

The Learning Outcomes of Industry Expert Collaborative Teaching and Enterprise Visits on Students in Business Schools of Universities of Technology in Taiwan

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Abstract

Technological and vocational education has developed in Taiwan for over 60 years and played a crucial role in cultivating talents for infrastructure construction and driving industries and economic growth there. Universities and colleges across Taiwan have introduced resources from various industries and adopted the two-teacher system to strengthen their practical teaching in recent years. To be specific, these schools hire experts in various industries for collaborative teaching and encourage enterprise visits, thereby presenting more opportunities for students to get involved in experiential learning. This study explored the learning outcomes of industry expert collaborative teaching and enterprise visits on students studying in business schools of universities of technology in Taiwan. Moreover, policies announced by the Ministry of Education in Taiwan were introduced and analyzed. Finally, the specific suggestions proposed in this study can be served as a reference to industries, the government, universities, and institutions in their effort to innovate teaching methods and improve teaching quality.

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1. Introduction

Higher education is a cradle for countries and regions to cultivate talents specializing in strategic majors and contributes considerably to making them more competitive and fueling economic growth. As Taiwan strives to grow its economy, technological and vocational education plays a pivotal role in providing talents for national infrastructure and promoting national industrial and economic development. They have been fulfilling the responsibility of cultivating talents required for economic and social progress. To serve the purpose of economic growth and technological upgrading, Taiwan's government emphasizes the development of technological and vocational education and even makes great efforts to get policies off the ground. These steps demonstrate the value of technological and vocational education and help cultivate quality professionals with hands-on skills for industries (Executive Yuan, Republic of China (Taiwan), 2021). The Ministry of Education in Taiwan has tried to raise funds through package plans in an attempt to attract more students and improve the quality of technological and vocational education. It has also taken measures to strengthen the cooperating mechanism of talent cultivation supported by industries to create and deliver quality technological and vocational education (Department of Technological and Vocational Education, Ministry of Education, Republic of China (Taiwan), 2019). Curriculum design might work best if industry experts were involved and relevant experts were engaged in practical collaborative teaching activities, in order to cultivate technicians fitting industrial demand and avoid the industry-university gap and theory-practice gap. Industry experts are invited to impart what professional abilities are required in industries, while full-time teachers in universities reinforce the practical know-how through their academic expertise. As such, theories and practices are complementary, whereas industries and universities have more opportunities for exchanges and cooperation. As the proverb says seeing is believing, teachers and students might benefit more from field observation and learning by going to different factories and businesses, namely, enterprise visits (field exploration), after industry experts finish their classes. In recent years, business schools of universities in Taiwan highlight the cultivation of management skills among students. Apart from formal courses necessary in the classroom, many schools and departments have offered a series of the informal curriculum in their education programs, such as keynote speeches, enterprise visits, thematic or case competitions on and off campus, off-campus internships, special projects, club activities, and overseas study. These programs are designed to endow students with management skills, such as leadership, communication, coordination, teamwork, and practical application abilities.

Conventional formal classes feature the stereotypical one-way teaching mode where "students just listen to the teacher". Teachers take on their duties of imparting knowledge, but there always are students who are not passionate in the class. Instead, they steal glances at their smartphones, doze off, or even skip classes. My years of teaching experience reveal that students stay curious and keen on off-campus visits

or activities, with a high degree of participation. The Ministry of Education in Taiwan has promoted industrial collaborative teaching in recent years, hoping to integrate theories and practices and improve the value of technological and vocational education by hiring industry experts for collaborative teaching. At present, many business schools in Taiwan's universities and colleges invite industry experts as teachers to offer collaborative courses and intersected their classes with multiple lectures and off-campus visits. These industry experts also engage in curriculum design and collaborative teaching activities. Such measures can keep courses and industries connected, sharpen up the practical abilities of students and teachers, and increase exchanges and cooperation between industries and universities. These efforts have translated into great outcomes. Specifically, these practices keep students more interested and keener because reflections and feedback imply that most students have a positive attitude. Several industry experts with rich practical experience also said they welcome such opportunities to share their stories with teachers and students at universities. These industry experts prepared rich content and shared many practical textbooks through video and audio files, but students still wish for field visits. Many industry expert teachers show their willingness to provide opportunities for teachers and students to make field visits or organize relevant off-campus activities (a part of the informal curriculum). Teachers and students can have better interactions with industry expert teachers after they have an experience in industries by themselves to achieve diverse learning values. Hence, this study delved into the learning outcomes of industry expert collaborative teaching and enterprise visits on students at business schools of universities of technology. By putting forward specific suggestions, this study aims to provide references for business schools in universities and other peers in innovating teaching methods and improving teaching quality.

