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Effectiveness and Evaluation of Online and Offline Blended Learning for an Electronic Design Practical Training Course

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ABSTRACT

It is imperative to bridge the disparity between college students' practical capabilities and professional expectations. To help facilitate such a progression, an electronic engineering course oriented around the Creative Innovation Practice project has been designed with the objectives of student-centric instruction, integration of both theoretical and practical components, and application of knowledge through project case studies. Adopting the open engineering education approach, there has been an initiation of project-driven blended teaching centered on "constructivism," constituting a model that joins online and offline instruction, in-class and out-of-class tasks, activities inside and outside the laboratory, coursework, and contests. This amalgamated mode of learning has had a beneficial outcome in enhancing learners' self-learning capabilities, hands-on practice, as well as their inventive aptitude. According to an analytic hierarchy process (AHP) evaluation and assessment, blended teaching could effectively augment participants' eagerness to learn and motivation.

KEYWORDS

AHP, Blended Learning, Evaluation Analysis, Practical Training Course

INTRODUCTION

In the past ten years, with the rapid advancement of technological innovation, industrial upgrading, and the informatization of Chinese enterprises, the demand for high-tech personnel has effectively promoted the rapid development of related majors in higher education. After graduation, students can work as senior technical or management personnel in enterprises, but student quality and ability development are inconsistent, which cannot meet society's demand for talent. According to the recent feedback from Shandong Technology and Business University (SDTBU) on the recruitment of graduates, "poor practical application skills" account for 39.41%, which is the important reason for their dissatisfaction, as shown in Figure 1. One possible reason is that students who may be affected by the epidemic are deprived of possible chances of entering the enterprise. Therefore, motivating students to partake in experiential learning within a professional setting is paramount in the foreseeable future. This requirement stems from the fact that inadequacies in practical aptitudes are symptomatic of a deficiency in university education in terms of the design, teaching methods and practice of relevant courses. There is consequently an urgent need for further refinement of practical training in universities.

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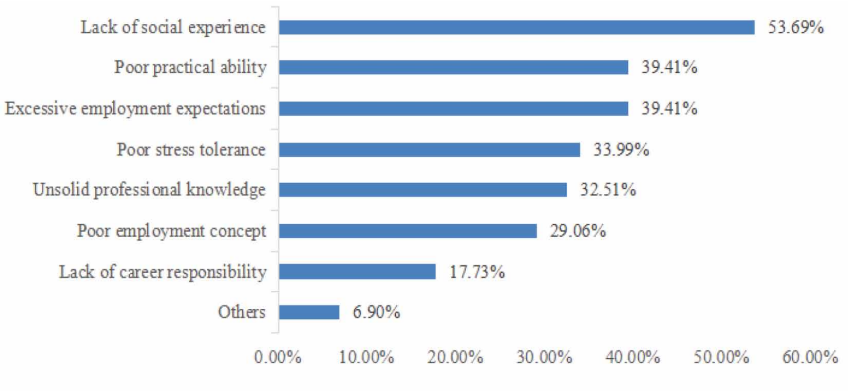
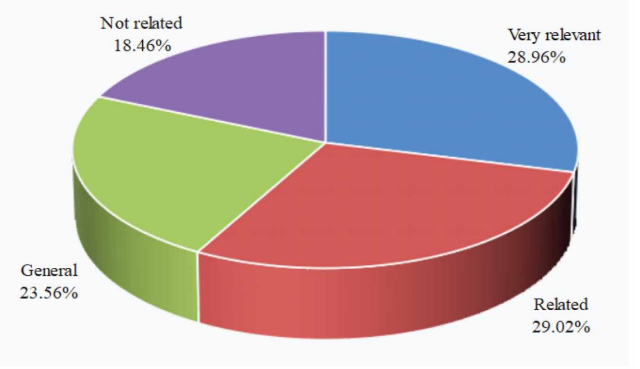
Figure 1. Employers' Feedback on the Shortcomings of Graduates when Applying for a Job



Moreover, taking the matching rate of employment and major in graduates of SDTBU in the past three years as an example, from 2019 to 2021, the matching rate is not high, as shown in Figure 2. There are some possible reasons behind. Firstly, students cannot find jobs corresponding to their major. Secondly, according to the feedback on the graduate's ability from employers, the theoretical knowledge of graduates is disconnected from the practice, and the graduates cannot quickly adapt to the working environment. Obviously, it is quite unusual that the employment situation of students is good, but the quality of employment is not high and needs to be improved. The main reason is the lack of students' professional employability, especially practical innovation ability, and the lack of in-depth learning and exploration of professionals and occupations.

Figure 2. The Professional Matching Situation of the Graduates' Current Job



It has become an important task facing higher education to cultivate industrial and technical talents with innovative spirit and strong practical ability, and also an urgent task for colleges and universities to train engineering talents (Liu, 2011; Wu et al., 2017). Therefore, taking economic development needs as a booster for students' career development, practical innovation, and engineering ability should be considered as the core to build students' employment quality for the engineering major, which will further improve the employment quality of college students.

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