance by using the system. With significant parallels with perceived usefulness, it leads to a decisive role on the part of students' alternatives and behavior intentions. Researches have shown that the students' utility value has a significant impact on the continuous use of the online teaching system (e.g. Parsons et al., 1984; Wigfield, 1994).
- H6:** Intrinsic value takes a notable positive effect on network teaching. Intrinsic value measures the extent of the enjoyment that an individual has gained from the system. Self-determination theory suggests that more students who savor pleasure and satisfaction during the process of using information systems will

Table 1. The first part is design scheme on the questionnaire

Factor	Items of Measurement
Performance Expectancy (PE)	Learning Achievement and usefulness of system
Ease Expectations (EE)	Usefulness of System, Interaction of System
Computer Self Efficacy (CSE)	The Interest on Computer Depends on the Degree of Proficiency
Acquisition Value (AV)	The way and Extent to Acquire Knowledge
Utility Value (UV)	Self-Improvement, Work Performance, Salary Level
Intrinsic Value (IV)	Teaching Content, Process of Use, Interest
Anxiety (AN)	Study Habits, Learning Style, the Use of System
Teaching Effect (E)	Study Performance, Academic Performance

Table 2. Reliability Analysis on Latent Variables

Latent Variables	QTY of Latent Variables	Cronbach's Alpha
Performance Expectation (PE)	3	0.8241
Ease Expectation (EE)	3	0.8304
Computer Self Efficacy (CSE)	4	0.8772
Acquisition Value (AV)	3	0.7964
Intrinsic Value (IV)	3	0.7432
Utility Value (UV)	3	0.8365
Anxiety (AN)	3	0.7499
Teaching Effect (E)	2	0.6594
Total (1791)	24	0.9374

definitely lead to a higher intrinsic value. Bong (2003) found that the higher interest students have in their academic courses, the more likely they were to choose such courses in the future.

H7: Anxiety has negative effect on network teaching. Anxiety refers to the state of feeling nervous or upset, normally due to the incapability of using online courses. Students are worried and skeptical about the way they are taught in the online teaching system, which may lead to an illusion that they will fail to do well in tasks. Ayersman and Reed (1995) and Kira (2007), etc. demonstrated that anxiety adversely affects the utility of information systems.

Questionnaire Design and Data Collection

In this paper, questionnaires were used through a professional research website, which should be responded to exclusively by education college students who have been involved in network teaching where all sampling students have certain work experiences, know-how on computer or network and are between 17-35 years old. It includes men accounting for 58% and women accounting for 42%. There were 1950 questionnaires used in total where all were shown to be valid. Questionnaires were classified according to students' learning styles, namely, 932 effective questionnaires for the intuitive learning style, 864 ones for the perceived learning style, 913 for the meditation learning style, 884 for the active learning style, 851 for the language learning style, 944 for the visual learning style, 872 for the comprehensive learning style and 923 for the sequential learning style. Based on the analysis of data, it was found that there existed no remarkable diversity of network teaching effect between students in the instinct/perceived learning style and the comprehensive/sequence learning style. Therefore, this article just states the hypothesis testing results between the meditation / active group and the language / visual group.

Data Analysis

Reliability of analysis

At first, the test on reliability of data was carried out. Each latent variable in the questionnaire was examined by the Cronbach's alpha coefficient with results shown in **Table 2**. As we can see from **Table 2**, that subscales, except for the alpha coefficients in reliability of effect being around 0.694, all the others are above 0.7 and the Cronbach's alpha coefficient of the total was 0.9374, which indicates that the reliability of the scale is relatively high.

Modeling process

Using the method of structural equation modeling, through the questionnaire of students' learning styles, we classified the survey sample into two dimensions of learning style - meditation/active type and language/visual

Table 3. Indicators Meaning and Model Acceptable Criteria

Index category	Index	Index Meaning	Model Acceptable Criteria
	CMIN/DF	Divided Chi-square by the degree of freedom for the model	<2
The Absolute Fitting Effect Index	GFI	Variance and covariance by model fitting can give explanation on the extent of data on variance and covariance	>0.90
	PGFI	GFI Adjust GFI from the degree of freedom of model	>0.50
The Relative Fitting Effect Index	TLI	Adjust NFI from the degree of freedom	>0.90
	RMSEA	Adjust F0 with the degree of freedom	the smaller the better
The Substitute Index	CFI	In view of the relationship between the hypothesis model and the independent model, the discrete degree of the chi-square distribution of the hypothesis model and the theoretical expectation also should be taken into consideration.	>0.90
	PCFI	Adjust CFI index with degrees of freedom	>0.50

type (intuitive / perceived and sequence/synthesis type), and then estimated using the maximum likelihood method.

