

# **The Desirable Characteristics of Industrial Teacher Education: A Delphi Study**

**Thongchai Arunchai**  
**Rajamangala University of Technology Suvarnabhumi**

**Peerapat Promtang**  
**Rajamangala University of Technology Suvarnabhumi**

**Peerapong Yimyam**  
**Rajamangala University of Technology Suvarnabhumi**

**Chayarat Boonputtikon**  
**Rajamangala University of Technology Suvarnabhumi**

**Prasart Nuangchalerm**  
**Maharakham University**

*This study aimed to investigate the desirable characteristics of students with professional teaching experience as industrial education teachers by employing the three rounds of the Delphi method to collect data. The research instrument was a 5-level value assessment scale questionnaire. The data was analyzed using the median, mean, standard deviation, and interquartile ranges. According to the findings, specialists think that, in terms of performance standards, instructors with professional experience must possess characteristics at a high level. In the case of professional ethics, instructors who practice professional experience with pupils must possess the highest levels. Regarding the specialization characteristics of teachers in a specific discipline, students exercising teacher professional experience must possess the maximum level of characteristics. Similarly, experts note that prospective educators must prioritize accountability, punctuality, and specialized operational skills.*

*Keywords: Delphi, desirable characteristics, teacher profession, teaching experience*

## **INTRODUCTION**

The Twelfth National Economic and Social Development Plan (2017-2021) of Thailand, which was prepared during the national reform amid the present crisis, outlines the national development strategy for bolstering and developing the potential of human capital. This plan will be in effect from 2017 until 2021. A world that is always changing, in addition to an understaffed labor force. It is vital to build skills in learning and life skills together with the development of ethical people, the growth of knowledge and skills

in labor does not match the job market (Succi & Canovi, 2020; Mtawa et al., 2021; González-Pérez & Ramírez-Montoya, 2022). This is required for the development of ethical people. The growth of a nation needs to have discipline, a good conscience for society as a whole, skills and knowledge, and the capacity to adapt to changes in educational development (Janpleng & Ruangmontri, 2021; Prachagool & Nuangchalerm, 2021).

Learning and training from the teaching practice process of students' professional experience training will form the essential qualities of industrial technician instructors. These characteristics will be developed through the development of industrial technician teachers. What characteristics or behaviors are associated with effective job performance? It is about one's knowledge, talents, and other traits, among other things. It is essential to encourage lifelong education to raise the level of quality, productivity, and capability possessed by the majority of a country's population for development to be both sustainable and of high quality. An individual's attributes are the traits of that individual that are connected to the individual's productivity or success at work (Chong et al., 2020; Ali & Anwar, 2021).

The teacher vocational training is a course that helps students prepare for an on-campus training experience that further strengthens the teacher's character and attitude towards the teaching profession. This experience is intended to improve the teacher's character and attitude toward the teaching profession (Sahito & Vaisanen, 2020). An examination of the relationship between the usefulness of the criteria used and the achievement of superior outcomes. The foundation for both key attributes and workgroup attributes is the concept that behavioral characteristics are related to the knowledge, skills, talents, and other traits that allow people to generate excellent outcomes (Juhji & Nuangchalerm, 2020; Lavy, 2020). The development of human resources currently focuses on the development of individual characteristics. This is because attributes are the criteria for judging successful performance.

Therefore, as a guideline for improving and developing the Bachelor of Science in Industrial Education Program in Industrial Engineering, B.E. educational institutes that fall under the Office of Vocational Education Commission emphasize developing students to become graduate teachers as industrial technicians as a driving force for economic capital for the strengthening and sustainable development of the nation. The research objective aims to study the desirable characteristics of students practicing teacher professional experience by employing the Delphi method for collecting opinions or making decisions about the future of a group of experts to obtain consistent and highly reliable information.

