

Online English teaching and learning: the magic between learners' academic motivation and teachers' information communication technology competence

Xiaohu Huang

School of Foreign Languages and Literatures, Chongqing Normal University, China

Pan Pan*

School of Foreign Languages and Literatures, Chongqing Normal University, China

Abstract

The rapid development of information communication technology (ICT) has benefited various fields to some extent. Education, as one of the fields most closely related to high-tech, naturally encourages teachers to widely apply cutting-edge technologies in teaching practice. Affected by the COVID-19 that began in 2019, online teaching has been widely carried out in all countries. As one of the countries with the largest number of learners in the world, China has conducted a large scale of online teaching. In the context of online teaching, whether learners' academic motivation is influenced by teachers' ICT competence has always been a concern for teachers. Therefore, this study collected relevant data from 349 Chinese EFL learners to figure out the relationship between learners' academic motivation and teachers' ICT competence perceived by learners. Results of the study indicated that learners' academic motivation were moderately influenced by teachers' ICT competence they perceived. Moreover, most participants showed positive attitude to their teachers' ICT competence. Practical implications could be concluded; for instance, researchers may pay more attention to the combination of ICT and teaching in order to make teachers' presentation of ICT competence more perceivable.

Keywords: Information Communication Technology, Academic Motivation, Online English Teaching, Teachers' Professionalism, Correlation

INTRODUCTION

Various factors will affect the effectiveness of learning, and motivation is one of them. As academic motivation is an internal priming mechanism that stimulates and maintains individual learning interactions towards a certain learning goal, it is the main driving force for initiating second language learning and the critical factor for completing long-term and arduous learning tasks. Academic motivation drives learners to continuously strive towards established goals (Dörnyei and Otto, 1998), not only reflecting the internal

psychological energy of individuals, but also promoting the smooth development of teaching and learning, and predicting learners' academic performance by evaluating their academic motivation (Gao, 2020).

Previous studies have focused a lot on academic motivation. Tang and He (2023) examined the correlation between Chinese students' academic motivation and emotional intelligence, finding that emotional intelligence predicted students' motivation positively. Squinca et al. (2021) studied the relationship between academic motivation and perceived stress and concluded that there was a straight relationship among stress and demotivation and groups of extrinsic motivation. Xu and Wang (2022) mentioned that when students are highly motivated, they will feel energetic during the learning process, thereby improving their academic performance. Berestova et al. (2022) studied factors that may affect university students' academic motivation in E-learning environment and found that positive feedback from teachers is needed in online teaching. Liu (2022) discussed the positive consequences of second language enjoyment for students' academic motivation, which could provide another direction for researchers to study. The relationship between university students' academic motivation, mental health and academic success had also been studied. Mahdavi et al. (2021) affirmed that mental health is related to learners' academic motivation while academic achievement and mental health are not directly associated. However, the relationship between teachers' ICT competence and EFL learners' academic motivation has never been studied, especially in on-line study context. Therefore, the key issues of the present study are academic motivation and information and communication technologies competence.

LITERATURE REVIEW

Academic motivation

Since the 1950s, the study of foreign language academic motivation has been a hot topic in the field of applied linguistics. It covers various groups of students, and the research content also includes theory and application. Gardner and Lambert (1960) firstly provided the concepts of instrumental motivation and integrative motivation, which is a symbol of the development of social psychology. Then from the perspective of educational psychology, Deci and Ryan (1985) suggested that academic motivation has two sides: intrinsic motivation and extrinsic motivation. The former can be generated by an individual's personal interest in the activity someone is engaged in while the latter is stimulated by external stimuli that are not inherently related to the activity itself. Afterwards, Crookes and Schmidt (1991) classified motivation into short-term motivation and long-term motivation according to the length of time spent by learners in the learning process. It can be easily found that studies of motivation have been generated based on various perspectives. In recent years, the relation between different components also attracts researchers' attention. As one of the most relevant fields, many research have been conducted. Analyzing the sample of 436 students from two universities, Zhang (2022) studied the relationship between academic motivation and learners' resilience and found that resilient learners show high academic motivation and performance, which means resilience is rather significant in high educational motivation