Firstly, the fitting results of the model parameters were obtained by parameter estimation where Regression Weights and Standardized Regression Weights were the load fitting result of a latent variable on the observed variable. Regression Weights comprised the non-standardized estimated value of each load, the standard deviation, dividing the estimated value by the standard deviation, and the significance of the p -value. Among them, PE represented performance expectations, EE represented ease of expectation, CSE for computer self-efficacy, AV for Acquisition value, IV for intrinsic value, UV for utility value, AN for anxiety and E for teaching effect.

Secondly, the significance test on the parameters was conducted to investigate how each influenced the relationships. We selected the confidence interval of $p < 0.05$, judging the significance by comparing the p value and 0.05 in the Regression Weights table.

Thirdly, the fitting effect of the model was checked by the model-fitting degree to see whether the model was established according to the theoretical development in the statistical sense and then make an adjustment. The evaluation index of the model fitting effect was divided into the following several aspects: the test on absolute fitting effect, the test on relative fitting effect, alternative indicators and contracted indicators such as index meaning and model acceptable criteria shown in [Table 3](#).

Grouped hypothesis testing

According to the two types of learning styles, the data of the sample was further analyzed. In this paper, in the scope of parameter estimation, we mainly observed the standardized path coefficient between the latent variables and the revised model. Numbers on the arrowhead are path coefficients, which reflected the exogenous structural index on endogenous one as well as the relationships between them. Besides, it was also a direct reflection of the size of the effect, showing how many units could cause the change of the latent variables by a unit of endogenous and exogenous latent variables. The results are shown in [Figure 2](#) and [3](#).

Through observation, it was found that there was a slight variation on the influential factors of two kinds of learning models in [Figure 2](#). It was anticipated that it had a significant impact on the utility value for learners with meditation learning styles, which indirectly affected learning achievements. The computer self-efficacy had significant impact on the performance expectation of learners with meditation learning styles, while with indirect influence on the effect of network teaching. However, the performance expectation has neither direct nor indirect impact on learners with active style, and the computer self-efficacy had no prominent influence on its performance expectation and web-based instruction effect. The parallel lies in the prominent impact of ease expectation and utility value on both kinds of learners. In [Figure 3](#), the performance expectation has a remarkable influence on the online teaching effect and utility value for learners with language styles. However, the performance expectation neither had direct nor indirect effect on learners with visual styles. The acquisition value has an outstanding effect on the online teaching effect and acquisition value for learners with visual styles, which doesn't affect the performance of e-teaching for learners with language styles directly or indirectly. With a notable impact on e-instruction effect for visual-styles learners, ease expectation failed to involve the influence on learners with language styles. Despite the difference in the dimension of effect, there exists parallel in the effect of utility value that having influence on the network teaching effect for two kinds of learners.

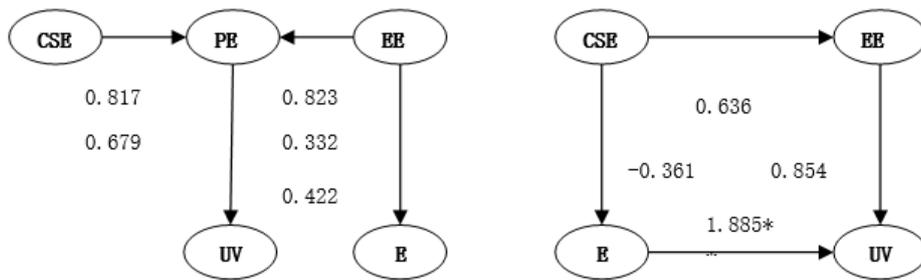


Figure 2. Path Coefficient of Learning Styles for Meditation/Active Learning Style and Correction Model

