Research on the Construction of Deep Learning Based Innovation and Entrepreneurship Education System in the Internet Plus Era

Xiong Lin\(^1\) and Weiping Zhou\(^2\)

\(^1\)Emergency Technology College, Zhejiang College of Security Technology, Wenzhou, 325000 Zhejiang, China
\(^2\)College of teacher education, Zhejiang Normal University, China

Correspondence should be addressed to Weiping Zhou; 610133144@qq.com

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In order to cultivate the innovative and entrepreneurial (IAE) spirit of college students, let them introduce the concept teaching of Internet + mass entrepreneurship and innovation while learning professional knowledge, and colleges and universities can provide an entrepreneurship platform to turn theoretical knowledge into practice. The school platform provides all the resources and funding sources needed by students to start their own businesses, and the students through the theory, knowledge, and wisdom combined use the school to provide a platform to achieve entrepreneurship. College IAE education analyzes students’ entrepreneurship through deep learning and statistical data, and the superiority of the school Internet + IAE concept teaching and the entrepreneurship platform provided by the school is demonstrated through the number of entrepreneurship graduates, entrepreneurship motivation, entrepreneurship capital source, entrepreneurship recruitment, and entrepreneurship survival cycle of graduates in the three years’ class.

1. Introduction

College students’ innovation and entrepreneurship education, also known as college students’ mass entrepreneurship and entrepreneurship project, was aimed at cultivating college students’ innovation and entrepreneurship spirit, let them shape students’ innovation and entrepreneurship personality while learning knowledge, and improve their comprehensive quality and ability of innovation and entrepreneurship. With a new educational concept, College students’ innovation and entrepreneurship consciousness and innovation and entrepreneurship thinking mode carry out systematic educational reform on innovation and entrepreneurship [1].

With the development of society, the employment mode of college students has changed again and again, and the education mode of colleges and universities to students has changed accordingly. The transformation from professional education to mass entrepreneurship and innovation education can also be regarded as the expansion and extension of professional education. In the era of Internet plus, deep learning and machine learning have also entered college education, improving the social sensitivity of students [2]. Xiangjin and Yanyan (2001) pointed out how college students deal with the opportunities of a series of entrepreneurship policies launched by the state and Industry under the background of 5g, and how to avoid risks and become successful in the opportunities [3]. Wang is a new force of potential entrepreneurs. Taking online education as the research background, this paper discusses the strategies and models of online education on the effectiveness of college students’ dual entrepreneurship education, which enriches the theory of college students’ entrepreneurship and entrepreneurship education [4]. Huimin, the school is the birthplace of knowledge dissemination. In the past, the understanding has completely failed to keep up with the rapid development of society, which requires reform from the source [5]. This paper points out that from the
perspective of the development of the new era, this paper demonstrates the relationship between college students’ innovation and entrepreneurship education from the educational concept of ideological and political curriculum and dialectically treats the relationship between them, so as to explore the integration countermeasures of curriculum ideological and political education and college students’ innovation and entrepreneurship education.

As the society develops, professional knowledge has no longer made college students take the initiative in the employment process. For the transformation of quality education to diversification, to stimulate students’ awareness of IAE education, the education system has developed a series of coping strategies. Jie takes Jiaxing Nanyang Vocational and Technical College as an example, and his paper analyzes the current situation and existing problems of IAE education in higher vocational colleges, in the environment of “Internet +,” to promote IAE education and practice needs to start from the aspects of system, curriculum, and government-school cooperation [6]. Jiayu and Wu analyzed the impact of short video media such as “TikTok” and “micro video” on IAE education, to provide effective suggestions to improve students’ entrepreneurial ability [7]. In Niu et al., through edible fungi as an example, it is pointed out that there are no complete IAE standards for edible fungi yet, works is available as an IAE project, it points out the development direction for the existing university talent training system and the IAE development of college students, in the future, universities can formulate corresponding standards to fill this gap [8]. Wang analyzed the existing problems in the IAE education function of the student union associations in higher vocational college students, to discuss the role of the student union association in promoting IAE education and improve the realization of the entrepreneurial path [9].

The realization of IAE education cannot be separated from the policy guidance and the cultivation of educational cognition, and college students, while learning professional knowledge, improve the Internet + concept learning [10]. Through this system, the IAE education platform system of “entrepreneurship education, entrepreneurship training and entrepreneurship practice” is built and promotes the construction of entrepreneurship classroom and real operation of the entrepreneurial process, to realize the path of entrepreneurial success [11].

