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Knowledge, Skills and Attitudes of Chinese University Teachers in Digital Applications

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Abstract: This study explores the knowledge, skills and attitudes of Chinese university teachers in digital adoption. The study is conducted from various aspects, including respondents' profiles, knowledge levels, skills, attitudes, and challenges they face in improving their digital application capabilities, with the aim of identifying areas for improvement. In addition, differences in assessment will be explored based on the respondents' profiles, which will help to gain insights into the perceptions of Chinese university teachers on digital adoption. Ultimately, based on the findings, the study aims to propose a robust Digital Application Capability Training Program (DACTP), for Chinese university teachers. The training program will serve as a practical guide for educators, provide valuable insights for comprehensively improving teachers' digital application competence, and provide data support for China's education reform and innovation, as well as for improving education quality and efficiency.

Keywords: Chinese University Teachers; Digital Applications; Knowledge; Skills; Attitudes.

1. Introduction

Digital applications are broad terms that refer to any application software that can be used by a computer, mobile device, or tablet to perform useful tasks. The applications have specific functions and can be accessed from any computer with internet connections.

In China, digital education has received widespread attention and promotion. In recent years, significant progress has been made in the digital application of Chinese university teachers. Many universities have established their own digital teaching platforms, such as Chinese University MOOC and Tsinghua University's XuetangX, offering online courses and learning resources that have attracted a large number of students and teachers. Chinese universities have also launched their own digital teaching platforms and online courses. Digital teaching has been widely used in Chinese universities, including online courses, blended teaching, virtual laboratories, etc. Through digital technology and tools, teachers can engage in activities such as online teaching, assignment grading, and sharing learning resources, thereby improving teaching effectiveness and student engagement. Despite the achievements in digital application in Chinese universities, there are still challenges such as technological barriers, insufficient digital teaching capabilities of teachers, low student engagement, the need for improvement in teaching content and evaluation methods, and limited digital collaborative education.

The integration of digital technology into education has transformed the teaching and learning landscape worldwide. Chinese universities have been no exception to this global trend, as educators increasingly adopt digital applications in their teaching practices. To address these questions, a comprehensive survey and data analysis are carried out. The respondents' profiles provide insight into the demographics and experience of Chinese university teachers. Their knowledge and skills in digital applications are assessed to gauge their competence in this field. Furthermore, their attitudes towards digital application are examined, shedding light on their perceptions and beliefs regarding its impact on education. It will have a positive impact on educational reform and innovation, improving educational quality and efficiency.

2. The Statement of the Problem

This study aims to assess the Chinese university teachers' knowledge, skills and attitudes toward digital applications wth the end result of the Digital Aplication Capability Training Program (DACTP). Specially, it seeks answers to the fllowing questions:

1.What is the proflile of the respondents in terms of:
1.1 Age
1.2 Sex
1.3 Highest Educational Atainment
1.4 Field of Specialization
1.5 Years of Teaching Experience?

2.What is the level of knowedge of the respondents on digital apications in terms of:
2.1:Basic concepts
2.2 Online productivity tools used in education
2.3 Educational technology
2.4 Technological tools

3.How do the respondents assess their siklls in digital applicatio with regard to:
3.1 Application of basic concepts
3.2 Use of online productivity tools
3.3 Use of education technologies
3.4 Use of technological tools

4.What are the attitudes of the respondents on the digital application as regards:
4.1 Improve learning experience
4.2 Improve teaching experience
4.3 Avantages in teaching-learning process
4.4 Technological concerns

5.How do the respondents' knowledge, sills and attitudes on digital aplicatins compare when grouped according to their profile?

6.What are the challenges encountered by the respondents

in enhancing their knowledge, skills and atitudes toward digital applications?

7.Based on the findings of the study, what Digital Application Capability Training Program (DACTP) may be recommended?