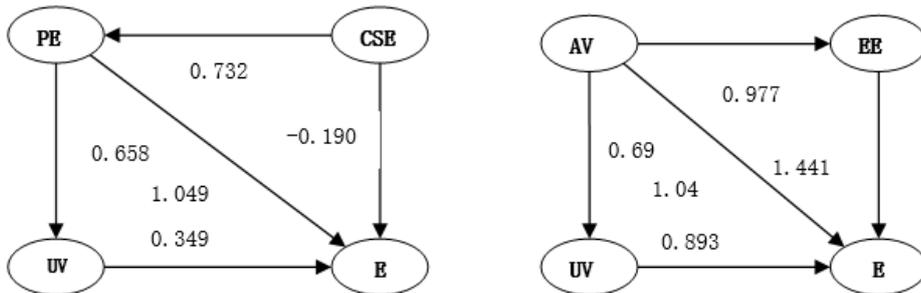


Figure 3. Path Coefficient of Language /Visual Learning Style and Correction Model

Table 4. Fitting Index

Group	CMIN / DF	GFI	PGFI		TLI		CFI	PCFI
			TLI	RMSEA	RMSEA	CFI		
Meditation	43.669 / 341.284	0.918	0.574	0.970	0.076	0.982	0.669	
			0.971	0.075	0.982			
			0.075	0.982	0.669			
			0.982	0.669	0.669			
Active	91.062 / 641.517	0.885	0.539	0.930	0.075	0.952	0.607	
			0.930	0.075	0.951			
			0.075	0.951	0.607			
			0.951	0.607	0.607			
Language	63.238 / 421.506	0.905	0.587	0.949	0.077	0.966	0.615	
			0.957	0.077	0.966			
			0.077	0.966	0.615			
			0.966	0.615	0.615			
Vision	54.412 / 361.511	0.903	0.593	0.942	0.075	0.962	0.630	
			0.942	0.075	0.962			
			0.075	0.962	0.630			
			0.962	0.630	0.630			

According to the general inspection standards and the results shown in Table 4, in addition to the active type of GFI = 0.885 < 0.9 (the data value is generally acceptable), it is known that all the indicators of the two model groups are coincidence with requirements and the model and the data are highly matched, so, it was considered to be a good performance on the model fitting effect.

According to the results of data analysis above (path coefficient and correction model and fitting index), the hypothesis test was concluded as shown in Table 5.

It can be seen that the two latent variables of the intrinsic values and the anxiety fail to exhibit a significant impact on online teaching effect. In this paper, the conclusion against H6, H7 assumptions is reached, owing to the academic quality of network teaching as well as the particularity of samples. No matter what kinds of learning

Table 5. Hypothesis Testing

	Meditation	Active	Language	Vision
H1	False	False	True	False
H2	True	False	False	True
H3	False	True	True	False
H4	False	False	False	True
H5	True	True	True	True
H6	False	False	False	False
H7	False	False	False	False

style, whether people are anxious or not, the intrinsic value has to be completed, so as to achieve their personal expectations.

DISCUSSION

Although this paper covers mainly influential factors, there are still some limitations. For example many of our samples are part-time working students, which means that they target the final degree as the main objective, using the network teaching system with a certain involuntary purpose. As a result, anxiety and inherent value do not play leading roles in this paper, which is inconsistent with many studies (Hossini et al., 2011; Nordin, Samsudin, & Harun, 2017; Ren, Yang, & University, 2014). Future research can move a step further in online teaching types. (1) Subdivide the teaching effectiveness of the network, such as continuous use, recommendation, dropping out rate, complaints and so on. (2) In the future, scholars can subdivide various characteristics of students. (3) Though some suggestions and measures are put forward to the network teaching service providers, they are not technical. It is hoped that the future research can be supplemented in terms of learning path optimization and learning object design. (4) Other variables affecting the learning effect of network are also needed to be considered, such as the external environment of a network teaching system.

CONCLUSION AND RECOMMENDATION

Based on the research, we have come to the following conclusions:

- (1) By introducing the subjective task value into the UTAUT model, we have proposed an influential factor model of network teaching effect from two aspects of students cognitive and information technology. The feasibility of the model is confirmed and the fitting degree of the combination of the two models gets good response, which can well explain how influential factors affect the network teaching achievement.
- (2) It is found that in the empirical research, no matter which type of learning style of learners, utility value conveys a significant impact on the network teaching effects, that is, when the greater relationship exists between the learning task and the current or future work prospects, the better the leaning effect will be. Influence factors - performance expectations, ease expectation, computer self-efficacy and acquisition value, have different influences on network teaching, varying from individual to individual of diverse learning styles. Network teaching service providers are supposed to design a personal course and learning objectives tailored to each type of learner based on their learning styles. Whereas with regard to the learners who engage into network teaching for a diploma, no matter which types of learning models they belonged to, anxiety and intrinsic value have no significant influence on their learning effect.
- (3) As to providers of network teaching, it can depend on students with different learning styles and cognitive characteristics to establish personalized teaching to increase interaction of the network teaching system and student's autonomy, so as to obtain better teaching effect.