## **METHODOLOGY**

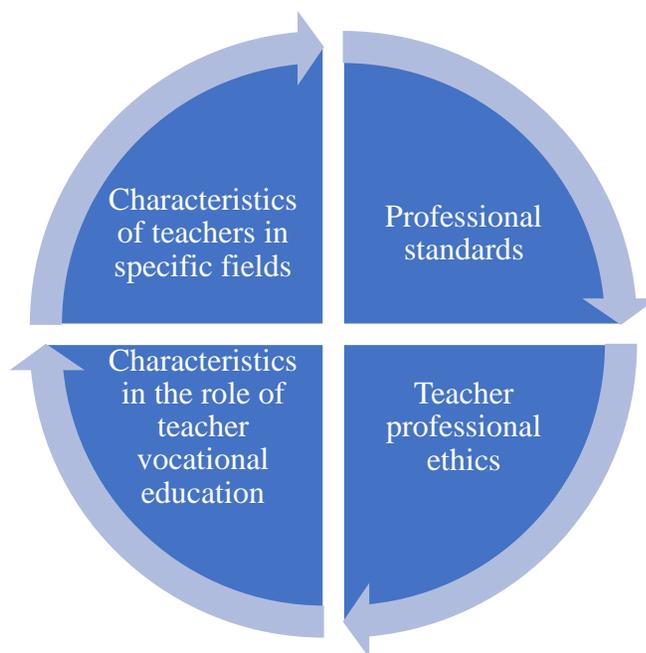
### **Participants**

Using the Delphi technique, this study collected data from a group of experts with the knowledge and competence in the subject and who are responsible for the experience. On the issues studied, the target number of 20 experts. Participants consisted of supervisors who have a master's degree or higher, an academic level of at least associate professor, and at least five years of experience supervising students who are pursuing degrees in industrial education related to the subject of industrial engineering. In addition, 15 students from 6 different schools are being mentored. All of the mentors are either heads of departments or have academic qualifications as specialized teachers who teach factory mechanics, welders, and basic techniques. These mentors work with students in the industrial education program and are employed by the Office of Vocational Education Commission.

### **Research Tools**

Using the Delphi technique, this study collected data from 20 experts for 3-cycles. The optimal number of cycles depended on reaching a consensus conclusion or a reason for the inability to reach that conclusion. The first round is an open-ended questionnaire to collect probing issues from the experts regarding the characteristics that depend on students' professional experience in teaching in the Bachelor of Industrial Education Program. To summarize the issues and create a 5-level Likert exam covering professional standards, teacher professional ethics, characteristics of vocational teachers, and Characteristics of teachers in specific fields (Figure 1).

**FIGURE 1**  
**COMPONENTS OF DESIRABLE CHARACTERISTICS OF INDUSTRIAL**  
**TEACHER EDUCATION**



The expertise of teachers in a specific field was examined for content validity by 3 -experts. The third round used the same questions. From the second round, in which the questionnaire expert knows the quartile position of his answer in each question, he decides to confirm the answer and give reasons for changing the answers.

### **Data Collection**

Round 1: The researchers requested survey assistance from educational institutes under the Office of Vocational Education Commission, Central Vocational Education Institute 4 with qualified mentors and students practicing professional experience, a qualified industrial engineering field with an open-ended questionnaire submission with time to independently consider the information and answer the questionnaire within 30 days.

Round 2: The second round of questionnaires was sent to the same 20 experts in the first round independently. They answered the questionnaires and returned them within 3-weeks, and they interquartile range and sent the questionnaire to the educational institution with the same set of 20 experts who answered the questions in Round 2.

Round 3: This round will show the change in the median and quartile range and the answers given by the experts in Round 2. There will be room for reasoning if the opinions are not consistent with the group but still validate the original idea or if the answer has been changed and concluded the change in the answers again. Once with 2-weeks to review or confirm the answers, the researcher travelled to receive the questionnaire, statistically analyzed to find the median, mean, standard deviation, and interquartile range.