2. Literature Review

2.1 Industry expert collaborative teaching

The Ministry of Education in Taiwan introduced "Regulations for the Selection and Employment of Industry Experts for Collaborative Teaching in Institution of Higher Education" to bring teaching content at colleges and universities closer to industrial realities. Therefore, these colleges and universities are allowed to introduce industry expert teachers for collaborative teaching. Practical experience shared by industry expert teachers enables students to learn more about relevant practical details in the workplace. Furthermore, teachers at universities can also understand practical demands better and improve their practical abilities to facilitate their teaching adjustments for innovations in teaching methods. Industry expert experts also act as a teacher who imparts knowledge and sharpened technologies to students. These knowledge and skills received from them can serve students for their practical applications in the workplace (Wu et al., 2008; Hsu, 2013). Collaborative teaching has the following functions: (1) provide abundant learning opportunities for students; (2) improve the professional competence of teachers; (3) make integrated

instruction more effective; and (4) nurture the on-campus atmosphere of reform and innovations (Kao, 2007).

Apart from fully tapping into teachers' expertise for better labor division and cooperation, collaborative teaching can help make innovations in teaching structure, promote teaching mode, leverage teaching facilities and resources, give full play to teamwork and break the limitations of conventional classes. These advantages allow students to obtain more guidance through flexible learning channels and approaches, featuring an equal emphasis on individual and group functions, thus increasing their interest in learning with their personal differences noticed and adapted (Chang et al., 2006; Hsu, 2013). Industry expert collaborative teaching mode means that industry expert teacher and full-time teacher work as a teaching team where the industry expert is responsible for supporting the full-time teacher in planning courses, preparing textbooks, and planning and performing teaching activities. As such, they provide more practical guidance for students studying in groups, with teaching resources and facilities available. The cooperation between industry experts and teachers makes theories and practices mutually reinforcing and leads to better teaching outcomes (Hsu, 2013). However, collaborative teaching is taken place for one subject. Through such teaching methods, teachers improve their practical teaching abilities, students understand industrial practices better, and the cooperation between industries and universities is increased. These methods have won strong and widespread support from teachers and students (Hsu, 2013). Yen and Wen (2016) found that industry expert collaborative teaching benefits students significantly and suggested industry expert teachers to adopt "experiential learning", "case teaching", and "information technology application" in their classes. Moreover, "experiential learning" might be prioritized for developing textbooks and planning teaching content.

2.2 Enterprise visits

When courses are planned for college students, industry expert collaborative teaching should be integrated with informal curriculum and activities, such as off-campus field visits, a part of experiential learning. Experiential learning includes visit tours, internships, service learning, field research, cooperative research, and solution exploration with faculty members. It helps students thrive but does not open a door for each student. These activities make learning more compelling and deeper and endow students with experiences that distinguish themselves from peers by connecting the classroom with the big world outside. For colleges and universities that aim to prove their values, and attract students and prospective graduates, they show their stronger willingness and support for experiential learning. This method helps students to understand their interests more, expand interpersonal connections conducive to their careers and develop skills required in their future workplace (Ministry of Education, Republic of China (Taiwan), 2017a).

Learner-centered experiential learning enables students to experience a thing through activities and acquire knowledge and feelings from their experiences and reflections (Liao and Huang, 2021). Most courses are designed to emphasize

experiential learning and learning opportunities that allow students to gain practical experience and understand the current situations of relevant jobs (Chen et al., 2011). As a goal-driven, systematic, and procedural teaching activity, off-campus teaching provides students access to learning from direct, practical, and daily experience and helps them know more about a specific topic. Its teaching objective and scope cover the acquisition of knowledge, comprehension, application, analysis, summarization, and evaluation (Wang and Chu, 1995; Li, 2000). That means students can reinforce their memory and comprehension of knowledge acquired from classes by experiencing real situations and interactions through real activities. Moreover, they can show their knowledge application, and analyze and generalize relevant knowledge from direct experience to have a fuller picture, thus achieving teaching objectives (Chen, 2009). Outdoor teaching is not designed to replace textbooks, but to serve teaching activities in universities and make up for their flaws.