3. Presentation, Analysis and Interpretation of Data

3.1. Profile of the Respondents

Table 1. Profile of the Respondents

Profile	Frequency	Percentage
Age		
21 – 30 years old	58	19
31 – 40 years old	103	34
41 – 50 years old	84	28
51 years old and above	55	18
Total	**300**	**100**
Sex		
Male	153	51
Female	147	49
Total	**300**	**100**
Highest Educational Attainment		
Bachelor's Degree	48	16
Master's Degree	169	56
Doctorate Degree	83	28
Total	**300**	**100**
Field of Specialization		
Philosophy	67	22
Education	72	24
Science	102	34
Medical	59	20
Total	**300**	**100**
Years of Teaching Experience		
0 – 5 years	70	23
6 – 10 years	100	33
11 – 15 years	71	24
16 – 20 years	31	10
21 years and above	28	9
Total	**300**	**100**

Table 1 displays the profile of the teacher respondents, such as age, sex, highest educational attainment, field of specialization, and years of teaching experience. With regards to age, the majority of the teacher respondents are in the age group of 31-40 years old, with a frequency of 103, or 34%. The least age group were from 51 years and above, with a frequency of 55 or 18%. As for the sex, a minimal proportion of the male teacher respondents had a frequency of 153, or 51%. The female teacher respondents had a frequency of 147, or 49%. In relation to the highest educational attainment, most of the teacher respondents finished master's degree with a frequency of 169, or 56%, followed by doctorate degree with a frequency of 83, or 28%, and, following that, bachelor's degree with a frequency of 48, or 16%. In reference to the field of specialization, most of the respondents specialized in the teaching of science, with a frequency of 102, or 34%. The least from a specialized field is medical, with a frequency of 59, or 20%. With respect to the years of teaching experience, the majority of the teacher respondents are in the range of 6-10 years of teaching experience, with a frequency of 100, or 33%. The least number of respondents but the longest experienced are from the group 21 years and older in the industry, with a frequency of 28, or 9%.

3.2. Respondents' Assessment of Their Level of Knowledge in Digital Applications

Table 2. Summary of the Respondents' Assessment of Their Level of Knowledge in Digital Applications

Indicator	Mean	SD	VI
2.1 Basic Concepts on Digital Applications	3.27	.698	K
2.2 Online Productivity Tools Used in Education	3.29	.687	K
2.3 Educational Technology	3.22	.776	K
2.4 Technological Tools	3.24	.751	K
Overall	**3.25**	**.702**	**K**

Legend: 3.50 – 4.00 Highly Knowledgeable (HK); 2.50 – 3.49 Knowledgeable (K); 1.50 – 2.49 Less Knowledgeable (LK), 1.00 – 1.49 Not Knowledgeable (NK)

Table 2 discloses the summary table of the respondents' assessment of their level of knowledge in digital applications. The respondents are knowledgeable in teaching digital applications, with an overall mean of 3.25 and a standard deviation of .702. Among the different indicators on digital applications, the highest were online productivity tools used in education (M = 3.29, SD = .687), followed by basic concepts on digital applications (M = 3.27, SD = .698), technological tools (M = 3.24, SD = .751) and educational technology (M = 3.22, SD = .776).

3.3. Respondents' Assessment of Their Skills in Digital Applications

Table 3. Summary of the Respondents' Assessment of Their Skills in Digital Applications

Indicator	Mean	SD	VI
3.1 Application of Basic Concepts	3.22	.775	AA
3.2 Use of Online Productivity Tools	3.28	.685	AA
3.3 Use of Education Technologies	3.22	.736	AA
3.4 Use of Technological Tools	3.26	.705	AA
Overall	**3.24**	**.700**	**AA**

Legend: 3.50 – 4.00 Excellent (E); 2.50 – 3.49 Above Average (AA); 1.50 – 2.49 Average (A), 1.00 – 1.49 Below Average (BA)

Table 3 reveals the summary table of the respondents' assessment of their skills in digital applications. The teacher respondents have been confident that their teacher skills were above average in digital applications, as visible by an overall mean of 3.24 and a standard deviation of .700. Between the different program tools, the highest were use of online productivity tools (M = 3.28, SD = .685), use of technological tools (M = 3.26, SD = .705), application of basic concepts (M = 3.22, SD = .775) and use of education technologies (M = 3.22, SD = .736).