### **Data Analysis**

Data synthesis, by grouping all opinion data and analyzing content for qualitative data, weighting the main points, minor points, and messages that can be combined. To create a questionnaire in the second round of questionnaires in the second round to study the desirable characteristics of students practicing professional teaching experience in the case of education courses. The questionnaire answered in the second round was used to analyze the data using the mean, standard deviation, and inter-quartile range, which the

inter-quartile does not exceed 1.50. It is concluded that the statement has been reached a consensus. The results were interpreted using average scores as Table 1.

**TABLE 1  
INTERPRATATION SCORES**

Mean score	Interpretational level
4.21-5.00	Highest
3.41-4.20	High
2.61-3.40	Moderate
1.81-2.60	Low
1.00-1.80	Lowest

## RESULTS AND DISCUSSION

This quantitative research focuses on the desirable characteristics of students practising teacher professional experience, a case study of Bachelor of industrial education Program. Criteria were set for 5-levels, asking 20 experts. Data analysis was done to find possible concordance by separating the results into different aspects.

### *Professional Standards*

Students practicing teaching professional experience should have characteristics at a high level ( $\bar{X} = 4.16, SD = 0.619$ ). Teacher students should be a commitment to developing learners to reach their full potential at the highest level ( $\bar{X} = 4.50, SD = 0.513$ ), and the results of learners' quality development should be reported systematically at a high level ( $\bar{X} = 4.10, SD = 0.852$ ), they should behave as a role model for learners at the highest level ( $\bar{X} = 4.70, SD = 0.470$ ), they should be able to cooperate with others in educational institutions creatively at the highest level ( $\bar{X} = 4.65, SD = 0.489$ ). It can be shown in Table 2.

The standards of performance significantly influence the efficiency and professionalism of educational professionals (Kartini et al., 2020). Students gaining professional teaching experience should have the following attributes at a high level. This suggests that students who are participating in professional teaching experiences should already possess specific attributes and skills at an advanced level (Toropova et al., 2021). These attributes may include understanding the topic matter, teaching tactics, abilities in classroom management, and the capacity to successfully connect with pupils. By establishing rigorous requirements, it ensures that students who aspire to become teachers are equipped with the required skills to perform admirably in their future careers.

**TABLE 2**  
**PROFESSIONAL STANDARDS**

Professional standards	Quartile	SD	Mean	Experts		
				Upper	Interquartile Range	Lower
Able to perform academic activities to develop the teaching profession to advance on a regular basis	4-5	0.587	4.35	0	19	1
Able to make decisions on various activities considering the consequences for the learners	4-5	0.598	4.60	0	19	1
We are committed to developing learners to grow to their full potential	4-5	0.513	4.50	0	20	0
Able to develop practical lesson plans in class	4-5	0.681	4.40	0	18	2
Able to develop effective teaching materials on a regular basis	4-5	0.681	4.40	0	18	2
Able to organize teaching activities for students to know critical thinking and creativity by emphasizing permanent effects on students	4-5	0.681	4.40	0	18	2
Systematically report the results of student quality improvement	3-5	0.852	4.10	0	20	0
Be a good role model for learners	4-5	0.470	4.70	0	20	0
Be able to collaborate creatively with others on schools	4-5	0.489	4.65	0	20	0
Be able to collaborate creatively with people in the community	4-5	0.657	4.30	0	18	2
Able to seek and use information and information for development	4-5	0.657	4.30	0	18	2
It can create opportunities for learners to learn in any situation	4-5	0.571	4.30	0	19	1
Mean score		0.619	4.16			

Students and teachers should be dedicated to helping students develop to their best potential so they may compete at the highest level. This trait stresses the significance of a teacher's dedication to promoting the growth and development of their students and draws attention to its value (Drew & Sosnowski, 2019; Whitehead & Greenier, 2019). Educators are responsible for encouraging students to reach their full potential by encouraging, guiding, and giving them proper challenges. For instructors to live up to this commitment, they must comprehend the specific requirements of each individual student, modify their instructional strategies, and provide learning environments that are welcoming and encouraging.