and even greater rates of academic achievement. Fuertes et al. (2020) collected and analyzed the data of 514 students from the Faculty of Education of the University of León to figure out relationship between the big five factors of personality and academic motivation. The results of their research suggest that there is a significant relationship between personality facets and motivation variables. In addition, the complex relationship between academic motivation and other research constructs is increasingly being valued, such as foreign language learning anxiety, learning pleasure, self-efficacy, etc. (Zheng et al., 2018; Huo and Rui, 2020). Similarly, pedagogy is another field which has natural linkage with academic motivation. Zalts et al. (2021) studied the association between 400 medical students' motivation with their learning environment and found that "higher" or well-organized learning environment is correlated to students' intrinsic motivation. Loes (2022) examined data of learners from diverse institutions throughout the U. S. and found that collaborative learning has a strong and positive influence on gains in academic motivation. Based on the studies above, it can be found that research on academic motivation have been changing from macro to micro dimensions and from qualitative studies to the combination of qualitative and quantitative studies.

Information and communication technologies competence

As the field most closely related to high-tech, education system tends to suggest teachers to adopt the latest teaching methods. Due to the pandemic of COVID-19, teachers and professors from different academic stages have to start their online-teaching business. More than 1 million university teachers have been teaching through online platforms, which provides more than 12.26 billion online courses for learners in China (Xu et al., 2020). For those teachers who are new to online teaching (especially middle-aged and elderly teachers), proficient use of electronic devices and software in a short period of time might be very challenging. Therefore, many teachers have realized the importance of developing information and communication technologies (ICT) competence.

The definition of ICT varies. ICT is defined as technologies used to communicate and to create, manage and distribute information, which is widely accepted and referenced around the world. A broad definition of ICT includes a diverse set of technological tools and resources used to transmit, store, create, share or exchange information (UNESCO, 2009). Almerich et al. (2016) defined ICT competence as series of knowledge and skills that teachers must acquire in various technological resources so they can introduce them into teaching practice completely.

ICT competence, a critical component of modern teachers' professionalism, has been studied through diverse research from different perspectives. According to the research conducted in Spain, ICT competences influence students' pedagogical competences intensely in education domain (Díaz-García et al., 2023). Ramanan (2017) conducted an assessment to see the ICT competence of 50 teachers and found that the lack of funds, inadequate training, insufficient time due to work load and absence of ICT facilities bother teachers most even though these participants showed positive attitude to apply ICT in their class. It can also be found that future teachers do not make the fullest use of technologies to optimize performance with ICT work (Prendes et al., 2010). Instefjord

and Munthe (2017) studied the relationship the integration of professional ICT in teacher education and gave possible directions to improve the quality of pre-service teachers' training. Studies focusing on teachers' ICT competence in specific subjects show that in the context of the information society and digital world, ICT competences are a prerequisite for effective professional activities of mathematics and information science pre-service teachers. An appropriate level of ICT competences can greatly enhance the teaching process, promote teachers' professional development, and adapt to changes in educational technology. In this regard, determining the structure and content of the ICT competences of mathematics and information science pre-service teachers is crucial for clarifying the results of the education process and the supportive personal characteristics that learners need to use ICT in their future work (Byrka et al., 2019). These studies offered multiple views of the relationship between teachers' ICT competence and other factors, which could be helpful for teachers and researchers to seek an efficient way of better previous teaching.

Present study

Research mentioned above mainly talk about how to evaluate learners' academic motivation or teachers' ICT competence and their relationship with other constructs. Factors that affect learners' academic motivation have been studied while relationship between learner' academic motivation and teachers' ICT competence is not yet clear. Moreover, most of the previous research about teachers' ICT competence focus on the teachers' perspective while learners' perception of teachers' ICT competence is relatively ignored. Educating is an interactive process between teaching and learning. Teaching will lack efficiency, no matter how advanced teachers' ICT competence is, if learners cannot perceive and understand it. Therefore, there is a need to explore the relationship between learners' academic motivation and teachers' ICT competence perceived by learners. The current study is aimed at investigating the following questions: Is the level of learners' academic motivation related to teachers' ICT competence that learners perceived? If yes, to what extent are these two variables related?

