Research Article

Design of Innovation and Entrepreneurship Education Ecosystem in Universities Based on User Experience

Dan Sheng and Yulong Wang

1 College of Humanities, Xi’an Shiyou University, Xi’an, Shaanxi 710065, China
2 College of Petroleum Engineering, Xi’an Shiyou University, Xi’an, Shaanxi 710065, China

Correspondence should be addressed to Dan Sheng; shengdan01@xsyu.edu.cn

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The conventional college innovation and entrepreneurship education ecosystem is not considered to be designed for low energy consumption, and there is confusion in function switching, which leads to a large value of packet loss rate in system transmission. In this paper, we analyze the construction of college innovation and entrepreneurship education ecosystem and construct the scientific ecosystem of college innovation and entrepreneurship education based on user experience so as to realize college. At the same time, it takes into account the principle of green and low energy consumption of system hardware and software design, in which the hardware part selects S3C6410 RISC microcontroller as the core component to build the structure of educational ecological controller, connects a 16 bit buffer in parallel outside the controller, uses the buffer as the actual conversion port, specifies the function switching bearing interface, uses a protocol conversion chip, and designs the data acquisition circuit structure. The software part builds a model of user experience elements, sets to get an ecological interaction interface under the interoperability between the model and information data, and uses JAVA programming to realize functional modules according to the deviation of educational information shown by users. The experimental results show that the educational ecosystem designed in this paper has high data throughput, high fault tolerance, and low packet loss rate and system energy consumption, which verifies the effectiveness of the system.

1. Introduction

User experience refers to a subjective feeling built by users in the process of using products. Set the corresponding experiment and get the commonness of users in a well-defined user group [1–4]. Innovation and entrepreneurship education contains a variety of basic entrepreneurial qualities, which can cultivate talents with pioneering personalities and establish an educational theme dominated by consciousness, spirit, and ability [5–9]. It broadens the adaptability of college education, exercises college students’ innovative thinking and innovative ability at different levels and stages, and forms a mature education system [10]. With the continuous development of information technology, innovation and entrepreneurship education in colleges and universities are gradually developing towards systematization. The design of innovation and entrepreneurship education ecosystem has become the focus of current research. Taking user experience as the design principle of innovation and entrepreneurship education ecosystem [11], a university innovation and entrepreneurship education ecosystem based on user experience is designed. The rapid development of digital technology provides a solid foundation for modern science and technology. With the support of cloud technology and the optimization of digital technology, the connotation of data will reveal the development of the times more accurately, and the social development trend reflected by it is forward-looking, which is an important landmark for the development of modern society [12, 13]. On this basis, the innovation and entrepreneurship ecosystem of universities is reviewed. As a way to promote college students’ independent entrepreneurship, optimize entrepreneurship,
and achieve linkage with the campus cultivation system, the sustainable development of ecological entrepreneurship education mode can be realized. The introduction of such forward-looking data technology and its close combination with the innovation and entrepreneurship education ecosystem will ensure the effectiveness and accuracy of campus entrepreneurship training, and truly cultivate advanced talents [14, 15]. In addition, the soft power of information support for college students’ innovation and entrepreneurship can realize cross-regional information exchange, provide information support for college students in remote areas, and build a good interaction between college students and basic knowledge of innovation [16]. With the support of this education ecosystem, it can reduce the course cost, break through the restrictions of time and location, and enhance the interaction between innovation and entrepreneurship education.

Foreign countries started early in the research of innovation and entrepreneurship education ecosystem. With the support of metadata, they have constructed a variety of system models, and most of the education systems have been put into use in colleges and universities [17]. The domestic design innovation and entrepreneurship education ecosystem is relatively late. Based on the existing Web (Global Wide Area Network) applications, a functional programming education process is constructed. The system uses the open-source community to transform the original file form into a distributed structure, but there are multiple service interfaces in the structure. A large packet loss rate occurs when the system transmits information [18]. With the support of NoSQL (Nonrelational databases) database technology, the Web adaptive interface technology is applied. However, with the support of HTML (Hyper Text Markup Language) technology, the user interface display process of the education system will occupy the system process, and the generated process data will interfere with the transmitted education data, resulting in packet loss of the data processed by the system.