The education system's accountability and transparency may be ensured by systematically reporting learners' quality progress. It advises that instructors keep accurate records of students' progress, assess their learning outcomes, and offer regular feedback to students and their parents or guardians. In addition, it suggests that teachers should provide regular feedback to students. This data helps track individual and general class development, highlight growth areas, and drive instructional decisions for improved student outcomes (Liang et al., 2020; Chew & Cerbin, 2021). They should act as a role model for students studying at the most advanced levels. Teachers are role models for their pupils, influencing their attitudes, values, and behaviors. Teachers need to exhibit professionalism, integrity, and ethical behavior in their

relationships with students, colleagues, and the larger community to behave in a manner that is congruent with being a role model (Bieliauskaitė, 2021).

In a nutshell, these performance requirements emphasize the requirement for teaching professionals to exhibit advanced traits, display dedication to their students' growth, record progress methodically, behave in a positive role model manner, and participate in creative collaboration. Teachers can make a significant contribution to the academic development and success of their pupils, as well as the larger learning community, if they can satisfy these rigorous criteria.

#### *Teacher Professional Ethics*

Students practicing teacher professional experience must have characteristics at the highest level ( $\bar{X} = 4.55, SD = 0.517$ ). They have to love and compassion for students by giving care, helping, encouraging, and encouraging students to study with equality at the highest level ( $\bar{X} = 4.65, SD = 0.489$ ), they should constantly train in teaching experiences, teach by profession, practice in their professional experiences, and enhance pedagogical knowledge. They have to had skills and habits that are right and good to the disciples to the fullest potential with sincerity are at the highest level ( $\bar{X} = 4.65, SD = 0.489$ ), they also should act against the development of physical, intellectual, mental, and emotional and disciple's society was at the highest level ( $\bar{X} = 4.55, SD = 0.510$ ). It can be shown in Table 3.

**TABLE 3**  
**TEACHER PROFESSIONAL ETHICS**

Teacher professional ethics	Quartile	SD	Mean	Experts		
				Upper	Interquartile Range	Lower
Have love and compassion for your students by giving them care and help. Encourage students to study continuously	4-5	0.489	4.65	0	20	0
Should regularly train, instruct, practice, and enhance knowledge, skills and good habits for students. to the best of our ability with sincerity	4-5	0.489	4.65	0	20	0
Be a good role model for students physically, verbally, and mentally	5	0.523	4.80	0	17	3
Do not act against the physical, intellectual, and mental growth. Emotions and society of students	4-5	0.510	4.45	0	20	0
Do not seek benefits as a bribe from the disciple in the normal performance of duties and do not use the disciple to do any act that is unlawfully exploited for himself	4.25-5	0.571	4.70	0	15	5

Teacher professional ethics	Quartile	SD	Mean	Experts		
				Upper	Interquartile Range	Lower
They should develop themselves professionally, personality and vision to keep pace with academic, economic, social and political development	4-5	0.571	4.30	0	19	1
Love and faith in the teaching profession and a good member of the teachers' professional organization	5	0.366	4.85	0	17	3
Teachers and communities should be supported in the context of the agency in a constructive way	4-5	0.587	4.35	0	19	1
Should behave as a leader in the preservation and development of Thai wisdom and culture	4-5	0.550	4.25	0	19	1
Mean score		0.517	4.55			

Students practicing teacher professional experience must possess the highest quality of characteristics. This can be discussed that students participating in teacher professional experience should possess exceptional qualities and abilities. These traits may include subject-matter expertise, effective communication skills, classroom administration skills, adaptability, and a genuine passion for teaching. Setting high expectations for these students will prepare them well to become successful educators.