METHOD

Participants

This research collected a sample of 349 EFL learners (invalid forms has been screened out) via Wechat (v8.0.39) employing Wenjuanxing (<https://www.wjx.cn/>), an online platform, from different colleges and universities in China. All the participants were informed with the purpose of the study. Only those who were fully aware of and consented to the purpose completed the questionnaires. To generalize the research results, both genders (females = 211; males = 138) were surveyed with their age ranging from 18 to 36 and the average age is about 23 years old. The proportion of male and female participants in this study is different, but in order to ensure that the participation and the sample size are appropriate, the ratio of gender was not adjusted. All the participants had attended online English courses. No participant stated that they attend online English courses in their senior year.

Instruments

Motivation questionnaire

The Motivated Strategies for Learning Questionnaire (MSLQ) is applied in this research. The MSLQ is a 44-item, self-report instrument designed to measure college learners' motivation and their use of learning strategies (Pintrich and De Groot, 1990). To evaluate participants' academic motivation, the motivation section which has 31 items was retained and the rest part was removed. Its components include self-efficacy (13 items), value judgement of the course (13 items) and test anxiety (5 items). The revised questionnaire underwent pilot testing (with a sample size of approximately 50 participants), and the results were analyzed to confirm that it can be used for large-scale data collection. The internal consistency of the questionnaire was 0.954 calculated by Cronbach's Alpha.

Teachers' ICT competence (perceived by learners) questionnaire

Teachers' ICT Skills Scale (TICTS) was designed to measure teachers' skills for using ICT. The original TICTS is based on the teachers' perspective. Yalın et al. (2017) confirmed that TICTS is a reliable and valid scale by using statistic tests. To figure out learners' perception of teachers' ICT competence, modification in its expression is necessary. In the modified TICTS, 12 items were retained and the rest is removed. Its components include teachers' basic hardware operations (3 items), teachers' personal ICT usage (4 items) and the use of ICT for teaching (5 items). The revised questionnaire underwent pilot testing as well, and the results were analyzed to confirm that it can be used for large-scale data collection. The internal consistency of the questionnaire was 0.952 calculated by Cronbach's Alpha.

Data collection and analysis

The data required in this research was collected in the beginning of June by distributing online questionnaires via Wenjuanxing. The entire process of filling out the questionnaire was open and anonymous. Finally, 349 valid questionnaires were gleaned from different provinces and regions, covering most parts in China. In order to improve the reliability and validity of the sample, all participants were fully informed about how to fill out the questionnaire and how to provide validated answers, and ensured that their answers and personal information were only used to achieve research objectives and would remain confidential. Participants got financially paid after finishing the questionnaires. As the participants did not have contact with the research, there was no conflict of interest between the research and the correspondents. IBM SPSS and Mplus were applied to analyze the sample statistically to ensure the reliability and validity of the questionnaire and answer the research questions.

RESULTS

The current study is aimed at investigating the relationship between learners' academic motivation and teachers' ICT competence perceived by learners. The following tables could be helpful to explain relative information of the data with reliability, structural validity, Pearson correlation between variables and etc.

In the process of statistical analysis, Cronbach's Alpha was used to verify the reliability of the questionnaire. This research applied confirmatory factor analysis to test the structural validity of the questionnaire. Pearson correlation is used to explore the correlation between learners' academic motivation and teachers' ICT competence perceived by learners.

Table 1. Reliability of the questionnaires

Cronbach's Alpha	N
0.954	31
0.952	12

Table 1 shows the reliability of the questionnaires used to test learners' academic motivation and teachers' ICT competence perceived by learners. The results (0.954 & 0.952) indicated that the questionnaires which own rather high statistical indices are reliable.

Table 2. Confirmatory factor analysis

	Motivation	ICT competence
RMSEA Estimate	0.094	0.141
90 Percent C. I.	0.090	0.128
Probability RMSEA \leq .05	0.000	0.000
CFI	0.819	0.908
TLI	0.805	0.881
SRMR	0.077	0.048

Table 2 shows different statistical indicators obtained through confirmatory factor analysis (CFA). The values suggested that the structural validity of the questionnaires was relatively acceptable, for some of the values meet general statistical requirements while others do not.