3.4. Respondents' Assessment of Their Attitudes on Digital Applications

Table 4 reveals the summary table of the respondents' assessment of their attitudes toward digital applications. Perhaps, the teacher respondents believed that the educator's attitudes toward digital applications were well considerable and predominantly agreed, as evident by an overall mean of 3.26 and a standard deviation of .675. Among the different

indicators, the highest were improve learning experience (M = 3.27, SD = .712) and followed by improve teaching experience (M = 3.25, SD = .702), teaching-learning process (M = 3.25, SD = .707) and technological concerns (M = 3.25, SD = .693).

Table 4. Summary of the Respondents' Assessment of Their Attitudes on Digital Applications

Indicator	Mean	SD	VI
4.1 Improve Learning Experience	3.27	.712	A
4.2 Improve Teaching Experience	3.25	.702	A
4.3 Teaching-learning Process	3.25	.707	A
4.4 Technological Concerns	3.25	.693	A
Overall	**3.26**	**.675**	**A**

Legend: 3.50 – 4.00 Strongly Agree (SA); 2.50 – 3.49 Agree (A); 1.50 – 2.49 Disagree (D), 1.00 – 1.49 Strongly Disagree (SD)

3.5. Comparison of the Respondents Level of Knowledge on Digital Application When Group According to Their Profile

Table 5 depicts the comparison of the respondents' level of knowledge on digital applications when grouped according to age. Based on the results, there is no significant difference between the age of the teacher respondents and online productivity tools used in education (F = .294, p = .830), technological tools (F = .212, p = .888), basic concepts on digital application (F = .035, p = .991) and educational technology (F = .013, p = .998). Therefore, the null hypothesis is failed to reject. This means that there is no evidence that the age of the respondents makes a significant difference in the assessment of dimensions such as online productivity tools, technological tools, digital applications and educational technology used in education.

Table 5. Comparison of the Respondents Level of Knowledge on Digital Application When Group According to Their Age

Items Considered	Age	Mean	SD	*F*-value	*p*-value	Interpretation	Decision on H_o
Application of Basic Concepts	21-30 yrs. old	3.23	.741	.026	.994	Not Significant	Failed to Reject H_o
	31-40 yrs. old	3.23	.776				
	41-50 yrs. old	3.21	.778				
	51 yrs. old and above	3.20	.825				
Use of Online Productivity Tools	21-30 yrs. old	3.27	.704	.045	.987	Not Significant	Failed to Reject H_o
	31-40 yrs. old	3.27	.652				
	41-50 yrs. old	3.30	.692				
	51 yrs. old and above	3.29	.733				
Use of Education Technologies	21-30 yrs. old	3.21	.706	.117	.950	Not Significant	Failed to Reject H_o
	31-40 yrs. old	3.25	.739				
	41-50 yrs. old	3.19	.753				
	51 yrs. old and above	3.22	.754				
Use of Technological Tools	21-30 yrs. old	3.29	.687	.044	.988	Not Significant	Failed to Reject H_o
	31-40 yrs. old	3.25	.703				
	41-50 yrs. old	3.25	.704				
	51 yrs. old and above	3.26	.749				

4. Conclusion

1) The profile of the respondents showed a diverse demographic composition with a large proportion (34%) aged between 31-40 years. The majority of the respondents had a master's degree (56%) and a significant proportion (33%) had 6-10 years of teaching experience.

2). In terms of respondents' knowledge and assessment of digital applications, the study concluded that teaching is characterized by a high level of teachers' basic knowledge of digital applications. In addition, online productivity tools and technology tools and educational technology used in education were also considered higher than average, which indicates the importance of digital applications in teaching and learning.

3) The Comparison of respondents' Assessment of digital applications in teaching and learning based on different

demographic characteristics shows insignificant differences in the level of digital applications. This implies that different age groups, genders, educational backgrounds, and teaching experiences have limited influence on the assessment of digital applications.

4) The Concerns Encountered by university teachers in specific digital applications highlight the complexity of their application. It requires a nuanced approach that includes factors such as enhanced training, breaking down resource and technology barriers, deeper integration of teaching and technology, communication and collaboration, time management, and effective assessment strategies.

5) The proposed roadmap for Digital Application Training Program for university teachers. By understanding the needs of digital teaching and learning, strengthening teamwork and using a variety of digital resources, university teachers can create engaging teaching activities, provide necessary support, guide digital teaching and provide personalized guidance on digital applications, while integrating assessment methods.

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