2. Introduction of the Concept of “Enterprise School Enterprise” in Entrepreneurship and Innovation Education

A benign environment can breed fertile soil and demand can also create opportunities [12]. In order not to limit the education of dual creation to the situation, deep learning is carried out based on the theory of Internet plus and from theory to practice cognition [13]. This requires the university to break the previous education model and create a platform suitable for the entrepreneurial needs of college students [14], as shown in Figure 1.

In Figure 1, we can see the “enterprise school enterprise” channel platform of dual entrepreneurship education. The university provides college students with the resources, needs, loans, equipment, and other obstacles encountered in their normal operation. Here, the role of the university is similar to the platform of resource integration, and it is not to directly input funds or inject resources into college students, because college students are still in the theoretical stage and have no practical experience in entrepreneurship. In order to avoid some fantasy of blind investment without practical experience, the University puts the resources needed by college students in entrepreneurship on the platform and provide an entrepreneurial environment for students who really want to start a business and have the ability to implement it thoroughly. The University platform is a mature and complete system, and entrepreneurship is not a temporary passion. College students must have mature enterprise planning and implementation plans and have certain operability. Only after the cooperative enterprise determines that it has certain market value and promotion value, can they invest resources and funds and obtain a certain return on investment. The “enterprise school enterprise” channel platform of dual entrepreneurship education is a public welfare platform, and the resources on the platform are provided free of charge.

In Figure 2, capital is the blood of an enterprise. An enterprise cannot develop better without capital investment and productivity return. The biggest difficulty of entrepreneurship is the difficulty of financing and slow return. Investors who want to have stable investment controllability can set up trust accounts for capital safety supervision. The trust account enlarges the original funds according to a certain proportion, in which there is a certain leverage effect. While the interests are enlarged, the risks are also enlarged. A trust platform is established under professional supervision to earn certain results through fund sales and purchases. The trust fund opened by the trustee of the trust account is a special account, and the fund after entering the trust account is relatively safe. In addition, financing enterprises raise funds through anchored asset issuance funds and make capital replenishment again as investors through asset sharing and asset integration, so as to make a virtuous cycle of capital utilization and maximize benefits.

In Figure 3, the patent R & D obtained by college students according to their professional knowledge can recruit funds for the feasibility study of capacity transformation through the University platform. Due to the shortage of funds, the patented technology cannot be effectively transformed into products and realized income. At this time, the University’s “enterprise school enterprise” channel platform can provide corresponding investment information. After the confirmation and evaluation of the patent authority, the enterprise with patent shares can obtain equity and dividends. With the injection of capital, the patent can be completed and the capital recovery can be realized. Trust account and income are the effective supervision and income source of its capital. They run through the whole process of capital circulation, effectively introduce the risk control process of financial investment institutions, and strengthen the
audit and supervision after state-owned trust investment, so as to make the capital circulation safer and more reliable.

3. General Information of the Surveyed Students

In order to enhance the safety of students’ participation in innovation and entrepreneurship, since the summer vacation of 2019, our university has carried out a three-year follow-up survey and research, including 2019 graduates, 2020 graduates, and 2021 graduates. The number of graduates and the situation of students participating in mass entrepreneurship and innovation are shown in Table 1.

The graduation age of each student is 21-23 years old, and the distribution of age, gender, and nationality is relatively stable. This paper does not make a comparative analysis. The gender proportion of entrepreneurial students is shown in Table 2.

3.1. Teaching Methods and Teaching System. The 2019 graduates did not introduce the concept of Internet plus double creation. The joint committee was organized by the league committee, the student union, and the student federation. The college student association of double creation of the University organized the seminar for the 2019 graduates and invited the successful start of the graduates to face up with Bijie. The activity was organized 15 times, with 519 students and 4325 person times. Of the 216 graduates involved in mass entrepreneurship and innovation, 194 were participants, accounting for 89.81%.

The 2020 graduates set up elective courses for Internet plus double creation at the beginning of the fourth year of the senior high school. The number of elective students was 625 students and 35000 students during the 56 hours. Meanwhile, the seminar of the old school leaders continued to be held 12 times, involving 447 students and 4369 people. At the same time, deep learning is introduced, and the algorithm is used to sort out the data related to the number of participants and entrepreneurs.