Table 3. Correlation for learners' academic motivation and teachers' ICT competence perceived by learners:

	Motivation	ICT competence
Motivation Pearson C.	1.000	0.539**
Sig. (2-tailed)		0.000
N	349	349
ICT competence Pearson C.	0.539**	1.000
Sig. (2-tailed)	0.000	
N	349	349

*** correlation is significant at the 0.01 level (2-tailed).*

Table 3 shows that learners' academic motivation and teachers' ICT competence perceived by learners are positively correlated to a moderate extent (Pearson correlation = 0.538) and the relationship is significant (p-value < 0.01).

Table 4. Descriptive statistics

	Mean	SD.	N
Motivation	4.8005	0.92449	349
ICT competence	5.5970	1.07684	349

Table 4 shows the average value and standard deviation of learners' academic motivation and teachers' ICT competence perceived by learners. These figures can be used to evaluate the average level of academic motivation among learners for this course and their average perception of the ICT competence of the teachers. The data collected from participants shows little dispersion, which means these data is reliable.

DISCUSSION

Results of this research indicates that there is a moderately strong positive correlation between these two variables. That is, the stronger the teacher's ICT competence perceived by students is, the higher learners' academic motivation will be. It is easy for learners to perceive teachers' professionalism, especially in the field of ICT. High level of teachers' ICT competence could improve learners' academic motivation of this course. Zheng et al. (2021) studied the influence of informatization teaching on learners' academic performance and motivation in higher vocational college and found that learners' self-awareness of learning and academic motivation was improved to varying degrees. The result of the present research is basically consistent with the results of their findings and can serve as an expansion of their study. According to the statistical figure above, most participants could perceive teachers' ICT competence, giving a positive comment on it. This finding is congruent with the conclusion given by Wang et al. (2023). They suggested that the overall ICT competence of Chinese university teachers is above the average level around the world. Authors of this paper believe that this occurrence can be attributed to two aspects: the rapid development of China's information industry and the good integration of ICT and education. According to the investigation conducted by Li (2022), from 2010 to 2020, China's total revenue from software products and ICT services maintained a stable growth trend, and the export volume of software business also continued to increase. While bringing economic benefits, the development of the information industry has also significantly improved the quality and efficiency of work implementation in related fields like manufacturing, education, health care, entertainment, logistics and other industries. As mentioned earlier, due to the unique characteristics of education, the development of it and high-tech always mutually promote each other. Wang (2022) indicated that the improvement of ICT significantly changed the teaching mode of Chinese teachers in diverse aspects. Firstly, ICT enriched the ways of dissemination of teaching and remedied the drawbacks of traditional teaching. Second, appropriate use of ICT can reduce the burden on teachers and learners, saving time and energy to learning and teaching. Third, ICT brings new educational ideas, prompting teachers to reconstruct and better their structure of teaching, which optimizes the quality and efficiency. Under the promotion of the national environment, it can be

understood that the overall ICT competence of Chinese teachers has been improved. Nevertheless, from a specific perspective, teachers with different educational backgrounds, subjects and genders also exhibit different ICT competence in real teaching while these factors were not considered in the present study.

