Current situation of information literacy of regional college teachers and improvement strategies in the age of “Internet+”

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Abstract. “Internet + higher education” provides a vital opportunity for educational reforms. How to integrate information technology with teaching practices, how to improve information literacy have become a challenge for college teachers. This paper discusses the definition and components of information literacy for college teachers, analyzes the current situation and defects of college teachers’ information literacy in the age of “Internet+”, and makes case studies on G College. On that basis, this paper proposes suggestions to improve college teachers’ information literacy in the “Internet+” age: on the individual level, teachers should rely on the Internet training community to seek progress in cooperation and interaction; on the organizational level, colleges should promote upgrading of the college teachers development center, and make full use of the Internet and big data technology to optimize the training mode; on the environment level, colleges should face “Internet+” positively and provide a supporting environment.

1. Introduction
As big data and Internet technology find their way into college education, “Internet+ higher education” provides a vital chance for educational reforms. New teaching modes like MOOC, Micro course and flipped classroom are beginning to inject vitality to traditional classes. New teaching modes, new evaluation methods and new teacher-student relationship pose new requirements for professional expertise of college teachers. In terms of policies, “Education Informatization ‘13th Five-Year’ Plan” and the subsequent “Education Informatization 2.0 Action Plan” released by the Ministry of Education point out that teachers should adapt to new technology reforms in information technology and AI, and improve their information literacy. Under this situation, how to adapt to the national strategies and educational reform, how to integrate information technology with teaching practice, and how to improve information literacy has become a major challenge for college teachers.

2. Definition and components of college teachers’ information literacy
In general, information literacy refers to people’s ability to use information technology and skills to solve problems in practice. As time moves ahead, the definition and connotation of information literacy are expanded and enriched. It has transformed from the ability to acquire, process and release information to an all-round ability to acquire, evaluation, internalize, use and transmit information. For college teachers, due to the influence of their profession, information literacy for them has unique characteristics, and has close connection with teaching philosophy, teaching skills, curriculum design, teaching assessment and teacher-student interaction. To be specific, college teachers should uphold the idea that “the students are the active acquirers of information knowledge and technology”; regarding
new technology, they should be brave to absorb new technology and new ideas; when teaching students, they should make full use of information technology, integrate information technology into course design and teaching activities, and internalize it as one of their teaching skills; in teaching assessment, college teachers should diversify the ways of works sharing and interaction via information technology; in terms of teacher-student interaction, teachers should carry out multi-channel interaction with students both online and offline to extend teacher-student interaction from class to outside the classroom [1]. Researchers have made further analysis on the structure of college teachers’ information literacy. Representative studies conclude that teachers’ information literacy consists of four aspects: information awareness, information knowledge, and information ability and information ethics; each aspect has secondary indicators, as shown in Figure 1 [2].

![Figure 1. College teachers' information literacy structure.](image)

3. Current situation and defects of college teachers’ information literacy in the age of “Internet+”

3.1. Analysis of existing studies
Research on college teachers’ information literacy is no longer something new. Based on research materials and data, researchers have made studies on the current situation and defects of college teachers’ information literacy from different perspectives. By sorting these studies, this paper concludes that college teachers’ information literacy is manifested in the following aspects:

First is information awareness. College teachers are fully aware of the importance of information technology in education, willing to learn information technology actively, and able to solve problems by retrieving and using information. The second aspect is information knowledge. College teachers have certain levels of information knowledge and can effectively acquire information and make rational judgement of information. However, previous studies show that most teachers lack in-depth understanding or the ability to re-process information and data [3]. The third aspect is knowledge application. Most teachers have not received professional or systematic information education, and thus are not proficient in using information software or data software. A survey reveals that more than half of teachers in schools consider their ability in computer, network and statistics “ordinary”, and are worst at data statistics and analytics [2]. The fourth aspect is information ethics. College teachers usually abide by academic ethics and respect others’ achievement in information utilization.

3.2. Case study: investigation of teachers’ information literacy in College G
To have a more accurate understanding of teachers’ information literacy, this paper made a case study on College G. We distributed 200 questionnaires and 178 pieces were returned, among which 165 were valid and the effective rate is 92.7%. To ensure the investigation result is scientific, seven
secondary teaching units at College G were involved in the case study, and the School of Computer Science was excluded. Besides, considering the teachers’ characteristics including age, position and years of teaching, layered sampling was carried out among teachers in secondary units during distribution of questionnaires to ensure that the selected sample of teachers could reflect the general characteristics of all teachers. Due to the limited length of the paper, the questionnaire design process, credibility and validity are not discussed here. The analysis result is as follows.

