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Critical thinking cultivation in Chinese learning classes for International students during the COVID-19 pandemic

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ABSTRACT

The COVID-19 pandemic has led to booming popularity of distance education, raising the question of ensuring critical thinking of students as one of the key competences. The present study aims to investigate how learning a Chinese language remotely affects the development of critical thinking in international students. The study took place in the Chongqing University of Posts and Telecommunications, China, and involved comparing the levels of critical thinking in 233 international students learning Chinese remotely and 214 international students engaged in other areas and learning in their native language while training critical thinking, also remotely. The critical thinking assessment was carried out twice, at the beginning and at the end of the study, using the validated HEIghten® Critical Thinking Assessment suite in the native language of the respondents. The results of the study show that learning a Chinese language can facilitate the development of critical thinking in international students and that the low level of critical thinking among Chinese speakers is a myth. Future studies should focus more on exploring the psychophysiological predictors of critical thinking and developing valid psychodiagnostic techniques with regard to racial and ethnic characteristics of the psychophysiological mechanisms of cognition. In addition, the learning programs and training curricula aimed at critical thinking development must take into account the psychophysiology of learning.

1. Introduction

The COVID-19 pandemic has had a substantial impact on international education, bringing to the forefront the safety of international students when they are abroad (Mok, Xiong, Ke, & Cheung, 2021). The outbreak has decreased the international student mobility (Mok et al., 2021), and the popularity of distance education has skyrocketed (Nie, Panfilova, Samusenkov, & Mikhaylov, 2020). Prior to the COVID-19 pandemic, the distance mode of delivery was used primarily to teach foreign languages, whereas during the lockdown period, it greatly developed as a priority area. Internationalization and international cooperation have always been a strategic priority of the Chongqing University of Posts and Telecommunications, China, and therefore the University has developed considerable experience in distance education. That being said, the COVID-19 pandemic has intensified things in this direction, making Chinese as a Second Language (CHSL) training through online classes even more popular. This gives rise to a challenge of ensuring educational quality of services provided with the view to instilling competences a learner may need to learn a language, among which is critical thinking, one of the core competences today. There is a belief that the development of critical thinking skills is a tougher call for Eastern, rather than Western, students (Cherkasov, Bratanovskii, Koroleva, & Zimovets, 2019a; Cherkasov, Bratanovskii, Koroleva, & Zimovets, 2019b). Therefore, it seems to be interesting to explore the relationship between language learning and critical thinking in
international students who learn Chinese as a Second Language. The present study aims to investigate how learning a Chinese language remotely affects the development of critical thinking in international students. The objectives of the study are to review scientific literature sources on the impact of distance learning on the development of critical thinking in foreign students studying Chinese and to examine the features of critical thinking development in international students who learn Chinese as a Second Language remotely using reliable methods. In this study, we proceed from the null hypothesis that the development of critical thinking in foreign students studying Chinese at a distance does not differ from the level of development of critical thinking in other subjects.  

1.1. Literature review

The development of critical thinking is interconnected with the development of creative skills. The responsibility of ensuring students’ creative self-efficacy lies with a teacher and creative self-efficacy of itself affects learning motivation and emotional state of students (Li, Gong, Zhang, Yu, & Zhou, 2021; Utegenova, Zubanova, Ushatikova, & Salimova, 2020). Teachers must create an environment that allows students to independently absorb the learning material by using hard but engaging texts and tasks that encourage them to take responsibility and give the feeling of success and freedom (Wilson, 2016). At the same time, scientists view the development of critical thinking skills as one of the criteria for giftedness, which has psychophysiological grounds, and the level of critical thinking in this context is an indicator of the quality of learning (Gilmanshina, Smirnov, Kauts, & Berechikidze, 2021). Critical thinking is at the core of higher education, and the critical reading skills are considered not only as a professionally significant, but also as a vital competence, especially in aspiring university students (Tsvekova, 2018; Wilson, 2016). Scholars emphasize that English for Academic Purposes (EAP) courses generally include some attention to critical thinking (Wilson, 2016), but similar studies of Chinese language programs have not been found. However, one can agree that developing deeper skills of critical thinking enables students to feel secure and comfortable in transcultural contact zones in which they are participating (Wilson, 2016).