In 2021, on the basis of the teaching system of 2020, the University held an entrepreneurship and innovation school enterprise exchange meeting and invited financial investment banks, consulting companies, and enterprise management companies to participate in 13 entrepreneurship exchange meetings for college students, with more than 1285 students and 16000 person times. Among the 227 graduates involved in mass entrepreneurship and innovation, 214 were activity participants, accounting for 94.27%. At the same time, it introduces deep learning and uses algorithms to sort out the impact of colleges and universities on students’ entrepreneurship through entrepreneurship and innovation education.

3.2. Statistical Methods. The neural network module adopts polynomial depth Iterative Regression node function, and its basis function is written in formula (1)

\[ y = \sum_{j=1}^{n} \sum_{j=0}^{5} A_j x_j^j, \]

where \( x_j^j \) is the \( j \)th power of the input value of the \( i \)th node in the upper neural network; \( A_j \) is the coefficient to be
regressed of the $j$th order polynomial; and $n$ is the number of nodes of the upper neural network.

All measurement data are expressed as mean ± standard deviation ($\overline{x} \pm s$) and $t$ as calibration. The counting data are expressed in (%), and chi square test and analysis of variance are used according to the nature of the data, and the data are analyzed by spss24.0 statistical analysis software.

The $t$ value and $p$ value of bivariate $t$-check come from the bivariate $t$-check process, where $t$ value is the value of the output result. When $t > 10.000$, it is considered that there is a statistical difference between the two columns.
of data, and the greater the $t$ value, the greater the statistical difference; $p$ value is the log value of the output result. When $p < 0.05$, it is considered that the result data is within the confidence space. When $p < 0.01$, it is considered that the result data has significant statistical significance. The smaller the $p$ value, the higher the degree of confidence. Subject to the length, only the calculation algorithm of $t$ value (value) is explained here, such as formula (2).

$$t_{value} = \frac{\bar{x} - \mu}{S/\sqrt{n - 1}}. \tag{2}$$

![Figure 4: Visual representation of college students’ employment data.](image)

<table>
<thead>
<tr>
<th>Year</th>
<th>Friendship</th>
<th>Love</th>
<th>Family</th>
<th>Social value</th>
<th>Self-realization</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>96(26.52)</td>
<td>62(17.13)</td>
<td>34(9.39)</td>
<td>32(8.84)</td>
<td>50(13.81)</td>
<td>88(24.31)</td>
</tr>
<tr>
<td>2020</td>
<td>64(18.44)</td>
<td>38(10.95)</td>
<td>65(18.73)</td>
<td>85(24.5)</td>
<td>42(12.1)</td>
<td>53(15.27)</td>
</tr>
<tr>
<td>2021</td>
<td>36(8.61)</td>
<td>29(6.94)</td>
<td>103(24.64)</td>
<td>163(39)</td>
<td>66(15.79)</td>
<td>21(5.02)</td>
</tr>
</tbody>
</table>

![Figure 5: Visual representation of college students’ entrepreneurial motivation.](image)
where $\bar{x}$ is the arithmetic mean of the sample series of entrepreneurship and entrepreneurship education model; $\mu$ is the average value of the sample series of previous entrepreneurial models; $n$ is the number of nodes in this series of entrepreneurship and entrepreneurship education model; $m$ is the number of nodes in the sample sequence of previous entrepreneurial models; and $S$ is the standard deviation rate of entrepreneurship and entrepreneurship education sample sequence.

The algorithm of arithmetic mean in formula (1) is shown in formula (3)

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{n} x_i,$$

where $i$ is the traversal pointer; $m$ is the number of nodes in the sample sequence of previous entrepreneurial models; and $x_i$ is the ith input value in the sequence. The meaning of mathematical symbols is the same as above.

The algorithm of standard deviation rate in formula (1) is shown in formula (4)

$$S = \frac{1}{n-1} \sqrt{\sum_{i=1}^{n} (x_i - \bar{x})^2}.$$  

### 4. Comparative Analysis of Teaching Results

#### 4.1. Survey Results of Students’ Entrepreneurial View

Through the follow-up survey of graduates over the years, through artificial intelligence and statistical data, the employment direction planning after graduation is obtained, which is mainly reflected in three aspects: entrepreneurship priority, independent employment priority and public recruitment priority.

