ISSN 2663-8169 Vol. 5, Issue 23: 115-119, DOI: 10.25236/IJNDE.2023.052320

Evaluation of Teachers' Information Technology Teaching Competencies in Higher Vocational College towards Enhancement of Their Technological Skills

Pan Luo[1,2,*]

[1]*Sichuan Technology & Business College, Chengdu, China*
[2]*Adamson University, Manila, Philippines*
[*]*Corresponding author*

Abstract: *Under the background of informationization, the regional economic and social development is in urgent need of technical and skilled talents with strong information literacy and competence, and the informatization teaching ability of higher vocational teachers is a key factor in improving the quality of talent training. The findings show that teachers in vocational colleges and universities exhibit significant levels of information literacy and pedagogical integration, which constitute the technological cornerstone of teaching practice. Communication and collaboration skills played a key role in instructional improvement, while research and innovation represented the highest pursuit of teacher development. However, in terms of resource preparation, there is a need for targeted training and support for teachers and enhanced infrastructure provision for effective integration of technology. The critical importance of integrating research into instructional technology underscores the need for continuous professional development for teachers. It is also crucial to provide students with advanced digital tools to facilitate better collaboration and communication, while fostering critical and creative thinking through design thinking approaches.*

Keywords: *higher vocational college, teachers' information technology, evaluation, enhancement*

1. Introduction

At present, the development of new technologies such as big data, artificial intelligence, mobile computing, virtual reality and other new technologies is rapidly changing, and the level of informatization is constantly improving in all walks of life. Under the background of informatization, how to comply with the requirements of the times, improve the informatization teaching ability of teachers in higher vocational colleges and universities, and cultivate high-quality technical and skilled talents with good information literacy and ability needed to adapt to the economic and social development of the region has become an important strategic topic that requires in-depth thinking and full practice in the reform of informatization teaching in higher vocational colleges and universities at present.

2. Connotation of informatization teaching ability of higher vocational teachers

"Teaching competence is the core ability of a teacher to effectively achieve teaching objectives, and it is a necessary condition for enhancing students' autonomous learning and ensuring learning outcomes. Currently, domestic scholars have not yet formed a unified definition of teachers' information technology teaching competence, and opinions vary. For example, scholars like Hu and Zhu [1] first defined the information technology teaching competence of teachers, considering it as the "core literacy of teachers' profession in the new form"; Wang [2] believes that "teacher information technology teaching competence is a comprehensive ability to use information resources with the purpose of promoting student development, engaging in teaching activities, and fulfilling teaching tasks"; Liu and Yin [3] believe that "the essence of teachers' information technology teaching competence is the teacher's use of information technology to 'transform' subject knowledge into a kind of intellectual structure that students can effectively acquire in real teaching situations" and so on. Literature analysis [4] shows that despite different conceptual definitions, a consensus has generally been reached: that in the context of informatization, with the aim of promoting mutual development between teachers and students, teachers integrate information technology deeply into teaching, fully leverage the advantages

ISSN 2663-8169 Vol. 5, Issue 23: 115-119, DOI: 10.25236/IJNDE.2023.052320

of information technology teaching, and strive to optimize the teaching process. Information technology teaching competence mainly includes abilities in information literacy, instructional integration, communication and collaboration, research and innovation, and other aspects ."

3. Current situation of the development of higher vocational teachers' informatization teaching ability

The target of this questionnaire survey is the higher vocational colleges and universities in Sichuan Province engaged in teaching teachers who are engaged in teaching work. The selected four local schools will be chosen for the study, Sichuan College of Architecture Technical, Chengdu Polytechnic, Sichuan Technology and Business College, Sichuan Engineering Technical College. The number of teachers and students are as is shown in Table 1:

Table 1: Number of students and teachers in four schools

University	Population (N) Students	Sample (n) Students	Population(N) Teachers	Sample (n) Teachers
Sichuan College of Architecture	18000	132	1300	125
Chengdu Polytechnique	12000	88	700	68
Sichuan Technology and Business School	11000	81	640	62
Sichuan Engineering Technical School	13000	96	1100	106
Total	54000	397	3740	361

A total of 37 questions were designed in the questionnaire and a comparative research design was utilized to identify similarities and differences between teachers' and student respondents' ratings of teachers' pedagogical skills in the use of technology in teaching.