Critical thinking is a universally agreed-upon key competence and one of the goals of higher education (Bali, 2015). Scholars argue that nowadays, critical thinking is of particular importance because it provides them with a way actively participate in democracy, even though it may be culturally biased, which is yet a controversial view (Bali, 2015). There is a misbelief that critical thinking is not inherent in representatives of non-English-speaking cultures, allegedly because Easterners are not capable of rational thinking (Bali, 2015). Even through critical thinking is not an exclusively Western concept, students may differ in cultural and social capital they bring to the university and, consequently, in readiness for Western ways of learning (Bali, 2015). The existence of cultural differences is a debatable issue, but no matter which viewpoint is true, the curriculum design should revolve around critical thinking to ensure that all students are ready to learn in a new environment where a wide variety of disciplinary, institutional, and cultural discourses are in the air (Bali, 2015). At the same time, scholars believe that, despite the crucial role of critical thinking for academic success, Asian students are sometimes perceived as lacking these skills (Floyd, 2011). The study investigating the impact of thinking in a second language revealed distinct computer tomography (CT) images in the head of students during English and Chinese tests (Floyd, 2011). We assume that these differences may stem from psychophysiological mechanisms. In other words, characters used in Western languages are largely associated with the left-hemispheric perception, which is responsible for logical thinking, whereas the hieroglyphic writing that is commonly seen in Eastern languages involves integrated artistic images, and therefore the processing of hieroglyphs mostly engages the right hemisphere.

Researchers offer a multitude of critical thinking training programs and manuals that concentrate on reducing mistakes by improving understanding (Klimesh, 2011), yet the major focus in the scientific debate lies on the question of whether rationality transcends particular cultures, or whether there are different types of thinking, different styles of reasoning (Mason, 2007). Researchers are also interested in the relationship between critical thinking and learning, especially with regard to moral dimension, which overlaps with epistemic and pedagogical beliefs (Mason, 2007).

Given that critical thinking is identified as an essential skill for the twenty-first century, therewith in demand in the labor market, it is a priority throughout the levels of learning. Hence, there is a need to lay out evaluation criteria and create adequate comprehensive tools to assess critical thinking (Davy et al., 2020). Note that the understanding of critical thinking varies depending on the historical and cultural background. For instance, critical thinking in the East typically refers to the existence of doubts, dismissal of blind belief, and the ability to develop an alternative opinion; in addition to that, it is often associated with creativity. In Western literature, however, critical thinking is often used as a synonym for logical thinking, as evidenced by the design of critical thinking tests that ultimately evaluate the logical thinking (Bali, 2015; Floyd, 2011; Mason, 2007). Nevertheless, the efforts to create valid methods for critical thinking assessment continue. The new evaluation techniques have been proven reliable in empirical research and well-perceived by students (Mishra, Gupta, & Gupta, 2021; Shaw et al., 2020). The global trend in higher education is currently the assessment of student learning outcomes. For this reason, Chinese scholars shifted their attention to the validation of the Chinese HELghten Critical Thinking test and found that it had satisfactory psychometric properties (HEIghten, 2021; Liu, Mao, Frankel, & Xu, 2016). Because critical thinking is a highly valued criterion for assessing the quality of learning, it is not surprising that a next-generation assessment system is built upon it. The assessment tool in point allows measuring students’ critical thinking skills in analytical and synthetic dimensions and exhibits satisfactory overall and subscale reliability (Liu et al., 2016).

Critical thinking should be encouraged on all levels and because higher education institutions are charged with the responsibility to meet society’s expectations through helping students mature into critical thinkers, the educational goals should be given precedence, also when systematizing the work of the teachers who support students (Erikson & Erikson, 2019). In the light of critical thinking, the learning outcomes may face these three challenges that concern interpretations, educational goals, and the risk that learning outcomes may establish a ceiling for student ambitions and diminish the academic freedom of both the students and the teachers (Erikson & Erikson, 2019). Therefore, the education should be planned in a way that gives teaches the academic freedom to articulate and
interpret the learning outcomes. With this freedom, however, comes responsibility for learning outcomes and the need to treat students as responsible adults who are capable to become critical thinkers and meet role expectations consciously (Erikson & Erikson, 2019). Curriculum designers need to exploit the same critical thinking they expect from students, otherwise there will be a conflict between administrative and academic goals (Erikson & Erikson, 2019).