In Table 3, bivariate $t$-test was conducted in pairs in the year of graduation. It was found that $t > 10.000$, $p < 0.05$, with credible statistical consistency; bivariate $t$-test between graduates’ employment tendency shows that $\oplus$ entrepreneurship priority and others $t > 10.000$, $p < 0.01$, with significant statistical consistency, $\odot$ employment priority and public recruitment priority $t > 10.000$, $p < 0.01$, with significant statistical consistency, and $\ominus$ entrepreneurship priority, others and employment priority, public recruitment priority $t < 10.000$, $p < 0.05$. There are credible statistical differences. According to the distribution of employment tendency of three-year graduates, the nonlin-

### Table 5: Statistics of start-up investment scale of student entrepreneurs (data from follow-up survey report).

<table>
<thead>
<tr>
<th>Year</th>
<th>Investment amount (million yuan)</th>
<th>Proportion of family and self-owned funds</th>
<th>Proportion of social funds</th>
<th>Proportion of student equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>1.25 ± 0.13</td>
<td>98.4 ± 0.11</td>
<td>1.6 ± 0.17</td>
<td>89.3 ± 0.58</td>
</tr>
<tr>
<td>2020</td>
<td>5.15 ± 0.53</td>
<td>76.5 ± 4.21</td>
<td>23.5 ± 4.82</td>
<td>64.5 ± 5.74</td>
</tr>
<tr>
<td>2021</td>
<td>27.38 ± 2.85</td>
<td>47.3 ± 14.85</td>
<td>52.7 ± 15.4</td>
<td>33.1 ± 12.35</td>
</tr>
</tbody>
</table>

Due to the influence of environment, major, family, and other factors, college students have different employment choices. Among them, the threshold for independent entrepreneurship is high. For entrepreneurs, the preparation of funds, the selection of entrepreneurship projects, enterprise operation planning, and team preparation need the support of a large number of human resources. For newly graduated college students, the strength in all aspects is slightly insufficient. Therefore, most graduates choose independent employment, civil service entrance examination, and recruitment of enterprises and institutions, and a small part of graduates flow to freelancers.

In order to more intuitively reflect the employment selection of graduates in the above table, visualize the data in the table to get Figure 4.

In Figure 4, due to the influence of environment, major, family, and other factors, college students have different employment choices. Among them, the threshold for independent entrepreneurship is high. For entrepreneurs, the preparation of funds, the selection of entrepreneurship projects, enterprise operation planning, and team preparation need the support of a large number of human resources. For newly graduated college students, the strength in all aspects is slightly insufficient. Therefore, most graduates choose independent employment, civil service entrance examination, and recruitment of enterprises and institutions, and a small part of graduates flow to freelancers.

In Table 4, bivariate $t$-test was performed for two pairs, and it was found that $t < 10.000$, $p < 0.01$, with significant statistical difference. In the table, it can be seen from the analysis of students’ entrepreneurial motivation that they are greatly affected by external factors. Among them, there are emotional factors for friendship and love, and other motives are random, so R2 test cannot be carried out.

In order to facilitate the observation of the data in the above table, the data in the above table are visually displayed, as shown in Figure 5.

In Figure 5, the communication circle of college students is mostly around the campus, which is more affected by family, external environment, and personality. Some people cannot give up friendship and love and choose to start a business together, mostly affected by various factors.

#### 4.2. Statistical Results of Student Entrepreneurship Scale

Through the follow-up survey of entrepreneurs, the specific statistical results are obtained by taking the entrepreneurial scale as the marker variable, as shown in Table 5.

In Table 5, bivariate $t$-test was performed between all rows and all columns. It was found that $t < 10.000$, $p < 0.01$, with significant statistical difference. With the increase of the amount of venture capital, the proportion of family and self-owned funds decreases, and the proportion of students’ equity increases.

In order to fully show the difference of data, the data is visualized, and the results are shown in Figure 6.
Figure 6: Visual diagram of the scale of start-up investment of student entrepreneurs.

Table 6: Statistics of student entrepreneurship scale (data from follow-up survey report).