Teachers must demonstrate affection and compassion for their pupils by providing care, assistance, and encouragement, and advocating for equality at the highest level. This includes caring for their health, providing assistance when necessary, and encouraging their academic and personal development. In addition, instructors should cultivate an inclusive and equitable learning environment, treating all students fairly and equally regardless of their background or abilities. They should continuously train in teaching experiences, teach as a profession, and increase their pedagogical knowledge (Wolff et al., 2021; Polyiem & Nuangchalerm, 2023).

Teachers must engage in ongoing professional development to remain abreast of the most recent teaching methodologies, educational research, and best practices. Student teachers can develop a thorough comprehension of effective pedagogy by actively engaging in training and pursuing opportunities to hone their teaching skills (Darling-Hammond & Oakes, 2021). This ongoing learning process enables them to provide quality education and adapt to their students' changing requirements.

Teachers should have the skills and dispositions necessary to assist their students in reaching their full potential. This includes employing effective instructional strategies, providing constructive feedback, and establishing a conducive learning environment. Teachers can inspire and motivate students to aspire for excellence if they approach their roles sincerely (Shea et al., 2020; Subagja et.al., 2022). Teachers are responsible for fostering the holistic growth of their students. This includes addressing their physical health, stimulating intellectual curiosity, encouraging mental and emotional development, and nurturing positive social interactions. Teachers play a crucial role in fostering their students' well-being by creating a secure and supportive environment.

The aforementioned characteristics emphasize the significance of students gaining professional teaching experience possessing exceptional qualities, such as love and compassion for students, continuous professional development, pedagogical knowledge, skills, and habits for student growth, and fostering holistic development. Future educators can create impactful and meaningful learning experiences for their students if they embody these traits.

*Characteristics in the Role of Teacher Vocational Education*

Students practicing teaching professional experiences must have the desirable characteristics at the highest level ( $\bar{X} = 4.41, SD = 0.593$ ). They should have the ability to communicate effectively in listening, speaking, reading, and writing at the highest level ( $\bar{X} = 4.60, SD = 0.503$ ), they should be able to solve problems using theoretical knowledge. and practical skills at the highest level ( $\bar{X} = 4.40, SD = 0.503$ ), teacher students should be able to work well with others at the highest level ( $\bar{X} = 4.60, SD = 0.503$ ), they should have good interpersonal relations with colleagues and stakeholders at the highest level ( $\bar{X} = 4.60, SD = 0.503$ ), they should have the ability to work in teams at the highest level ( $\bar{X} = 4.70, SD = 0.470$ ), they should express the potential to perform both physically and mentally efficiently at the highest level ( $\bar{X} = 4.55, SD = 0.510$ ), they should have a high level of service consciousness ( $\bar{X} = 4.25, SD = 0.425$ ), they also should able to give the advice to help learners to have a better quality of life at the highest level set ( $\bar{X} = 4.35, SD = 0.489$ ). It can be shown in Table 4.

**TABLE 4  
CHARACTERISTICS IN THE ROLE OF TEACHER VOCATIONAL EDUCATION**

Characteristics in the role of teacher vocational education	Quartile	SD	Mean	Experts		
				Upper	Interquartile Range	Lower
Ability to communicate effectively both in listening and listening. Speaking, reading, writing	4-5	0.503	4.60	0	20	0
There is a way to present information with the right communication style	4-5	0.639	4.25	0	18	2
Able to apply information and communication technology effectively	4-5	0.550	4.25	0	19	1
Able to analyze the root cause of problems and determine solutions to problems effectively	4-5	0.550	4.25	0	19	1
Able to solve problems using theoretical knowledge and practical skills effectively	4-5	0.503	4.40	0	20	0
Able to work well with others	4-5	0.503	4.60	0	20	0
Good human relations with colleagues and related parties	4-5	0.503	4.60	0	20	0
Ability to work as a team	4-5	0.470	4.70	0	20	0
Able to develop themselves in the teaching profession and specific professions effectively	4-5	0.607	4.50	0	19	1
Demonstrate the potential to perform both physical and mental tasks effectively	4-5	0.510	4.55	0	20	0
Be responsible and punctual	5	0.410	4.80	0	16	4
Be thorough in performing tasks	4-5	0.587	4.65	0	19	1
Be conscious of service	4-4.75	0.444	4.25	5	15	0
Able to create a course learning plan in the right way	4-5	0.671	4.35	0	18	2
Able to design instruction that is suitable for the learners	4-5	0.657	4.30	0	18	2
Choose suitable methods for media creation and media development methods. Devices that support learners' learning appropriately	4-5	0.616	4.20	0	18	2