Even though critical thinking is a vital goal across all sectors of education, not every student is able to master the skill of critical thinking, and not every teachers can teach this skill (Pithers & Soden, 2000). One of the reasons behind this situation is that there is disagreement about the essence of critical thinking (Munix, 2012). Some sources distinguish critical thinking from other forms of mental processes with which it is often associated, and define it as an act of acquiring, developing, and exercising the ability to grasp inferential connections that exist between statements (Munix, 2012). Although Chinese teachers are generally aware of how important the critical thinking actually is and are willing to integrate it into the learning process (Ma & Luo, 2020), there are misconceptions and challenges in the way associated with numerous socio-cultural factors, such as previous learning experience, cultural values, evaluation system, and more that should be considered when training a teacher (Munix, 2012). Recent studies not only show that the ability to think critically determines the academic achievements of the students, but also refute the established belief that international students from China lack this ability (Wu, 2020). The problem is that students with different levels of language proficiency and sociocultural intelligence absurd the learning content differently. The way they make critical and reflective judgments is also important. Hence, one can assume that sociocultural factors play an important role in multilingual and intercultural education and that there is a need to exploit dialogic pedagogy to build a constructive discussion over critical thinking and its place in education (Munix, 2012). Drawing on McIntyre’s concept of rationality, the research into the conceptions and practices of critical thinking in Chinese institutions of education indicates that the educational reforms in China focused on the promotion of critical thinking and that high-stakes assessments and prevailing socio-cultural values gave rise to certain challenges (Tan, 2020). The definitions and applications of critical thinking were reported to heavily depend on socially embodied and historically contingent traditions, which manifests in an exam-oriented system, an emphasis on didactic learning, the centrality of textbooks, a non-confrontational view of critical thinking, and a hierarchical relationship between the teacher and student (Tan, 2020).

In the search for answers to why international students from China do not have (or rather do not demonstrate) critical thinking skills when studying abroad, it was found that some components of critical thinking could be seen in ancient Chinese culture (Tian & Low, 2011). Scholars argue that the stringent regulation of higher education curricula by the state in China is one of the main obstacles to the development of independent and critical thinking in students, especially in the arts, humanities and social sciences (Zhang, 2017).

Among other things, researchers investigate the impact of second language acquisition on the cognitive function (Weyman, Shake, & Redifer, 2020). Findings show that the predictor of differences in the academic performance of students when learning a second language is the native language effect (Figueiredo, Alves Martins & Redifer, 2020). Associated with the variation in semantic and grammatical processing (Grüter, Lau, & Ling, 2020), these conclusions can serve as confirmation of the idea that psychophysical mechanisms of language perception, those associated with interhemispheric asymmetry, have some kind of effect on how well a student learns a language.

There is a belief that oral language is a speciality of the biological system, since the ability to acquire a language is innate and develops according to the Darwinian principle, whereas written language is neither innate nor biological; in fact, it is an artifact and a surrogate of speech (Aaron & Joshi, 2006). That being said, the written language is an independent system that is equivalent to the spoken language (Aaron & Joshi, 2006). Biolinguistics defines language as an innate and species-specific product of biological adaptation. Similar to spoken language, written language has adaptive value, evolved over time, and is relatively independent of spoken language (Aaron & Joshi, 2006). The evidence for this statement comes from the study of Egyptian hieroglyphic writing (Aaron & Joshi, 2006). Note that the Chinese written language is hieroglyphic too and therefore the above statement is also relevant to Chinese. As an independent manifestation of the human endowment, the written language cannot be considered as a substitute for speech and must be given an equal importance as elements of spoken language for that matter (Aaron & Joshi, 2006). The latest findings contribute empirical support for the neural models of bilingualism, due to its heterogeneous nature and the lack of consistency in the methods used for the analysis of the brain imaging data (García-Pentón, Fernandez Garcia, Costello, Dunaibetía, & Carreiras, 2016). What is interesting is that bilingual people activate information about both languages when using one language alone (Kroll & Bialystok, 2013). Parallel activation of two languages has been seen in both highly proficient bilinguals and second language learners (Kroll & Bialystok, 2013). The advantages of bilingualism manifest in the cognitive sphere. Namely, bilinguals are better than monolinguals at tasks that require ignoring irrelevant information, task switching, and resolving conflicts. The adult mind and brain are open to experience in ways that create profound consequences for both language and cognition (Kroll & Bialystok, 2013).