It is worth noticing that the level of teachers' ICT competence obtained from tests cannot be equated with the real level perceived by learners. In most cases, the competence of teachers in the context of class teaching will be more or less affected by other factors and weakened. Additionally, learners' also show different degrees of perception which means they could not always sense what teachers would like to deliver with the ICT devices. Nevertheless, the results of this study are not entirely consistent with the conclusion, which indicated that Chinese English teachers' performance of using ICT in class was far from satisfactory, from the research applied by Sun et al. (2021) even though they still got some other similar findings as well. The reason for this situation may be due to the fact that two studies were conducted at different stages of the pandemic of COVID-19, and teachers' ICT competence has been improved to a certain extent during the two-year practical application process. Based on the document published by UNESCO (2018), the development of teachers' ICT competence has been acknowledged as a component in teachers' training plan which gives them guidance to facilitate the improvement of professionalism. From the policy framework of this document, ministry of a country could use the modules articulated in the companion document to arrange proper training for teachers. Li and Yang (2019) stated that a qualified teacher should possess sufficient scientific and cultural literacy, which is the guarantee for teachers' professional skills to be fully utilized. In addition to psychological knowledge, educational knowledge, professional knowledge of the teaching subject, and scientific and cultural knowledge, ICT knowledge is also rather crucial in scientific and cultural literacy. The deep integration of the Internet and education is based on ICT, which offers rich cognitive tools and intelligent supporting environment, prompting the transformation of teaching structure. Teachers' "information technology knowledge" directly affects their ability to "serve learning" and also affects students' learning efficiency and effectiveness. It can be supposed that with the development of ICT, teachers' professionalism will continue to improve, and students' academic motivation will also be correspondingly enhanced to a certain extent.

CONCLUSION AND IMPLICATIONS

The present study could offer an understanding of the correlation of learners' academic motivation and teachers' ICT competence. Modern teachers may take various ways to make their teaching more attracting and efficient so that learners can concentrate on the learning materials. Regarding the findings of this research, it is necessary for teachers to improve their ICT competence and apply it to their teaching. It should be pointed out that combining ICT with teaching content improperly would do no help to improve the quality of teaching, which makes learners underestimate teachers' professionalism. "How to use ICT appropriately?" is still a constantly evolving question for teachers. Researchers may pay more attention to the combination of ICT and teaching in order to make teachers' presentation of ICT competence more perceivable, which means traditional guidebooks

of helping teachers use diverse hardware and software are technically insufficient. Teachers should also be aware of their identity of researchers, because teaching and doing research are always integrated in modern times.

From the perspective of arousing the enthusiasm for scientific research, improving teachers' ICT competence could not only perfect teaching, but promote further integration of education and ICT development. In recent years, an increasing number of researchers have been applying cutting-edge technology to teaching practice. Chao et al. (2021) equipped Chinese language class with virtual reality (VR) technology to examine learners' motivation before and after using VR tech under the circumstances of COVID-19. In their research, more teacher-learner and learner-learner interactions were found and learners showed a high level of academic motivation. Besides, ChatGPT, an online AI chatbot, has become fairly popular among researchers. Although the attitude of scientific community towards the application of this technology is not yet clear, as modern teachers, referencing and learning from others is also a significant channel for self-improvement. Therefore, teachers can also pay more attention to relevant content in the field of AI and dare to apply it to teaching practice, thereby developing learners' academic motivation. It is worth noting that all applications of AI technology mentioned above should be carried out with respect for the intellectual property rights of others.

Finally, there are still some limitations in the implementation process of this study. On the one hand, the motivation test for the English subject was conducted separately, without involving other subjects; On the other hand, when conducting structural validity tests on the questionnaire used in this study, some indicators were located at the numerical edge commonly accepted by the academic community. Future researchers can obtain more samples from other subjects and optimize the structure of the questionnaire to address the above issues.

Author contributions

Huang and Pan conceived the ideas and revised the manuscript. Pan organized the logical framework and Huang wrote the initial draft. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

REFERENCES

- Almerich, G., Orellana, N., Suárez-Rodríguez, J. & Díaz-García I. (2016). Teachers' information and communication technology competences: A structural approach. *Computers & Education*, 100, 110-125. doi: 10.1016/j.compedu.2016.05.002
- Berestova, A.; Burdina, G.; Lobuteva, L.; & Lobuteva, A. Academic Motivation of University Students and the Factors That Influence It in an E-Learning Environment. *The Electronic Journal of e-Learning*, 20(2), 201-210. doi: 10.34190/ejel.20.2.2272