The survey results indicate that both teachers and students perceive teachers to be proficient in incorporating visual and auditory elements like computers, movies, and TV, highlighting their aptitude in utilizing these tools for effective instruction. Notably, both groups rated the understanding of basic computer networks and school network operations highly, underscoring its significance in enhancing student learning through ICT integration. Proficiency in navigating the internet and conducting effective online searches received slightly lower ratings, suggesting an area for potential improvement. Specifically, the use of video conferencing classes and teaching video basics received the lowest scores. To enhance teachers' digital skills, recommendations include leveraging educational resources available online, participating in professional development programs, and integrating online tools into their classes. It's also crucial for teachers to incorporate information literacy concepts and activities into their courses, enabling students to develop effective research skills. Overall, the assessment suggests that teachers demonstrate proficiency in information literacy, which not only benefits their own learning and teaching but also equips students to become discerning users of digital information. As is shown in Table 2:

The study reveals that teachers demonstrate proficiency in resource preparation for integrating technology into their teaching, as both teachers and students provided overall mean ratings of 2.96 and 2.98, respectively. Notably, students acknowledged teachers' expertise in installing computer software, receiving the highest mean rating of 3.01. Additionally, teachers exhibited proficiency in utilizing the deep web as a teaching tool, signified by a mean rating of 2.99. While resource preparation involving identification and exploration of various technological tools received slightly lower ratings, it remains a crucial aspect of effective teaching and learning. To enhance this skill, it is recommended that teachers receive training and support on utilizing different technology tools, aligning them with learning objectives and considering accessibility and affordability. In terms of the teaching process, both teachers and students assessed teachers to be proficient, with an overall mean rating of 3.00 and 3.13, respectively. Discrepancies in the assessment of specific tools like WEB CT or Blackboard and complex computation software suggest differing expectations and criteria for measurement. Notably, using technology for differentiated instruction received the lowest ratings, suggesting a need for professional development opportunities and the exploration of free online resources. In terms of assessment and diagnosis, both teachers and students assessed teachers' proficiency in using technology tools, garnering the highest mean ratings of 2.99 and 2.96, respectively. This implies that teachers

ISSN 2663-8169 Vol. 5, Issue 23: 115-119, DOI: 10.25236/IJNDE.2023.052320

utilize technology for assessments, employing spreadsheet programs and online platforms to create assignments and quizzes aligned with learning objectives. Overall, the study underscores the importance of teacher proficiency in resource preparation and technology integration for effective education. As is shown in Table 3:

Table 2: Teaching integration

Resource Preparation	Position	Mean	SD	Interpretation
1. Identify and explore a wide variety of technological tools and devices in order to determine and select those that best respond to teaching and learning contents	Teacher	2.94	1.10	Proficient
	Student	2.95	1.04	Proficient
2. Able to install computer software onto a computer system	Teacher	2.95	1.04	Proficient
	Student	3.01	1.04	Proficient
3. Know what the Deep Web is and how to use it as a resource tool Teaching Integration	Teacher	2.98	1.06	Proficient
	Student	2.99	1.08	Proficient
Overall	Teacher	2.96	0.93	Proficient
	Student	2.98	0.92	Proficient
Teaching Process				Proficient
1. Integrate technology to teach and facilitate as well as to improve learning and productivity of students	Teacher	2.99	1.10	Proficient
	Student	3.11	1.04	Proficient
2. Incorporate pedagogical approaches that prepare teacher to effectively use technology	Teacher	2.99	1.10	Proficient
	Student	3.16	1.05	Proficient
3 .Use technology to differentiate instruction to meet diverse learning needs	Teacher	2.98	1.10	Proficient
	Student	3.07	1.05	Proficient
4. Use electronic presentation software to create and give electronic presentations1	Teacher	3.03	1.10	Proficient
	Student	3.11	1.06	Proficient
5 Aware of the online tools such as WEB CT, or Blackboard and know how to use them to teach the students	Teacher	3.05	1.12	Proficient
	Student	3.13	1.08	Proficient
6. Use computer software to do complex computation1	Teacher	3.02	1.10	Proficient
	Student	3.18	1.07	Proficient
Overall	Teacher	3.00	.96	Proficient
	Student	3.13	.92	Proficient
Assessment and Diagnosis				Proficient
1. Use appropriate technology tools for assessment	Teacher	2.99	1.07	Proficient
	Student	2.96	1.08	Proficient
2. Use spreadsheet program to compute grades and chart data	Teacher	2.98	1.10	Proficient
	Student	2.90	1.11	Proficient
3. Uses online platforms to create assignments, quizzes and rubrics that are aligned to learning objectives.	Teacher	2.97	1.07	Proficient
	Student	2.94	1.09	Proficient
Overall	Teacher	2.98	0.98	Proficient
	Student	2.93	0.99	Proficient