Characteristics in the role of teacher vocational education	Quartile	SD	Mean	Experts		
				Upper	Interquartile Range	Lower
Seek a variety of learning resources to enhance learners' learning	4-5	0.571	4.30	0	19	1
Able to give advice and help students to have a better quality of life	4-5	0.489	4.35	0	20	0
Be patient and responsible	4-5	0.688	4.50	0	18	2
Comply with the code of ethics of the teaching pprofession	4-5	0.686	4.55	0	18	2
Have appropriate professional competence	4-5	0.686	4.45	0	18	2
Convey content and respond to students' inquiries completely and clearly	4-5	0.696	4.20	0	17	3
Create a learning environment for classroom engagement	4-5	0.696	4.20	0	17	3
Give examples and case studies to support teaching clearly	4-5	0.686	4.45	0	18	2
Motivate students to participate in the teaching and learning process	4-5	0.754	4.40	0	17	3
Measure and evaluate learning outcomes based on real-world conditions	4-5	0.657	4.30	0	18	2
Analyze and prepare teaching materials Choose the right teaching aids	4-5	0.671	4.15	0	17	3
Mean score		0.593	4.41			

Students practicing teaching professions must possess the highest level of desirable characteristics. This emphasizes the significance of prospective instructors possessing exceptional qualities and skills that are highly sought after in the teaching profession. These characteristics comprise extensive skills, attitudes, and traits that contribute to effective teaching and student development. They should have the maximum level of communication proficiency in listening, speaking, reading, and writing. Teachers must communicate effectively to convey information, engage students, and facilitate learning.

Teachers proficient in listening, speaking, reading, and writing can articulate concepts clearly, actively attend to students, provide instructions, and facilitate meaningful discussions (Monte-Sano et al., 2021). Strong communication skills facilitate rapport-building, comprehension, and efficient classroom management. They should be able to solve problems at the highest level using theoretical knowledge and practical skills. Frequently, teaching involves encountering numerous obstacles and problems. Teachers should be able to analyze situations, utilize theoretical knowledge, and employ practical skills to address these issues effectively. Teachers can adapt their instructional strategies, modify their approach, and assist students in overcoming obstacles when they possess problem-solving skills (Nithitakharanon & Nuangchalerm, 2022; Polyiem & Nuangchalerm, 2022).

Student teachers must be able to collaborate effectively at the highest level. Teaching is a profession that requires collaboration, so the ability to work well with others is essential. Teachers must collaborate effectively with colleagues, administrators, parents, and other stakeholders to create a positive and supportive learning environment. Collaboration encourages the exchange of ideas, resources, and best practices, ultimately benefiting students' learning outcomes (makri et al., 2021). They must have positive interpersonal relationships with coworkers and stakeholders at the highest level. Teachers must develop solid interpersonal relationships in order to establish positive connections with colleagues and stakeholders. By cultivating positive relationships, teachers can establish a network of support that contributes to their professional development and the school's overall success.