2. Materials and methods

2.1. Population and instruments

The study was conducted in the Chongqing University of Posts and Telecommunications, China, a university that promotes internationalization. The University has recently launched three Sino-foreign cooperation projects and a bulk of courses in Teaching Chinese as a Second Language alongside courses dealing with Chinese language, Chinese history, Chinese culture, and international relations, compulsory or optional. The sample of respondents was formed by randomization in accordance with the international standard (ISO 24153: 2009 "Random sampling and randomization procedures"), IDT, which contributed to an increase in the reliability of the experimental results and provided the possibility of using statistical methods for their processing.
2.2. Description of statistical analysis methods

The research materials were statistically processed using the methods of parametric and nonparametric analysis. The accumulation, correction, systematization of the initial information and visualization of the results were carried out in Microsoft Office Excel 2016 spreadsheets. Statistical analysis was carried out using the IBM SPSS Statistics v.26 program (developed by IBM Corporation). When comparing the mean values in normally distributed sets of quantitative data, the Student’s t-test was calculated. The obtained values of the Student’s t-test were evaluated by comparison with the critical values. Differences in indicators were considered statistically significant at a significance level of $p < 0.05$. As an indicator of the closeness of the relationship between quantitative indicators $x$ and $y$, the correlation coefficient was used, the values of which were interpreted in accordance with the Chaddock scale (Table 1).

This study involved establishing two groups of respondents using the randomization method: 233 international students learning Chinese remotely and 214 international students from other faculties who took remote lessons in their native language. While the first group was engaged in intensive language learning following their curriculum, the second group received a specially designed online course aimed at fostering critical thinking. Student progress was assessed twice, at the beginning of the study and three months later, at the end of the study, using the validated HEIghten® Critical Thinking Assessment suite, a widely used method of critical thinking evaluation in the world. The tests offered to respondents were in their native language (HEIghten, 2021).

The HEIghten® Critical Thinking Assessment addresses two central aspects of critical thinking, analytical and synthetic. The assessment of analytical skills involves evaluating evidence and its use, whilst the assessment of synthetic skills is concerned with the understanding of the consequences, identification of unspoken conclusions that go beyond the original argument, and development of arguments based on strong evidence. Some questions, as part of assessing analytical or synthetic skills, also assessed skills in evaluating statements or drawing conclusions about causations (HEIghten, 2021).

Online critical thinking course consists of drills and brain teasers such as riddles, tasks aimed at discovering antinomies, true or false quizzes, and logical reasoning tasks aimed at identifying sequences and missing items.

2.3. Study design

The critical thinking research process involves several stages. The first stage involves determining the relevance of the research topic and defining the research goals and objectives. The second stage concentrates on literature review to find out how critical thinking evolves through foreign language learning. The third stage consists of selecting a valid methodology to meet the goal and objectives of the study and establishing the groups of respondents. The HEIghten Critical Thinking assessment took place at stage four, followed by the processing of statistical data using an online calculator at stage five. The final stage in the research process involves hypothesis testing and drawing conclusions.

2.4. Ethics

The anonymity of each respondent was achieved by encrypting the questionnaires and not requiring respondents to provide their passport details. No regard was given to gender and age; attention was exclusively paid to participation in Chinese language (group 1) and critical thinking programs (group 2).

2.5. Limitations

The limitations of this study are associated with the challenges arising during the formation of a second group of respondents. There was a need to motivate students to participate in psychological testing and additional online classes and explain them the importance of critical thinking. The first group was not assigned to additional classes, so it was easier to stimulate students to enter this group. It was also a failure to ensure the 100% participation in the second test, as some students refused further participation at different stages of the study. Of 500 respondents (250 per group) enrolled into the study, 233 in the first group and 214 in the second group completed the second test.

The aim and objectives of the study were also a limiting factor, since the focus was exclusively on the level of critical thinking in international students learning Chinese. Since the data of scientific literature indicate the difficulties of forming critical thinking in Chinese students (Bali, 2015), from the point of view of psycholinguistics it would be interesting to continue research with Chinese students studying their native and foreign languages. In addition, future studies can involve international students learning things
other than Chinese language and who do not take the critical thinking courses.

3. Results

The primary level of critical thinking (high, medium, and low) in first-year students was assessed before the beginning of the first semester. Thus, the first group has not yet started learning the Chinese language and the second group has not yet started training the critical thinking. During the semester: the first group followed the established Chinese language curriculum, and the second group received additional critical thinking lessons twice a week. At the end of the semester (three months after the first assessment), both groups were given a second critical thinking test. The results are summarized in Table 2.