Based on the study results, it's evident that collaboration spaces are highly favored by teachers for communication and remote collaboration, receiving a high mean rating of 3.11. However, students rated this platform lower, with a mean rating of 2.93, possibly indicating a divergence in preferences for communication and collaboration tools. It's important to acknowledge that students may have varying levels of familiarity with these platforms compared to their teachers. To enhance the effectiveness of collaboration spaces, further research and understanding of students' needs and preferences are crucial. Providing training, tutorials, and integrating these tools effectively into the curriculum can bridge the gap and create a more engaging learning environment. Additionally, addressing the lower ratings on indicators related to collaborative web-based tools suggests a need for teacher training and providing students with access to advanced digital tools to facilitate effective collaboration and communication. Ultimately, a collaborative effort between teachers, students, and stakeholders is essential for optimizing the use of technology in education. As is shown in Table 4:

ISSN 2663-8169 Vol. 5, Issue 23: 115-119, DOI: 10.25236/IJNDE.2023.052320

Table 3: Communication and collaboration

Communication and collaboration	Position	Mean	SD	Interpretation
1. Communicate electronically, organize activities and information and create information and documents in school.	Teacher	3.02	1.13	Proficient
	Student	2.93	1.10	Proficient
2.. Able to use e – mail to communicate information and be able to send attachments and create e- mail folders	Teacher	3.05	1.10	Proficient
	Student	2.86	1.06	Proficient
3. Uses technology to share and demonstrate lessons in a way that is both interactive and collaborative	Teacher	2.99	1.08	Proficient
	Student	2.98	1.10	Proficient
4. Use a collaborative web based tool that teaches students to work as a team uses technology to share and demonstrate lessons in a way that is both interactive and collaborative to manage and plans projects effectively	Teacher	2.98	1.09	Proficient
	Student	2.98	1.04	Proficient
5. Uses online feedback tools to provide timely , constructive and personalized feedback to students and to solicit feedback from them	Teacher	3.06	1.11	Proficient
	Student	2.95	1.10	Proficient
6. Uses Collaboration Spaces which are platforms that enable teachers and their students to communicate , share files and work together remotely	Teacher	3.11	1.07	Proficient
	Student	2.93	1.10	Proficient
7. Uses Learning Management Systems , class blogs , to submit work, do research and collaboration and communicate with students and group peer for feedback	Teacher	3.03	1.09	Proficient
	Student	3.01	1.07	Proficient
8. Uses a multipurpose social media app that allows students and teachers to chat make voice and video calls , share files	Teacher	3.02	1.11	Proficient
	Student	2.94	1.01	Proficient
Overall	Teacher	3.03	0.96	Proficient
	Student	2.95	0.92	Proficient