To conclude, there are different influential factors for learners of different learning styles. Irrespective of the learning styles of learners, the impact of utility value on network teaching merits consideration, that is the greater relationship there exists between the learning task and the current or future work prospects, the better the leaning effect will be. Influence factors - performance expectations, ease expectation, computer self-efficacy and acquisition value, have different influences on network teaching for students with different types of learning styles. E-teaching service providers are supposed to design a personal course and learning objectives tailored to each type of learner on the basis of their learning styles. However, with regard to the learners who engage into network teaching just for a diploma, no matter which types of learning models they belong to, anxiety and intrinsic value have no significant influence on their learning effect. Consequently, suggestions in this paper are proposed as follows:

- (1) Provide personalized learning content, catering for all abilities. In order to improve the adaptability of the network teaching system, it is vital to provide customized learning content for learners. Providers of network teaching services should design the curriculum in accordance with students' aptitude. As for

meditation style students, they are game for thinking and reflection, preferring to work independently. So for this kind of students, the teaching content with a certain degree of organization and logic should be supplied by the network teaching system to arrange the appropriate learning task and learning node, such as holding regular test or examination, monitoring their daily learning activities, and the measures associated with performance, etc. As to active style students, they are confident in learning materials through active study, using materials and dealing with the problem, based on which, the network teaching system can provide some exploratory learning content to stimulate their interest in learning. A valid teaching scenario should be established to stir up their interest and thought.

- (2) Enhance the interactivity of the network teaching system and students' autonomy. It was found in the study that individuals' subjective value, especially the utility value and acquisition value, have substantial impact on the network teaching effect, which demonstrates it is vital to complete specific tasks. So, this task is for learners themselves, the pleasure and achievability obtained in the process of implementing the task. Therefore, it is necessary for e-instruction systems to possess an array of learning contents available for different levels as well as different learning goals and career planning, which requires providers match learners' needs.

ACKNOWLEDGEMENT

Project Support: General project of Humanities and Social Sciences, Henan Provincial Department of Education (2018-ZZJH-404); The education of Henan province "in 13th Five-Year" plan ([2017]-JKGHYB-0175); List of key scientific research projects of Henan universities and colleges in 2018 (18B790014); Research project of Henan Provincial Federation of Social Sciences in 2017 (SKL-2017-2960); Research project of Xinxiang Municipal Social Science Association in 2017.

REFERENCES

- Ayersman, D. J., & Reed, W. M. (1995). Effects of learning styles, programming, and gender on computer anxiety. *Journal of Research on Computing in Education*, 28(2), 148-161. <https://doi.org/10.1080/08886504.1995.10782157>
- Bong, M. (2001). Role of self-efficacy and task-value in predicting college students' course performance and future enrollment intentions. *Contemporary Educational Psychology*, 26(4), 553-570. <https://doi.org/10.1006/ceps.2000.1048>
- Chen, L. H. (2010). Web-based learning programs: use by learners with various cognitive styles. *Computers & Education*, 54(4), 1028-1035. <https://doi.org/10.1016/j.compedu.2009.10.008>
- Chiu, C. M., & Wang, E. T. G. (2008). Understanding web-based learning continuance intention: the role of subjective task value. *Information & Management*, 45(3), 194-201. <https://doi.org/10.1016/j.im.2008.02.003>
- Chiu, C. M., Hsu, M. H., Sun, S. Y., Lin, T. C., & Sun, P. C. (2005). Usability, quality, value and e-learning continuance decisions. *Computers & Education*, 45(4), 399-416. <https://doi.org/10.1016/j.compedu.2004.06.001>
- Connolly, T. M., MacArthur, E., Stansfield, M. & McLellan, E. (2007). A quasi- experimental study of three online learning courses in computing. *Computers & Education*, 11(49), 345-359. <https://doi.org/10.1016/j.compedu.2005.09.001>
- Gong, M., Xu, Y., & Yu, Y. (2004). An enhanced technology acceptance model for Web-based learning. *Journal of Information Systems Education*, 11(4), 365-373. Retrieved from https://www.researchgate.net/publication/265266184_An_Enhanced_Technology_Acceptance_Model_for_Web-Based_Learning
- Hamburg, I., & Lindecke, C. (2003). Social aspects of e-learning and blending learning methods. In *Proceedings of the 4th European Conference E-Comm-Line*, Bucharest, Romania.
- Hossini, M., & Mahdizadeh, H. (2011). The effect of online quran teaching on physicians' general and professional ethical conduct. *Arak Medical University Journal*. Retrieved from: <http://www.maarefquran.org/files/pdf/20565.pdf>
- Jr, H. E. M. (2003). The web-based community college student: an examination of factors that lead to success and risk. *Internet & Higher Education*, 6(3), 241-261. [https://doi.org/10.1016/S1096-7516\(03\)00044-7](https://doi.org/10.1016/S1096-7516(03)00044-7)
- Kira, D. (2007). Mediating the impact of technology usage on perceived ease of use by anxiety. *Computers & Education*, 49(4), 1189-1204. <https://doi.org/10.1016/j.compedu.2006.01.009>