Teachers must be able to collaborate effectively to partake in collaborative planning, curriculum development, and problem-solving. Teachers can combine their knowledge, skills, and experiences through teamwork, resulting in innovative and effective instructional practices. Additionally, teamwork fosters a sense of shared responsibility and collective accomplishment. They should demonstrate the ability to perform physically and mentally at the highest level. Teaching can be physically and mentally taxing. For optimal performance, educators should prioritize self-care and maintain physical and mental health (Martin, 2021). By prioritizing their health, teachers can demonstrate a balanced lifestyle and ensure they have the energy and concentration to meet their students' requirements (Mahfouz & Gordon, 2021).

Service consciousness refers to the dedication to serving the requirements of students, colleagues, and the educational community. Teachers should prioritize the health and development of their students, go above and beyond to satisfy their requirements, and contribute actively to enhancing the educational environment. At the highest level, they should be able to guide to help students improve their quality of life. Beyond academic subjects, teachers play an essential role in guiding and supporting students. They should be able to provide guidance, mentorship, and advice to assist students in overcoming obstacles, making informed decisions, and developing life skills. Supporting the holistic development of students contributes to their well-being and quality of life as a whole.

In conclusion, the desirable characteristics emphasize the significance of students practicing teaching professions possessing exceptional qualities such as effective communication, problem-solving skills, teamwork, good interpersonal relations, physical and mental efficiency, service consciousness, and the capacity to provide guidance. Future educators can contribute to creating a positive and influential learning environment for their students by demonstrating these traits.

#### *Characteristics of Teachers in Specific Fields*

Students practicing teaching experience must have characteristics at the highest level ( $\bar{X} = 4.37, SD = 0.587$ ). Consistently, the students who practiced teaching professional experience in the case study of the Bachelor of industrial education program should know about occupational safety at the highest level ( $\bar{X} = 4.55, SD = 0.510$ ), they should know about machine tool maintenance at a high level ( $\bar{X} = 4.45, SD = 0.510$ ), they should be a high level of knowledge of measurements and measurement standards ( $\bar{X} = 4.45, SD = 0.510$ ), They have skills in the correct use of measuring instruments should be at the highest level ( $\bar{X} = 4.55, SD = 0.510$ ), they should have the skills and knowledge to sharpen drills and turning knives correctly at the highest level ( $\bar{X} = 4.55, SD = 0.510$ ). They also should have skills in being a lecturer and leader in related activities were at a moderate level ( $\bar{X} = 3.50, SD = 0.688$ ). It can be shown in Table 5.

This emphasizes the importance of students in the teaching program possessing exceptional qualities and skills that are essential to their future careers. It establishes a high standard for their abilities and ensures that they are adequately prepared to become effective industrial education instructors. In an industrial education program, students must have a comprehensive comprehension of occupational safety. This includes knowledge of safety protocols, regulations, hazard recognition, risk assessment, and safety measure implementation. In a hands-on learning environment, students must prioritize their and future classmates' safety.

**TABLE 5**  
**CHARACTERISTICS OF TEACHERS IN SPECIFIC FIELDS**

Characteristics of teachers in specific fields	Quartile	SD	Mean	Experts		
				Upper	Interquartile Range	Lower
Knowledge of occupational safety	4-5	0.510	4.55	0	20	0
Knowledge of machine tool maintenance	4-5	0.510	4.45	0	20	0
Knowledge of a wide range of different types of reading	4-5	0.598	4.40	0	19	1
Possess skills in hand drawing and computer drawing in the right way, both theoretical and practical	4-5	0.587	4.35	0	19	1
Knowledge of machinery and ability to choose materials and equipment correctly	4-5	4.60	0	19	1	0
Knowledge of measurement and measurement standards	4-5	4.45	0	20	0	0
Good skills in using measuring instruments correctly	4-5	4.55	0	20	0	0
Knowledge of electric welding Gas welding and welding equipment, etc. in its entirety according to the know-how	4-5	4.35	0	18	2	0
Have the right welding skills and be able to choose the right materials and equipment	4-5	4.35	0	18	2	0
Have the skills and knowledge to sharpen drills and various types of turning knives correctly	4-5	4.55	0	20	0	0
Skilled in turning, milling, cutting, planning, cutting, drilling, etc.	4-5	4.40	0	18	2	0
Skilled as a lecturer and event leader in related tasks	3-4	3.50	2	18	0	0
Mean score		0.587	4.37			