On the information awareness level, almost all teachers hold the same attitude towards information technology and information utilization, and think that information technology plays a vital role in professional growth, teaching and research. Nearly all teachers use information tools in teaching and hope to improve their skills in using information technology. On the information knowledge level, most teachers know the theories and methods for information technology, can acquire effective information and make distinction. Regarding the two questions for “computer application software knowledge” and “fundamental knowledge of information retrieval”, most teachers select “generally understand”, and the proportions of teachers that select “do not know much” for the two questions are 10.9% and 17%, respectively. Meanwhile, we found that regarding information knowledge utilization creation, only 37.6% of the teachers can make in-depth analysis of the acquired information resources. On the information ability level, most teachers rely on traditional measures like the blackboard, PPT and videos, and few use the new teaching measures like Micro course or MOOC or Flipped classroom, as shown in Table 1. In terms of utilization of information tools, most teachers are good at Office Suite, but not familiar with Mindjet Manager, Focusky, and screen recording software. In terms of information communication, 73% of the teachers are capable of using online platforms and software to communicate with students, and can use data analysis tools to assist and evaluate teaching, but 27% of the teachers ticked “not skilled” on the questionnaire. In terms of information ethics, due to impacts of academic regulations, nearly all teachers indicate that they can abide by regulations when using information and respect others’ fruits of labor and intellectual property.

| Teaching methods (multiple choices)                                      | The proportion |
|------------------------------------------------------------------------|----------------|
| Use traditional blackboard                                            | 89.7%          |
| Use multimedia courseware such as PPT and video                        | 98.8%          |
| Use online courses (such as MOOCs, boutique courses, etc.)             | 58.1%          |
| Utilize digital teaching resources (teaching resource library)         | 78.8%          |
| Use flip classroom or blended instruction                               | 33.9%          |

To sum up, college teachers are excellent in terms of information awareness and information ethics, but need improvement in terms of information processing, information technology knowledge, utilization of new information tools and information communication, and they cannot make flexible use of information technology in course design and teaching management. These aspects are what college teachers should improve.

4. Strategies to improve college teachers’ information literacy in the “Internet+” age

4.1. Individual level: teachers should depend on the Internet training community and seek growth in cooperation and communication

In the “Internet+” age, college teachers should develop toward the direction of openness and cooperation to improve their professional expertise. In face of a sea of Internet teaching resources, it is difficult for any teacher alone to acquire required information accurately and on time. Only by cooperating with others can they fulfill teaching tasks efficiently.

Moreover, the fast growing information technology has provided many platforms and channels for teachers to communicate and cooperate, and teachers have more diverse ways to cooperate with each
other. College teachers can build an online training community via cloud platforms, mobile apps, WeChat groups or QQ groups, and communicate with each other online via this community to share quality teaching resources and operation techniques of information technology, discuss problems they meet in informatized teaching practice. In this way, they can create a continuous and benevolent mode of interaction and communication, and seek progress together. In addition, in group work, teachers can learn from excellent colleagues some new information knowledge and technology, improve their skills in informatized teaching. Furthermore, teachers can play an active role in contests of course design, micro-course teaching and informatized teaching, which will not only facilitate communication with other teachers, but improve their own information literacy.

4.2. Organizational level: colleges should promote teacher development-centered transformation and use Internet and big data technology to optimize the training mode

The college teacher development center is an important organization to promote teachers’ development. With the integration of Internet and higher education, the teacher development center faces new challenges in upgrading and transformation. In the age of “Internet+”, colleges should keep up with the time, develop integrated big data platforms to integrate teacher training modules. College teacher development centers should integrate online and offline teacher development programs, promote sharing of information resources, strengthen interaction and communication [4].

Moreover, college teacher development centers should make use of the Internet and big data technology to optimize the training mode, and strengthen the training system of teachers’ information literacy. Due to limitation in technology and policies, the traditional training mode does not perform well in combining the training content with the teachers’ expertise, or in combining the training methods with the teachers’ demand. The result is that the training is not practical, focuses more on theories than on practice, and fails to meet the teachers’ needs in the information age. Therefore, colleges should admit the defects, make use of big data platforms and data analysis technology, and optimize training plans, content, methods and services. Regarding the training content, colleges can collect data on professional information, training needs and study preferences via data platforms, open targeted courses on the basis of surveys, and make adjustment according to feedbacks. In terms of training methods, college should combine online activities with offline methods to provide teachers with more choices, and push messages on training via mobile, email and WeChat, improve the quality of training.

4.3. Environment level: colleges should have a positive attitude towards “Internet+” and provide supportive conditions

Improvement of college teachers’ information literacy requires not only the teachers’ individual efforts, but also supportive conditions. On one hand, colleges take a positive attitude towards the influence of “Internet+ higher education”, be brave to lead educational reforms, and speed up the informatization process of colleges from the level of top design. For instance, they can design incentive mechanisms. Colleges can design relevant rewarding policies or set up specific program funds to reward teachers with outstanding achievements in informatized teaching, and promote their information literacy. On the other hand, improving college teachers’ information literacy needs a well-organized teaching service system. Currently, many colleges suffer from a shortage of teachers and the teaching faculty are overwhelmed by onerous teaching and research tasks. College teachers do not have enough time and energy to improve their information literacy in teaching. Thus, colleges should combine the informatization initiatives with the teachers’ actual conditions, build an information service team, provide information teaching and research service for teachers, and allow the “Internet +” technology be a driving force for improvement of teachers’ information literacy.
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