<table>
<thead>
<tr>
<th>Year</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of people</td>
<td>4.92 ± 0.51</td>
<td>44.08 ± 4.39</td>
<td>317.12 ± 31.24</td>
</tr>
<tr>
<td>Partner (classmate)</td>
<td>1.17 ± 0.24</td>
<td>2.79 ± 0.57</td>
<td>4.28 ± 0.43</td>
</tr>
<tr>
<td>Partner (social recruitment)</td>
<td>0.22 ± 0.02</td>
<td>2.85 ± 0.27</td>
<td>17.58 ± 1.83</td>
</tr>
<tr>
<td>Employee (classmate)</td>
<td>3.12 ± 0.35</td>
<td>15.43 ± 1.68</td>
<td>87.26 ± 8.95</td>
</tr>
<tr>
<td>Employees (social recruitment)</td>
<td>0.36 ± 0.05</td>
<td>22.47 ± 2.31</td>
<td>203.41 ± 21.26</td>
</tr>
<tr>
<td>Senior manager</td>
<td>0.08 ± 0.00</td>
<td>3.57 ± 0.31</td>
<td>13.26 ± 1.38</td>
</tr>
</tbody>
</table>

Figure 7: Distribution of students’ entrepreneurial scale and personnel.
Table 7: Statistics of students’ entrepreneurial success rate (data from follow-up survey report).

<table>
<thead>
<tr>
<th>Year</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of enterprises</td>
<td>184</td>
<td>62</td>
<td>53</td>
</tr>
<tr>
<td>One-year survival rate</td>
<td>26 (14.13)</td>
<td>32 (51.61)</td>
<td>39 (73.58)</td>
</tr>
<tr>
<td>First year profit margin</td>
<td>16.5 ± 1.48</td>
<td>8.6 ± 0.79</td>
<td>7.2 ± 7.41</td>
</tr>
<tr>
<td>First year debt ratio</td>
<td>27.3 ± 2.84</td>
<td>75.8 ± 76.8</td>
<td>86.7 ± 8.72</td>
</tr>
<tr>
<td>Bankruptcy debt ratio</td>
<td>465.2 ± 47.2</td>
<td>3025.6 ± 308.4</td>
<td>5468.1 ± 552.6</td>
</tr>
</tbody>
</table>

In Figure 6, with the increase of entrepreneurship specifications, the amount of investment also increases. The participation of investors will reduce the proportion of self-financing of entrepreneurs, so as to drive the benign and sustainable development of enterprises.

In Table 6, bivariate t-test was performed between all rows and all columns. It was found that \( t < 10.000, p < 0.01 \), with significant statistical difference. At the initial stage of students’ entrepreneurship, due to the influence of capital and scale, most of the enterprise recruits are absorbed from students. With the development and growth of enterprise scale, the social recruits also increase.

In order to fully show the difference of data, the data is visualized, and the results are shown in Figure 7.

In Figure 7, the initial stage of students’ entrepreneurship is not large, and the enterprise scale and preparation are not mature. Most of them recruit employees from nearby students. With the development of the company scale and the gradual improvement of the management system, social recruitment and the emergence of professional managers will replace the original model.

In order to fully show the difference of data, the data is visualized, and the results are shown in Figure 8.

In Figure 8, students’ entrepreneurial life cycle takes one year as an example. Most entrepreneurial enterprises will face difficulties in all aspects within one year, so they cannot survive and go bankrupt. The surviving enterprises will gradually improve the enterprise management system and realize profits in the competitive environment.

5. Summary

IAE education is a product of the Internet + era, in order to improve the scientific and technological innovation education for college students, and the integration of expertise and IAE education [15]. This study establishes an IAE education platform system of “entrepreneurship education, entrepreneurship training, and entrepreneurship practice,” and in-depth learning and machine learning theory were introduced to analyze IAE education. In this paper, the advanced nature of IAE education system is analyzed through the number of college students, entrepreneurship motivation, entrepreneurship capital source, entrepreneurship personnel recruitment, and entrepreneurship survival cycle after IAE education, and entrepreneurship factors were analyzed through statistical data and promote the construction of entrepreneurship classroom and real operational business process, to were analyzed through statistical data
and promote the construction of entrepreneurship classroom and real operational business process, to achieve the path of entrepreneurial success and to achieve the path of entrepreneurial success and to provide a basis for educational participation for the later IAE education. Although college students are limited by experience, capital, management and other factors, the survival cycle of entrepreneurial enterprises is relatively short, but the entrepreneurial process provides valuable experience for entrepreneurs and lay the foundation for future success [16].

Data Availability

The data underlying the results presented in the study are available within the manuscript.

Disclosure

We confirm that the content of the manuscript has not been published or submitted for publication elsewhere.

Conflicts of Interest

There is no potential conflict of interest in our paper, and all authors have seen the manuscript and approved to submit to your journal.

References