2.3 Learning outcomes

Learning means learners expose themselves to behavioral changes in the long term through practice or experience, while achievement is a result of the born abilities and acquired outcomes combined (Liu and Wang, 2022). Learning outcomes are an indicator of evaluating the outcomes of learning for learners. The evaluation is aimed at helping students understand their learning situations, improving their learning methods, and providing references for teachers to enhance their teaching methods (Guay et al., 2008). Learning outcomes refer to what students have learned after they finish the learning of certain knowledge or skills. Learning outcomes, if evaluated and quantified, throw light on whether learning activities work and whether learners have acquired what they should acquire, and provide inspirations on the planning of subsequent learning activities (Huang et al., 2009). However, since the evaluation and quantification are diverse and complex, achievements should never be the only indicator to evaluate learning outcomes. Instead, it should be measured with more indicators including learner satisfaction, learning performance, self-evaluation, learning achievement, in-class evaluation, participation, self-efficacy, learning interest, and learning experience (Wang and Liao, 2008).

Pike et al. (2011) argued that “cognitive gains” and “non-cognitive gains” might serve as two dimensions to measure the learning outcomes of students. Cognitive gains mean that learning experience acquired at universities and colleges is beneficial to general education, professional knowledge and skills, writing and oral expressions, and critical analysis and thinking. In contrast, non-cognitive gains are an indicator to examine students for their response to such dimensions as self-knowledge, teamwork, moral code, and citizen and community engagement.

3. Research and Analysis

The “theory-practice gap” persists in higher education and remains a major concern in many countries. By carrying on the mission of cultivating excellent professionals, technological and vocational education should be positioned at “learning from practices” and “putting theories to practical use”. It should nurture the core value of “introducing practical knowledge into the classroom” and “sharpening up hands-on and innovative abilities”, rather than being limited to knowledge impartment. As a result, technological and vocational education cultivates prominent talents with hands-on and innovative abilities who lead industrial development and improve industrial R&D and innovations. Therefore, higher technological and vocational education should pay more attention to technical abilities than higher education. However, as junior colleges are elevated to universities of technology which establish their research institutions, signs show that higher technological and vocational education in Taiwan has prioritized certain subjects and shrank hands-on practices. Additionally, more technological and vocational students in Taiwan tend to further their studies, in response to changes in industrial structure, lower birth rate, and new records in college enrollment and vacancy (Wu and Fey, 2010). The Ministry of Education in Taiwan has noticed that most full-time teachers employed by universities of technology have no practical experience at all and prioritize academic research. Thus, it is difficult for students to develop professional skills and nurture a correct attitude towards jobs so that they cannot fit into industry well, leading to the theory-practice gap. Hence, in the effort to reform technological and vocational education, the Ministry of Education is established to provide subsidies for technological and vocational schools to offer practical courses and empower the practical experience of teachers and students. Relevant schools and departments are expected to identify their positioning, focus on industrial demand for talents, and ensure the rights, interests, and quality of internships for students. Meanwhile, they need to track practical skills required by enterprises and improve the proportion of scores of practical tests for full-time teachers engaged in professional subjects at technological and vocational schools (Ministry of Education, Republic of China (Taiwan), 2014).

Taiwan has seen new records in college enrollment and vacancy in recent years. Other structural factors, such as a lower birth rate, also contribute to the less willingness and negative attitude towards learning among college students. Besides, people have often mentioned and discussed unfavorable employment environments (job loss and low salary) and the industry-university gap featuring the disconnection between education and industry. Lin (2016) attributed the “widening industry-university gap” to two major reasons. The first reason is a weak tie between industries and universities. Most current colleges and departments are subdivided based on conventional knowledge systems, and their curriculum design fails to keep pace with the fast-changing age. Though interdisciplinary courses are offered, it takes wisdom and effort to digest knowledge from different fields for students. Furthermore, most employed teachers have to choose research over teaching,