- Byrka, M. F., Sushchenko, A. V. & Lukashiv, T. O. (2019). COMPONENTS OF ICT COMPETENCE OF TEACHERS OF MATHEMATICS AND INFORMATICS. *Information Technologies and Learning Tools*, 74(6), 225-237. doi: 10.33407/itlt.v74i6.3258
- Chao, G. C., Jong, M. S. & Luk, E. T. (2021). "Work-in-Progress–Motivation in Virtual Reality Chinese Language Learning in the Context of COVID-19". 2021 7th International Conference of the Immersive Learning Research Network, Eureka, CA, USA, 2021. doi: 10.23919/iLRN52045.2021.9459245.
- Clark, M. H., Middleton, S. C., Nguyen, D. & Zwick, L. K. (2014). Mediating relationships between academic motivation, academic integration and academic performance. *Learning and Individual Differences*. 33. doi: 10.1016/j.lindif.2014.04.007.
- Crookes, G. & Schmidt, R. W. (1991). Motivation: Reopening the research agenda. *Language Learning*, 41(4), 469-512. doi: 10.1111/j.1467-1770.1991.tb00690.x
- Deci, E. L. & Ryan, R. M. (1985). *Intrinsic Motivation and Self-determination in Human Behavior*. New York: Plenum. doi: 10.1007/978-1-4899-2271-7
- Díaz-García, I., Almerich, G., Suárez-Rodríguez, J. M., & Orellana, N. (2023). University students' competences in ICT: A view from the education domain. *Australasian Journal of Educational Technology*, 39(1), 106-124. doi: 10.14742/ajet.6820
- Dörnyei, Z. & Otto, I. (1998). Motivation in Action: A process model of L2 motivation. *Applied Linguistics*, (4), 43-69.
- Fuertes, A. M. D. C., Fernández, J. B., Mata, M. G., Gómez, A. R., & Pascual, R. G. (2020). Relationship between personality and academic motivation in education degrees students. *Educ. Sci.* 10:327. doi:10.3390/educsci10110327
- Gao, X. (2020). On Characteristics of College Students' Learning Motivation and the Influence on their Academic Performance. *Higher Education Exploration*, 01, 43-47. https://kns.cnki.net/kcms2/article/abstract?v=3uoqIhG8C44YLTlOAIrKibYIV5Vjs7i8oRR1PAR7RxjuAJk4dHXomECBDEHGWsRo-6QIWZahLj_-bKNcpSXVogbKD2ph8Hl&uniplatform=NZKPT&src=copy
- Gardner, R. C. & Lambert, W. E. (1960). Motivational variables in second-language acquisition. *Canadian Journal Psychology*, 13(4), 26-72. doi: 10.1037/h0083787
- Huo, W. & Rui, Y. (2020). The mediating effects of L2MSS on self-efficacy and English proficiency. *Journal of Xi'an International Studies University*, 28(02), 54-58. doi: 10.16362/j.cnki.cn61-1457/h.2020.02.011
- Instefjord, E. J., & Munthe, E. (2017). Educating digitally competent teachers: A study for integration of professional digital competence in teacher education. *Teaching and Teacher Education*, 67, 37–45. doi: 10.1016/j.tate.2017.05.016
- Li, J. (2022). China's IT Industry and Information Technology Application in the Context of Digital Economy: Status and Policy. *Journal of Beijing Technology and Business University (Social Sciences)*, 37(06), 1-11. doi: 10.12085/j.issn.1009-6116.2022.06.001