With the development of the social economy, the innovation and entrepreneurship education ecosystem in colleges and universities continues to rise, which points out a new direction for the further development of the field of education. Therefore, the green and low-energy innovation and entrepreneurship education ecosystem in colleges and universities has become the direction of continuous research and design by researchers. Because the conventional innovation and entrepreneurship education ecosystem in colleges and universities does not consider the low-energy consumption design, and the function switching is chaotic, resulting in a large number of packet loss rate in the transmission of the system, and a kind of innovation and entrepreneurship education ecosystem in colleges and universities based on user experience is designed to solve this problem. (1) The construction of the university innovation and entrepreneurship education ecosystem is analyzed. (2) In the hardware and software design of the system, the principle of green and low-energy consumption is taken into account. (3) The throughput rate, fault tolerance, packet loss rate, energy consumption, and ecoefficiency of the two traditional systems and the innovation and entrepreneurship education ecosystem designed in this paper are compared and evaluated.

2. Research Method

2.1. Educational Ecosystem Ecocontroller Structure Design.

The progress of science and technology, people’s living standards have been greatly improved, but pollution has also followed. Low carbon and environmental protection have also attracted more and more attention. At present, green environmental protection has become the direction of people’s joint efforts. Therefore, this paper uses the principles of green environmental protection and low-energy consumption design to develop and design the system hardware to achieve the ultimate goal of reducing the overall energy consumption of the system.

The S3C6410 RISC (a chip model name) microcontroller is used as the core component of the education ecology controller. After connecting an ATA (advanced technology attachment) controller in series, the internal function register [19, 20] is used to control the two controllers to output the same hardware interface, and the timing configuration register and the function register are connected. Another register is designated as the hardware structure startup device [21]. The working order of the I/O (input/output) interface in the PC (personal computer) card is transformed, and the different working states of the PC card are constructed. The designed controller structure is shown in Figure 1.

Under the controller structure shown in the above figure, the FIFO (first in/first out) interface in the ATA controller is used to directly connect the DMA (dynamic mechanical analysis) controller in series. According to the driving state of the DMA controller, the connection state of the DMA controller is defined [22]. Paralleling a 16-bit buffer outside the controller, the buffer is used as the actual conversion port, which is regarded as the partition point to form two different buffers [23]. Two external pins are placed outside two different buffers, which are used as the input and output interfaces of the circuit chip to construct a data acquisition circuit.

2.2. Construction of Data Acquisition Circuit. The main task of the education ecosystem controller is the conversion process between the education task and the corresponding protocol. Therefore, in the construction of the data acquisition circuit, the ELM327 (a chip model name) series OBD (on-board diagnostics) protocol is used to convert to the RS232 (a chip model name) protocol chip, and its internal RS232 interface is used to connect the above set controller. The semiconductor of 10K is placed on the circuit in series, forming a buffer effect in the circuit structure [24] to maintain the current stability of the hardware circuit. The designed data acquisition circuit is shown in Figure 2.

Under the data acquisition circuit structure shown in the figure above, the crystal oscillator with values of 8 MHz and 32 MHz is used as the double crystal oscillator of the circuit.
structure. A clock source is configured on the 8 MHz crystal oscillator, and two groups of external serial ports are reserved. One of the serial ports is connected to the SPI bus to realize the real-time transmission of collected data by the data acquisition circuit. In order to realize the normal operation of the hardware controller and circuit structure, the voltage value of the hardware power supply output is controlled to be 5V, and an asynchronous buck converter named TPS54331 [25] is placed between the data acquisition circuit and the controller. The power management circuit is constructed by using its internal integrated MOSFET. The structure is shown in Figure 3. Under the circuit structure shown in the above figure, the relationship between the voltage of the data acquisition circuit and the controller voltage is balanced [26] to maintain the normal operation of the system hardware.