because they only go through conventional training from the academic community without first-hand practical experience in their respective industries, and title assessment is determined by how many academic papers they have published. The lack of direct connection between college teachers and industries denies students access to skills required by enterprises. Second, there is a mismatch in human resources between industry and universities. At present, the policies on human resources for industries introduced by the government are “top-down”. Specifically, industrial policies and plans precede labor demand estimation and serve as standards for adding or canceling departments and enrolling students for the Ministry of Education. However, this practice misses practical demands in the labor market. In addition, these industry-specific policies on human resources are hard to be combined together and work as a whole, because the government and industry competent units are responsible for different parts of these plans and implementation respectively, with little coordination and communication. Hence, technological and vocational education is expected to cultivate competent and problem-solving talents who can access and apply information, work with people from other fields, and make innovative decisions, with great industrial vision and thinking ability (Executive Yuan, Republic of China (Taiwan), 2021).

Jou (2019) stressed that schools and departments should plan informal curricula to be integrated with formal courses in the classroom and cultivate the management skills of students, such as keynote speeches, enterprise visits, thematic or case competitions on and off campus, off-campus internships, special projects, club activities, and overseas study. These programs are designed to endow students with management skills such as leadership, communication, coordination and teamwork, and practical application abilities. “Classrooms may not last forever, but learning can”. Informal curricula are combined with formal courses through classes taken place on campus and through social and online channels (Wang, 2001). Among them, keynote speeches (including industry expert collaborative teaching) and off-campus visits have been exercised for years, but nobody has tried to plan and organize these learning activities into informal curricula in a systematic manner. Therefore, students might learn better if curriculum design were combined with industry expert collaborative teaching and enterprise visits. Students might be kept motivated and keen on learning if industry expert collaborative teaching and visit activities were included in subsequent courses after their content and specific topic are discussed and identified. These steps can help students develop their abilities of comprehending and analyzing topics and putting them to practical use, and understand the industrial environment and culture better to increase their knowledge of relevant industries and improve their relevant abilities. As a result, they are made more competitive in the workplace. Experiential learning highlights reflections from specific activities, through which students can learn as required and expected by curriculum design (Ewert and Garvey, 2007). Chen et al. (2011) found that courses on practical experience through enterprise visits are helpful for the learning outcomes of students by helping them acquire great professional practical experience. Practical courses and theoretical courses are mutually corroborative.

Students should examine their weaknesses in industrial and professional proficiency during their college years.

Burgoyne and Hodgson (1983) emphasized the importance of learning from practices. In other words, experiential learning creates a view or attitude that can change a person in a gradual or acquiescent manner, including problem-solving and “learning to how”. Learners should reflect on their past experience, learn about the meaning brought by experience, and take action to test solutions, thus leading to a higher level of participatory learning. Therefore, teachers attach great importance to including experiential learning in courses, while setting learning objectives. Limited by funds and teaching environment, many schools and departments are unable to offer courses where industrial experience is integrated with teaching and learning. Therefore, students would have a better understanding of industries and teachers know more about the working environment and demands for talents in industries if industry expert collaborative teaching and enterprise visit are included in courses. Such courses can give a fuller picture of the trajectory and latest developments of industries, and present more opportunities for closer industry-university cooperation for teachers or internships for students.

4. Results and Discussion

In recent years, the Ministry of Education has stressed the importance of closing the theory-practice gap in higher technological and vocational education. It introduced policies to encourage relevant universities and colleges to take coping strategies, such as strengthening the bond with industries, adopting industry expert collaborative teaching, offering classes specializing in industries, implementing off-campus internships, supporting teachers in learning and studying at enterprises, encouraging the promotion of technical report and diversity, and establishing research centers (Lin and Chen, 2017).

As digital technologies drive the innovation-based society, technological and vocational education should make constant adjustments in the policies on talent cultivation and conduct practical teaching by the availability of teachers with practical experience and guide the practical learning of students. These practices allow students to learn and thrive in line with their personal interests, aptitudes, and talents, and quickly serve the demands in industries as applied professionals in various fields (Executive Yuan, Republic of China (Taiwan), 2021). Different from foreign counterparts that train students in group discussion and defense in classes, colleges and universities in Taiwan provide few opportunities for students to improve their diverse expression and communication abilities. In response, Taiwan has taken active measures to reinforce the diverse narrative abilities of college students, especially abilities of oral expression, communication, and narration. Besides, group courses on interdisciplinary issues are also provided to produce an interdisciplinary dialogue effect, thus strengthening the professional knowledge and skills of students, along with their abilities of narration and communication (Ministry of Education, Republic of China (Taiwan), 2017b). For example, (1)