- Mahmod, R., Dahlan, N., Ramayah, T., & Karia, N. (2005). Attitudinal belief on adoption of e-mba program in Malaysia. *Turkish Online Journal of Distance Education*, 6(2), 10. Retrieved from: http://xueshu.baidu.com/s?wd=paperuri%3A%28927b301f631c508a28c2719618836819%29&filter=sc_long_sign&tn=SE_xueshusource_2kduw22v&sc_vurl=http%3A%2F%2Feric.ed.gov%2F%3Fid%3DED490366&ie=utf-8&sc_us=1156664249558029144
- Najah, O. (2014). *The effect of online teaching approach in enhancing strategic thinking skills for engineering students*. Retrieved from <http://iportal.ump.edu.my/lib/item?id=chamo:83680&theme=UMP2>
- Nordin, N., Samsudin, M. A., & Harun, A. H. (2017). Teaching renewable energy using online PBL in investigating its effect on behaviour towards energy conservation among Malaysian students: an oval repeated measures approach. *Physics Education*, 52(1), 015001. <https://doi.org/10.1088/0031-9120/52/1/015001>
- Ong, C. S., Lai, J. Y., & Wang, Y. S. (2004). Factors affecting engineers' acceptance of asynchronous e-learning systems in high-tech companies. *Information & Management*, 41(6), 795-804. <https://doi.org/10.1016/j.im.2003.08.012>
- Parsons, J. E., Adler, T., & Meece, J. L. (1984). Sex differences in achievement: a test of alternate theories. *Journal of Personality & Social Psychology*, 46(1), 26-43. <https://doi.org/10.1037/0022-3514.46.1.26>
- Petrides, L. A. (2002). Web-based technologies for distributed (or distance) learning: creating learning-centered educational experiences in the higher education classroom. *International Journal of Instructional Media*, 43(29), 69-77. Retrieved from <https://search.proquest.com/openview/3e7dda8d5bd2420d180d808fe176d8e0/1?pq-origsite=gscholar&cbl=30932>
- Pollock, P. H., & Wilson, K. H. B. M. (2005). Teaching and learning online: assessing the effect of gender context on active learning. *Journal of Political Science Education*, 1(1), 1-15. <https://doi.org/10.1080/15512160490921815>
- Ren, T., Yang, D., & University, N. M. (2014). On multidimensional online assessment system for the degree of teaching effect recognition in university. *Journal of Liaoning Medical University*, 26(3), 45-51.
- Saadé, R. G., & Kira, D. (2007). Mediating the impact of technology usage on perceived ease of use by anxiety. *Computers & Education*, 49(4), 1189-1204. <https://doi.org/10.1016/j.compedu.2006.01.009>
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: toward a unified view. *Mis Quarterly*, 27(3), 425-478. <https://doi.org/10.2307/30036540>
- Wigfield, A. (1994). The role of children's achievement values in the self-regulation of their learning outcomes. *Self-regulation of Learning and Performance: Issues and Educational Applications*, 27(6), 101-124.
- Wu, S. Y. (2016). The effect of teaching strategies and students' cognitive style on the online discussion environment. *The Asia-Pacific Education Researcher*, 25(2), 267-277. <https://doi.org/10.1007/s40299-015-0259-9>

<http://www.ejmste.com>