- Li, Z. & Yang, X. (2019). The Structure and Training Path of Teachers' Professionalism in "Internet+" Era. *e-Education Research*, 40(07), 110-120. doi: 10.13811/j.cnki.eer.2019.07.014
- Liu, S. (2022) Toward the Role of L2 Enjoyment in EFL Students' Academic Motivation and Engagement. *Front. Psychol.* 12:822588. doi: 10.3389/fpsyg.2021.822588
- Loes, C. N. (2022). The Effect of Collaborative Learning on Academic Motivation. *Teaching & Learning Inquiry* 10. doi: 10.20343/teachlearninqu.10.4
- Mahdavi, P., Valibeygi, A., Moradi, M. and Sadeghi, S. (2021). Relationship Between Achievement Motivation, Mental Health and Academic Success in University Students. *International Quarterly of Community Health Education*. Publicación anticipada en línea. doi: 10.1177/0272684X211025932
- Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning component of classroom academic performance. *Journal of Educational Psychology*, 82, 33-40. doi: 10.1037//0022-0663.82.1.33
- Prendes, M. P., Castañeda, L. & Gutiérrez, I. (2010). ICT Competences of Future Teachers. *Comunicar*, (35), 175-182.
- Ramanan, R. (2017). ICT Competence among College Teachers: An Assessment. *International Journal of Scientific and Research Publications*, (7). <http://www.ijsrp.org/research-paper-0817.php?rp=P686743>
- Squincalha, G. R., Leal, E. A., & Silva, T. D. (2021). Relationship between Academic Motivation and Perceived Stress: a study with Accounting Science Students. *Journal of Accounting, Management and Governance*, 24(1), 72-91. doi: [10.51341/1984-3925_2021v24n1a5](https://doi.org/10.51341/1984-3925_2021v24n1a5)
- Sun, Y., Wu, X., Wang, C. & Gu, X. (2021). A Large-Scale Survey on ICT Teaching Ability of Chinese Teachers in the "Undisrupted Online Learning" during the COVID-19 Pandemic: Comparisons on Grades, Regions, and Teaching Experiences. *Open Education Research*, 27(01), 84-93. doi: 10.13966/j.cnki.kfjyyj.2021.01.009
- Tang, Y. & He, W. (2023). Relationship between emotional intelligence and learning motivation among college students during the COVID-19 pandemic: A serial mediation model. *Front. Psychol.* 14:1109569. doi: 10.3389/fpsyg.2023.1109569
- Türel, Y. K., Özdemir, T. Y., & Varol, F. (2017). Teachers' ICT Skills Scale (TICTS): Reliability and validity. *Cukurova University Faculty of Education Journal*, 46(2), 503-516. doi: 10.14812/cuefd.299864
- United Nations Educational, Scientific and Cultural Organization. (2009). Guide to measuring information and communication technologies (ICT) in education. <https://unesdoc.unesco.org/ark:/48223/pf0000186547> [Accessed July 1st, 2023]
- United Nations Educational, Scientific and Cultural Organization. (2018). UNESCO ICT Competency Framework for Teachers. <https://unesdoc.unesco.org/ark:/48223/pf0000265721> [Accessed July 3rd, 2023]

- Wang, J. (2022). 信息技术赋能教育的三个层次——基于中小学教师信息技术应用能力提升的视角. *Journal of the Chinese Society of Education*, 06, 1-6. <https://kns.cnki.net/kcms2/article/abstract?v=3uoqIhG8C44YLTl0AiTRKibYIV5Vjs7iITKGjg9uTdeTsOIra5XVjR0MOZsM2AZ1yStaYa2XsJjh4cjY6NV3n4r4Wllj&u niplatform=NZKPT> (in Chinese)
- Wang, Y., Wang, J., Han, H. & Li, L. (2023). Investigation into the current information-based teaching ability of college English teachers in China. *Foreign Language World*, 2, 54-61.
- Xu, X. & Wang, B. (2022). EFL Students' Academic Buoyancy: Does Academic Motivation and Interest Matter? *Front. Psychol.* 13:858054. doi: 10.3389/fpsyg.2022.858054
- Zalts, R., Green, N., Tackett, S. & Lubin, R. (2021). The association between medical students' motivation with learning environment, perceived academic rank, and burnout. *International Journal of Medical Education*, 12, 25-30. doi: 10.5116/ijme.5ff9.bf5c
- Zhang, B. (2022). The Relationship Between Chinese EFL Learners' Resilience and Academic Motivation. *Front. Psychol.* 13:871554. doi: 10.3389/fpsyg.2022.871554
- Zheng, C., Liang, J., Li, M. & Tsai, C. (2018). The relationship between English language learners' motivation and online self-regulation: A structural equation modelling approach. *The system*, 76, 144-157. doi: 10.1016/j.system.2018.05.003
- Zheng, K., Wu, L., Yang, Z., et al. (2021). Influence of informatization teaching on the learning behavior of medical students in higher vocational colleges. *China Journal of Health Psychology*, 29(04), 590-593. doi: 10.13342/j.cnki.cjhp.2021.04.024