2.3. Software Design of Educational Ecology System. In order to further reduce the overall energy consumption of the system and meet the theme of modern green environmental protection, this paper develops and designs the system hardware based on the design principles of green environmental protection and low energy consumption so as to minimize the system energy consumption and promote the further development of ecological environmental protection system.

2.3.1. Setting Ecological Interaction Interface Based on User Experience. According to the constituent elements of user experience, the demand of college students for innovation and entrepreneurship education is divided into the performance layer, structure layer, scope layer, strategy layer, and framework layer. The strategic layer is taken as the innovation and entrepreneurship education goal of system software[27], and the composition of education courses is taken as the information data source. Under the information data source of this part, the innovation and entrepreneurship information scope is formulated, which can be expressed as

\[
R(ij) = \sum_{u \in N(i) \cap N(j)} (r_{ui} - r_{uj}) / |N(i) \cap N(j)|
\]

Among them, \(i\) represents innovation education information data, \(j\) represents entrepreneurship education information data, \(u\) represents scope parameters, \(N(i)\) represents users using innovation education, \(N(j)\) represents users using entrepreneurship education, \(r_{ui}\) represents scoring of information data by users using innovation education, and \(r_{uj}\) represents scoring of information data by users using entrepreneurship education. Within the defined information scope, a user experience element model is constructed by using the information architecture [28] in NoSQL database technology, as shown in Figure 4. Under the experience model shown above, the information exchange between hardware structure and information is constructed, and the interaction between ecosystem and users is completed [29].
2.3.2. The Realization of Function Module. Calculate the information deviation shown by the user group, and the calculation formula can be expressed as

\[
P_u = \frac{\sum_{i \in N(u)} (r_u - R(i))}{\sum_{i \in N(u)} |N(i)|},
\]

where \(r_u\) refers to the evaluation parameters, \(N(u)\) refers to the data set evaluated by the user, and the meaning of other parameters remains unchanged. The information data with small information deviation are used as the common data set of ecosystem interaction [30]. Under the control of the above interaction interface, after entering the ecosystem, the specific information node parameters are calculated according to the defined information range, which can be expressed as

\[
o = \frac{R(ij)}{\chi},
\]

where \(o\) represents the node parameter, \(\chi\) represents the hierarchical value in the user experience model, and the parameter value is 5. Distribute the different authority in the different hierarchical structure [31], and finally realize the education function of the education ecosystem.

2.4. Simulation Experiment Preparation. The entrepreneurship education ecosystem needs to set a variety of data, so the test uses Windows 7 system as support, and adopts a computer with Intel Core i3-2130 CPU, 3500 MHz frequency, 2G memory, and 500 GB hard disk capacity. The server adopts a server with 2 GHz CPU, 4 GB memory, and NVIDIA Geforce GT graphics chip. Under the above experimental parameters, the test structure of the storage layer, service layer, and display layer is constructed. Also, the test structure is shown in Figure 5.

In the test environment constructed above, the client is used to deploy the instance relationship in the test structure, the instance relationship is used to obtain the request proxy service, and it is deployed in the service container, and an education database instance is constructed. The configuration code process is shown in Figure 6. In the database configuration process shown above, after the docker-compose up-d document is run, the test environment is set up, and two conventional systems and the designed entrepreneurship education ecosystem are prepared to test, and the performance of the three systems is compared.

2.5. Comprehensive Study on Ecoefficiency. Ecoefficiency is generally defined as the use of unit ecological resources to obtain more output, while the ecoefficiency of the university...
Figure 5: The built system test environment.