Table 4: Research and Innovation

Research and innovation	Position	Mean	SD	Interpretation
1.Introduce experimentation into teaching practices and maintain accessible technological tools and devices	Teacher	3.09	1.05	Proficient
	Student	2.92	1.10	Proficient
2. Equip students with critical analytical thinking and problem solving skills through audio visual learning materials	Teacher	3.12	1.05	Proficient
	Student	3.04	1.05	Proficient
3. Design instruction that utilizes content specific technologies to enhance teaching and learning	Teacher	3.08	1.03	Proficient
	Student	2.98	1.10	Proficient
4. Understand the copyright issues related to education including multimedia and Web- based copyright issues	Teacher	3.12	1.02	Proficient
	Student	2.96	1.08	Proficient
5. Use the internet in data collection for research	Teacher	3.06	1.09	Proficient
	Student	3.08	1.07	Proficient
6. Use internet based approaches to collect quantitative data from vulnerable groups	Teacher	3.19	1.02	Proficient
	Student	2.88	1.08	Proficient
7. Use online questionnaires to conduct research	Teacher	3.07	1.06	Proficient
	Student	2.98	1.09	Proficient
8. Use Digital interview for qualitative research	Teacher	3.11	1.03	Proficient
	Student	2.93	1.09	Proficient
9. Use computer software in the statistical analysis of research data	Teacher	3.05	0.99	Proficient
	Student	2.93	1.12	Proficient
Overall	Teacher	3.10	0.86	Proficient
	Student	2.97	0.92	Proficient

ISSN 2663-8169 Vol. 5, Issue 23: 115-119, DOI: 10.25236/IJNDE.2023.052320

In the area of research and innovation the findings shows that the teachers are proficient in using internet based approaches to collect quantitative data from vulnerable groups and have been rated highly by the teacher respondents group , conversely this indicator obtained the lowest mean rating of 2.88 from the students. Similarly, teachers who understand copyright issues related to research and education including multimedia and web- based content have also received high ratings

The implications of these findings suggest that teachers who are proficient in using internet-based approaches and understand copyright issues can be more effective in their teaching practices. This can lead to better learning outcomes for students and a more engaging learning experience. Equip students with critical analytical thinking and problem solving skills through audio visual learning materials. Running counter to the foregoing findings is the rating assessment to the following indicators" Use computer software in the statistical analysis of research data" this obtained the lowest mean rating of (3.05) from the teachers. Low mean ratings from teachers could indicate that they are not comfortable using computer software in statistical analysis of research data. This could be due to a lack of training or experience with such software. In this case, it would be beneficial to provide training and support for teachers to help them become more comfortable with using computer software for statistical analysis.

Another implication could be that the software being used is not user-friendly or does not meet the needs of the teachers. In this case, it would be helpful to gather feedback from teachers on what features they would like to see in such software and work with developers to create software that meets their needs.

Finally, low mean ratings could indicate that there is a lack of resources available for teachers to use computer software for statistical analysis. In this case, it would be beneficial to provide additional resources such as funding for software licenses or access to training materials.

4. Conclusion

The study assessed the teaching skills of teachers in utilizing technology across various dimensions. It found that teachers demonstrated proficiency in information literacy, teaching integration (including resource preparation, teaching process, and assessment), collaboration, and communication. Additionally, they were proficient in incorporating research and innovation in their teaching practices. Notably, research and innovation received the highest rating from teachers, while students rated teaching process the highest. There was no significant difference between teacher and student assessments. The findings suggest that while teachers excel in certain aspects of technology integration, there is room for improvement, particularly in resource preparation. Therefore, it is recommended that teachers receive training and support in this area. Additionally, schools should provide adequate resources and infrastructure for effective technology integration, and encourage collaboration among teachers. Incorporating research into teaching technology is also crucial for staying updated with best practices, necessitating further training and support for teachers in this regard. Lastly, enhancing students' access to advanced digital tools for improved collaboration and communication is essential, along with promoting critical and creative thinking through the integration of design-thinking methodologies.

Acknowledgements

This work is supported by the Sichuan Technology & Business College (NO: 2023SA05)

References

[1] Hu X Y, Zhu Z T. Teacher Education in the Perspective of Informatization[J]. China Electric Education, 2003(6): 25-27.
[2] Wang W J. Information Technology Teaching Competence: Teachers Challenging the Informatized Society [J]. Modern Distance Education, 2012(2): 46-47.
[3] Liu Z, Yin R. Connotation and Enhancement Path of Teacher's Information Technology Teaching Competence [J]. China Education Journal, 2014(10): 31-36.
[4] Huang W Y. Research on Information Technology Teaching Competence Standards for Higher Vocational College Teachers in Jiangsu Province [D]. Wuxi: Jiangnan University, 2017: 22.