Based on the results of critical thinking assessment (Table 2), it can be concluded that learning a Chinese language enhances critical thinking in learners. For comparison, the same assessment was performed in the second group where students were additionally engaged in critical thinking activity online. The results are presented in Table 3.

Data in Table 3 above show that participation in an online training program on critical thinking has a statistically reliable positive effect on the level of critical thinking in international students who study remotely in their native language and do not study Chinese as their second language. The comparison between groups is given in Tables 4 and 5.

The baseline statistics show very small differences between groups. At the same time, the frequency of both high and medium levels of critical thinking was slightly higher in the second group, whilst the frequency of low critical thinking in both groups was almost the same. Thus, the primary data indicate the comparability of the studied groups in terms of critical thinking ability, which confirms the initial null hypothesis that online Chinese language teaching contributes to the development of students' critical thinking to the same extent as in other forms of education. Table 5 presents the results of the second critical thinking assessment conducted three months after baseline.

As it can be seen from Table 5 above, the levels of critical thinking in the second group at three months after baseline were statistically significantly higher as compared to the first group of respondents who did not received additional training for critical thinking. This pattern suggests that targeted learning along with the absence of language barriers contributes to statistically greater frequency of high and medium levels of critical thinking among learners in language learning programs that do not have critical thinking as their major goal. Nevertheless, both groups demonstrate strong progress, as evidenced by Fig. 1.

Another interesting observation is that the predominant share of improvements in the second group are associated with a shift to a high level of critical thinking, while in the first group, they largely relate to the medium-level skills. At the same time, both groups demonstrate a significant decrease in the number of low-level students. Even though the percentage of low-level critical thinkers in the second group remained two times lower than in the first group, the portion of low-level critical thinkers in both groups did not exceed 5 percentage points after training, with the baseline of more than 20%. The between-group difference in this case is not significant. In this study, we proceed from the null hypothesis that the development of critical thinking in foreign students studying Chinese at a distance does not differ from the level of development of critical thinking in other subjects.

4. Discussion

Extrapolation of present findings to the existing data gives rise to a question, 'What exactly enhanced the development of critical thinking in international Chinese language learners if native Chinese speakers themselves, according to many authors (Bali, 2015; Floyd, 2011; Mason, 2007), do not demonstrate high levels of critical thinking?' Some researchers associate the problems of critical thinking development in Easterners with cultural traditions, features of a curriculum, and even ideological attitudes (Mulnix, 2012; Zhang, 2017). In our opinion, the answer might lie somewhere near the psychophysiological domain, which aligns with the opinion of other researchers (Aaron & Joshi, 2016; Ritter et al., 2020). Critical thinking in Western sense is an analogue of logical thinking, ruled by the left hemisphere of the brain. In other words, European languages and critical thinking share the same psychophysiological grounds. The Chinese language, on the other hand, similarly to some other Eastern languages, is based on hieroglyphic writing, a system that employs characters in the form of pictures and is processed in the right hemisphere. Therefore, thinking in Chinese language, or hieroglyphically, has no direct correlation with logical thinking, or critical thinking in Western sense. An increase in the level of critical thinking among international students learning Chinese may be associated with the stimulation of both hemispheres (Kroll & Bialystok, 2013), as the native (European) language is based in the left hemisphere and the Chinese language is based in the right hemisphere. In addition, as ‘left-hemisphere’ thinkers, international students were able to master Chinese writing thanks to the

### Table 2

| Level of Critical Thinking | Baseline | After training | t-statistic | p |
|----------------------------|----------|---------------|-------------|---|
|                            | Frequency | %            | Frequency   | %  |
| High                       | 37       | 15.9         | 86          | 36.9 | 13.092 | <0.05 |
| Medium                     | 138      | 59.2         | 136         | 58.4 |           |       |
| Low                        | 58       | 24.9         | 11          | 4.7  |          |       |
| Total                      | 233      | 100          | 233         | 100  |          |       |
| Correlation coefficient    | 0.500    |              |             |      |          | <0.05 |
understanding of the rules for writing Chinese characters rather than through holistic imaginative perception. According to the results of the present study, this way of learning can facilitate the development of their critical thinking skills and abilities to draw conclusions.