Knowledge of machine tool maintenance at a high level: As part of the program, students must acquire a solid foundation of machine tool maintenance knowledge. This includes comprehending various types of machinery, their components, preventive maintenance practices, troubleshooting techniques, and ensuring the machines' correct operation and safety. This knowledge is essential for ensuring operations run smoothly and preventing catastrophes. In industrial education, a thorough comprehension of measurements and measurement standards is essential (Meyer & Norman, 2020). Accuracy, precision, calibration, and various measurement techniques should be familiar concepts for students. This knowledge enables them to instruct students on conducting precise measurements and adhering to industrial measurement standards.

With superior proficiency in the precise use of gauging instruments and a thorough understanding of measurements, students must be adept at the proper application of measuring instruments. This requires the precise and efficient use of instruments such as calipers, micrometers, gauges, and other precision tools. Utilizing these instruments correctly is essential for obtaining accurate measurements. Abilities and knowledge for sharpening drills and turning blades to the utmost standard: As part of their industrial education, students should acquire superior abilities and knowledge in sharpening drills and turning blades.

This requires knowledge of various tool geometries, grinding techniques, and cutting edge maintenance. Students will be able to effectively use and maintain their instruments for optimal performance if they have mastered these skills. Students should cultivate teaching and leadership skills in

addition to their technical expertise (Moldoveanu & Narayandas, 2019). While the statement suggests a moderate level for these skills, it is essential that students acquire competencies in effective lecture delivery, classroom administration, lesson preparation, and student engagement (Iqbal et al., 2021). They will be able to guide and facilitate learning in an industrial education setting with these skills.

The aforementioned characteristics highlight the significance of Bachelor of Industrial Education practicum students possessing exceptional knowledge and skills in occupational safety, machine tool maintenance, measurements, the correct use of measuring instruments, sharpening drills, and turning knives, as well as teaching and leadership skills. By acquiring these advanced qualities, students will be well-equipped to instruct and mentor future industrial education students.

Experts regarding desirable characteristics of students practising professional teaching experience in the case study of Bachelor of industrial education program. If students who have graduated from vocational certificate and vocational certificates come to teach, they will have more practical skills than the high school. Therefore, it should focus on specialized work skills, skills in working with machines to increase confidence. and responsibility before acting as a professional teacher. Overall, there is a consistent issue among experts. It is expected that students practicing the teaching profession must have a high standard of practical skills and act as a good role model for learners who act as role models. A general personality, dress, manners, speech and ethics consistent with the teacher's beliefs motivate the learners. Able to cooperate with others in the school creatively, have professional ethics of teachers, love and compassion for students.

## **CONCLUSION**

Characteristics of expertise of teachers in specific fields. Teaching experience students should have the highest expertise characteristics in a particular subject when considered on a case-by-case basis. The corresponding point of the experts, with the highest average, is that the teaching experience students must have knowledge of safety, which is accidents will result in loss of both life and property. The teacher characteristics for industrial technicians know computers, technical drawings, handicraft training (preliminary tools, turning, welding, parts), occupational health and safety, and technician materials. Industrial teacher education must have qualifications in planning internships, teaching professional technicians, practicing industrial technicians, evaluating industrial technicians, giving advice, professional counseling, personality characteristics, and using innovative media and teaching technology.

According to the findings, specialists think that, in terms of performance standards, instructors with professional experience must possess characteristics at a high level. In the case of professional ethics, instructors who practice professional experience with pupils must possess the highest levels. Regarding the specialization characteristics of teachers in a specific discipline, students exercising teacher professional experience must possess the maximum level of characteristics. Similarly, experts note that prospective educators must prioritize accountability, punctuality, and specialized operational skills.

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