Figure 6: Configuration process of entrepreneurship education database.

```
Command Prompt
D:\opensourc_e_docker\miec\docker-compose up -d
Creating network "miec_default" with the default driver
Creating miel_miepadminweb_1
Creating miel_akkaseed_1
Creating miel_miepweb_1
Creating miel_eventstore_1

D:\opensourc_e_docker\miec\docker-compose scale akkanode=4
Creating and starting miel_akkano_de_2 ...
Creating and starting miel_akkano_de_3 ...
Creating and starting miel_akkano_de_4 ...
D:\opensourc_e_docker\miec\docker-compose ps

<table>
<thead>
<tr>
<th>Name</th>
<th>Command</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>miel_akkano_de_1</td>
<td>bin/miec-service</td>
<td>Up 2552/tcp, 9001/tcp</td>
</tr>
<tr>
<td>miel_akkano_de_2</td>
<td>bin/miec-service</td>
<td>Up 2552/tcp, 9001/tcp</td>
</tr>
<tr>
<td>miel_akkano_de_3</td>
<td>bin/miec-service</td>
<td>Up 2552/tcp, 9001/tcp</td>
</tr>
<tr>
<td>miel_akkano_de_4</td>
<td>bin/miec-service</td>
<td>Up 2552/tcp, 9001/tcp</td>
</tr>
<tr>
<td>miel_akkano_de_1</td>
<td>bin/miec-service</td>
<td>Up 2552/tcp, 9001/tcp</td>
</tr>
<tr>
<td>miel_eventstore_1</td>
<td>/entrypoint.sh</td>
<td>Up 0.0.0.0:1113-&gt;1113/tcp, 0.0.0.0:2113-&gt;2113/tcp</td>
</tr>
<tr>
<td>miel_miepadminweb_1</td>
<td>nginx --g daemon off;</td>
<td>Up 443/tcp, 0.0.0.0:8083-&gt;80/tcp</td>
</tr>
<tr>
<td>miel_miepweb_1</td>
<td>nginx --g daemon off;</td>
<td>Up 443/tcp, 0.0.0.0:8081-&gt;80/tcp</td>
</tr>
</tbody>
</table>
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innovation and entrepreneurship education ecosystem in this paper is the amount of data available to the system that can be obtained with a unit of energy consumption, which is expressed by

\[ EES = \frac{SDV}{C} \]

\[ SDC = TOC \times [a\% \times b\% \times (1 - c)\%] \]

where EES is ecological efficiency of innovative educational ecosystems, \%; TOC is the volume of raw data of the innovative education ecosystem, GB; SDV is the actual amount of data that the system can be used for innovative education ecosystem GB; \(a\), \(b\), and \(c\) are the throughput rate, fault tolerance, and packet loss rate of the innovative education ecosystem, respectively, \%; and \(C\) is the energy consumption of innovative educational ecosystems, \(j\).

3. Results and Analysis

3.1. Comparative Analysis of System Throughput Rate Results. Based on the above experimental preparation, after debugging the three systems, the administrator identity is used to log in to the display layer, and the same learning task is clicked. The three systems are set to be tested 20 times, and 200 data are inserted before each test. The numerical ratio of the actual number of data to the set amount of data is used as the throughput result of the system. Finally, the throughput results of the system are shown in Figure 7.

According to the throughput results shown in Figure 7, the three systems are controlled to process the same amount of inserted data at the same time. According to the throughput results obtained from calculation and statistics, the throughput of conventional ecosystem 1 is 25%, and the system throughput data efficiency is the lowest. The average throughput rate of conventional ecosystem 2 is 38.3%, and the system throughput rate is less, while the throughput rate of the designed education ecosystem is 52.1%. Compared with two conventional systems, the designed system has the largest amount of throughput data.

3.2. Comparative Analysis of System Fault Tolerance. In the above experimental environment, a command-line tool is used to create 15 commands on the API tool. Each command contains 100 sets of data, and the command is used as a test file for the fault tolerance of the system. After reading and writing, the quiz data in the definition command is increased from one to two. The system has a recovery process, indicating that the system has strong fault tolerance. The number of data successfully processed by the three educational ecosystems is counted, and the results are shown in Figure 8.

The number of successfully recovered data is used as an indicator to measure the fault tolerance of the system. Three systems are defined to process 100 sets of data at the same time. According to the results in Figure 7, the number of successfully recovered data groups of the conventional education ecosystem is about 55, accounting for about half of the set data groups. The fault tolerance is poor. Also, the number of successfully recovered data groups in the conventional education ecosystem is about 83, accounting for three quarters of the number of set data groups. The actual fault tolerance is strong. While the number of successfully recovered data groups by the designed education ecosystem is about 94, and almost all the set data can be restored. Compared with the two conventional education ecosystems, the designed ecological education system has the strongest fault tolerance.