group courses based on interdisciplinary issues promote the interdisciplinary dialogue of professional knowledge and skills to create positive teaching teams. (2) Students are cultivated for narrative abilities with altruistic spirits. That means those students are able to put their professional knowledge and skills to practical use for social purposes and reproduce or express professional knowledge and the concept, idea, or action of social practices, thereby achieving a positive interaction between knowledge and society. (3) Students are cultivated for the abilities of listening, note-taking, reading, writing, oral presentation, creative communication, and narrative imagination with realization momentum.

Narrative teaching is designed to endow students with a brief speech, copywriting, and business plan writing and cultivate them to dive into issues, and collect information through diverse channels for summarization, explanation, and expression by making full use of language or media. Hence, courses are expected to enable students to observe, explore, discuss, reflect and face the facts of a core issue in the field, and develop and express their ideas by taking narration as a medium in new course groups (Ministry of Education, Republic of China (Taiwan), 2018). Problem solving is a process of mental activities of solving problems by using existing knowledge, experiences, skills, thoughts, and actions. As such, situations can go as expected. The representative of abilities required to solve problems (It might be a part of all abilities endowed with a general name) is the problem-solving ability (Huang and Cheng, 2004). As life and working scope are getting more globalized, people resort to past experiences or ask for help from others when faced with more complex and trickier problems. However, their strategies do not always work effectively. Therefore, the new generation must be equipped with excellent abilities of solving problems and settling on the best solutions by fully using their logic in the workplace (Chang, 2012). Spady (1994) argued that learning outcomes refer to specific achievements students have made after they acquire significant learning experiences. They represent students can apply and demonstrate what they know and acquire, instead of knowing or having various mental states. Informal curricula refer to various learning activities arranged and organized on purpose, apart from formal courses. Their system and organization are not well-structured but flexible and even allow students to teach themselves. These activities are designed with great autonomy, indicating that schools can introduce diverse, various, and rich learning activities consistent with their respective development objective, regional features, and students' interests and demands. They guide students to positive learning in this way to expand the learning scope of students and make learning deeper and wider, thus complementing the weaknesses of formal teaching activities. Students are exposed to those less formal activities and experiences in a more natural manner and have decent effects on students, no less than formal courses.

Informal curricula can enrich the content of school teaching and meet the individual difference, interests, and demands of students, thus keeping students more hooked on school and learning. From this perspective, schools should be given more flexible room to arrange informal curricula (Yu, 2000). Jan (2010) suggested that

formal courses prioritize cognitive learning, while informal curricula supplement effective and action learning and stimulate learning motivations and active learning among students. Experiential learning emphasizes to develop skills required in the real world through practice and applied learning and prepares students for graduation and employment (Roberts, 2018). Therefore, this study calls for industry expert collaborative teaching and enterprise visit in some courses offered by business schools to keep students motivated and keen on learning. To be specific, by working with a full-time teacher, a professional industry expert from a specific industry is invited to engage in cooperative teaching for a specific topic in the first week, cooperate with enterprise visits (learning activities included in informal curriculum) in the second week, and guide students to discussion based on the content and activities of the former two weeks in the third week. As such, teachers and students can have a better understanding of the industrial environment and practices (through industry expert collaborative teaching, discussions, and enterprise visits) and sharpen up relevant professional knowledge and skills. Additionally, these courses are helpful for students to grow more competitive in the workplace, close the industry-university gap and increase interactions between universities and industries. Furthermore, it is suggested that curricula are planned and teaching materials are designed by industry experts and full-time teachers together, and teaching methods are adjusted.

If multiple topic-oriented teaching and discussion can be held, students may improve their abilities of narrative, diverse imagination, and problem solving with better learning outcomes. Combining teaching and on-the-spot learning in one environment helps students understand the cream of industrial and academic research for self-improvement in professional skills. While allowing students and teachers to learn more about the industrial environment and culture, and to enrich proficiency in industry, industry expert collaborative teaching helps to improve the competitiveness of students in the workplace, works to close the industry-university gap and strengthen the interactions between industries and universities.

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