The conclusion drawn above may seem controversial and thus will require further, more in-depth research, yet one can confidently

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**Table 3**

Critical Thinking Skills in International Students Engaged in Classes Other Than Chinese Language and Spending Extra Hours Training Critical Thinking Skills (Group 2).

| Level of Critical Thinking | Group 2 | t-statistic | p |
|---------------------------|---------|-------------|---|
|                           | Baseline | After training |     |
| Frequency | % | Frequency | % |
| High     | 35 | 16.4 | 91 | 42.5 | 15.968 | <0.05 |
| Medium   | 126 | 58.9 | 117 | 54.8 |         |       |
| Low      | 53 | 24.7 | 6 | 2.8 |         |       |
| Total    | 214 | 100 | 214 | 100 |         |       |
| Correlation coefficient | 0.500 | | | | | <0.05 |

**Table 4**

Baseline Levels of Critical Thinking (Group 1 vs Group 2).

| Level of Critical Thinking | Group 1 | Group 2 | t-statistic | p |
|---------------------------|---------|---------|-------------|---|
|                           | Frequency | % | Frequency | % | | |
| High                      | 37 | 15.9 | 35 | 54.4 | 3.54 | <0.05 |
| Medium                    | 138 | 59.2 | 126 | 58.9 | 2.12 | <0.05 |
| Low                       | 58 | 24.9 | 53 | 24.7 | 1.41 | >0.05 |
| Total                     | 233 | 100 | 214 | 100 |         |       |

**Table 5**

The Levels of Critical Thinking after Training (Group 1 vs Group 2).

| Level of Critical Thinking | Group 1 | Group 2 | t-statistic | p |
|---------------------------|---------|---------|-------------|---|
|                           | Frequency | % | Frequency | % | | |
| High                      | 86 | 36.9 | 91 | 42.5 | 39.60 | <0.05 |
| Medium                    | 136 | 58.4 | 127 | 54.8 | 25.46 | <0.05 |
| Low                       | 11 | 4.7 | 6 | 2.8 | 13.44 | <0.05 |
| Total                     | 233 | 100 | 214 | 100 |         |       |

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**Fig. 1.** Levels of Critical Thinking in International Students Learning Chinese Language (1-3) or Engaged in Other Areas (4-6): blue column — baseline; red column — after training; 1 and 4 — high level; 2 and 5 — medium level; 3 and 6 — low level (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article).
assert that not only does learning a Chinese language not hinder the development of critical thinking in international students, but it also enhances it. The belief that Chinese speakers have a low level of critical thinking is false, as indicated by multiple researchers, and associated with the fact that the existing psychodiagnostic methods do not consider the psychophysiological differences that exist between ethnic groups. Future research should focus more on exploring the psychophysiological predictors of critical thinking and developing valid psychodiagnostic techniques with regard to racial and ethnic characteristics of the psychophysiological mechanisms of cognition. Accordingly, the learning programs and training curricula aimed at critical thinking development must take into account the psychophysiology of learning.

5. Conclusions

The present study confirms the null hypothesis that online learning of Chinese by foreign students affects their development of critical thinking in the same way as other subjects. Findings on critical thinking ability of Chinese language learners are comparable to those obtained for students who did not learn Chinese, as evidenced by a fourfold decrease in the amount of low-level critical thinkers after baseline in both groups. Presumably, the development of critical thinking has a psychophysiological basis. In this case, European languages and critical thinking share the same psychophysiological mechanisms, and the Chinese hieroglyphic writing is processed more in the right hemisphere that is not responsible for logical thinking, or critical thinking in Western sense.

The improvement of critical thinking in international Chinese language learners may stem from the stimulation of both hemispheres of the brain. In this context, the progress is due to the understanding of the rules for writing Chinese characters rather than holistic imaginative perception. The present findings also indicate the falseness of the belief that Chinese speakers have a low level of critical thinking.

The novelty of the obtained results lies in the empirical evidence of the positive influence of online Chinese language learning on the development of critical thinking, which is an unambiguous answer to the conflicting data in the scientific literature. Despite the fact that the study of the problem of the development of critical thinking in students is a long and comprehensively studied problem, the influence of studying the Chinese language on the formation of this competence, which is especially relevant today, was questioned. Nor could we find convincing data on the formation of critical thinking in students when using online Chinese language teaching. Our research clarifies this issue and proves not only the importance of the Chinese language for the development of critical thinking, but also the equal effectiveness of online learning in comparison with other forms of it.

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Data availability

Data will be available on request.

CRediT authorship contribution statement

Zhenzhen Li: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing - original draft, Writing - review & editing.

Declaration of Competing Interest

This research has no competing interests.

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