3.3. Comparative Analysis of System Packet Loss Rate. Keep the above experimental environment unchanged, and control the three systems to transmit a 20 GB data group in the same network environment. In order to ensure the accuracy of calculation results, the packet loss rate generated by the system under 10 transmission times is counted. The results are shown in Figure 9. The experimental results shown in Figure 9 show that after controlling the three systems to transmit the same size of data, according to the data in the table, the packet loss rate of the conventional education ecosystem 1 is 3.7%, and the actual loss data is more, and the packet loss rate of the conventional education ecosystem 2 is 2.8%. Compared with the conventional education ecosystem 1, the packet loss rate is smaller, and the packet loss rate of the designed conventional education ecosystem is 1.4%. Compared with the two conventional education ecosystems, the designed education ecosystem has the smallest packet loss rate and the best system performance.

3.4. Comparative Analysis of System Energy Consumption. On the basis of the above, the changes in system energy consumption in the transmission of different amounts of data are compared, and the specific comparison results are shown in Figure 10. It can be seen from the experimental results shown in Figure 10 that after controlling the three
systems to transmit data of different sizes, the energy consumption of the three systems is rising. When the amount of data transmission is 50 GB, the energy consumption of the three systems has reached the maximum, the maximum energy consumption of the conventional education ecosystem 1 is 59 J, the maximum energy consumption of the conventional education ecosystem 2 is 60 J, and the maximum energy consumption of the design education ecosystem is 37 J, which is far lower than the two conventional systems, indicating that the energy consumption of the system is the lowest, and the important goal of the green and low energy design of the system is achieved.

3.5. Comparative Analysis of System Ecoefficiency. Using the system ecoefficiency equation in Section 2.5, the system ecoefficiency of the three systems under the same network
and operating conditions is calculated, and the results are shown in Figure 11. It can be seen that the ecoefficiency of the three systems shows an increasing trend after controlling the transmission of data of different sizes, among which the ecoefficiency of the system designed in this paper reaches the maximum of 85% when the transmission data volume is 70 GB, and then the ecoefficiency is maintained at about 82% with the increase of the transmission data volume, while the ecoefficiency of the other two systems is maintained at about 60% with the increase of the transmission data volume, indicating that the ecoefficiency of the educational ecosystem designed in this paper is higher than that of the other two systems, indicating that the system can realize the characteristics of efficient transmission and low energy consumption.

4. Conclusions

With the continuous popularization of innovation and entrepreneurship education in colleges and universities, the online education system of this course has gradually become the focus of current research, and the current concept of ecological and environmental protection has gradually penetrated the field of education. Therefore, this paper takes the low energy consumption design of the system as the goal and the user experience as the support to design an ecological system of innovation and entrepreneurship education in colleges and universities, which can improve the shortcomings of the conventional system and reduce the energy consumption of the system operation. However, there is room for optimization of the microcontroller in the hardware part used in this paper, while the software part still needs to be systematically optimized for data throughput rate, fault tolerance, and packet loss rate to improve the overall ecoefficiency of the system. At the same time, Jiang et al. designed a laboratory task management system based on B/S in [18]. In terms of the test cycle and cycle unit, automatic screening of due dates is realized. Load balancing is achieved by using an assignment strategy based on task and user attributes. The user experience value is quantified based on task completion time, and this strategy is realized by using java code. Also, in this paper, the same problem of unbalanced system load is realized, and the purpose of low-power and high-efficiency operation can be achieved, but this paper has not yet realized the optimization effect of system ecoefficiency based on the assignment strategy of user attributes, and the overall system efficiency still has more room for improvement. The research results of this paper can provide theoretical support for future research and the construction of an ecological civilization society.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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