

Research on the Improvement of Campus Express Service Quality under the Background of Big Data

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Abstract: Under the background of big data era, campus express ushered in new development and opportunities. With the rapid development of e-commerce industry, it also immediately promoted the development of express service industry. However, with the rapid development, the problems of campus express delivery in many colleges and universities have also been exposed. In order to ensure the high-quality development of "the last kilometer" service of College express, taking China's Linyi University as an example, this paper deeply understands the various problems of campus express through on-site investigation, questionnaire survey and SPSS data analysis, and puts forward the corresponding countermeasures for the high-quality development of campus express in terms of digital technology. Adding equipment such as express cabinets and UAVs, building intelligent storage systems, developing value-added services and promoting green logistics recycling can comprehensively solve the problems of students' difficulties in sending and receiving express. This field survey provides new ideas for the high-quality development of College express and provides reference for colleges and universities to coordinate the campus express industry.

1. Introduction

College express delivery continues to grow steadily from 2.5 billion in 2020, and China's campus express delivery will exceed 3 billion in 2021. For example, with the increase of delivery quantity, demand for express service in colleges and universities also increased, but the existing service mode are not so good, it is difficult to form the efficient service mode, greatly restricts the development of college campus logistics. Through the research and analysis of the logistics information statistics of the express station on campus and the purchasing intention of college students, it is not difficult to find that college students are more inclined to shop online because of the variety and low price of online goods. However, The relatively closed campus economy makes it difficult for the campus logistics distribution to achieve relatively efficient services, resulting in unsatisfactory distribution of the last kilometer of logistics, especially in the annual shopping season. Express delivery services in the logistics services play a crucial role in the whole logistics activity, however, once the deficiency in the express service, quickly in a short time to upgrade the service quality, renovation of the existing service way is like a mountain block. Therefore, do a good job planning, gradually establish a pattern of logistics structure, to improve the quality express service. Through the analysis of the survey data, this paper intends to solve the problem of low service quality on campus.

2. Literature Review

Villegas managed and analyzed the Internet of things and big data on the university campus. You can only find reliable solutions for your environment.¹⁴ Guofeng x studied the application of big data technology in campus and put forward the construction scheme of intelligent campus. Liao f proposed the combination of intelligent algorithm and intelligent campus construction to build a smart campus. Wang Z studies the decomposition algorithm of unstructured campus big data and believes that it can be applied to campus big data analysis and decision-making.

Bai Z et al. Studied the feasibility of campus distribution by express UAV. It also puts forward

the overall framework of campus distribution platform system. The function of fast UAV is defined. Bai y et al. Investigated the efficient express management and positioned the function of the college students' Campus express service center. They divided the functions of the new model university campus express service center into mailing area, pick-up area, free express package area, student entrance buffer area and express area. Wang Na studied the problem of campus express delivery through questionnaire survey and put forward corresponding solutions. Hao Wu studied the campus express packaging recycling system and refined various functions of the system. Yan Bai has proposed the use of WeChat official account and express service center to provide fast, convenient and intelligent express service for students and teachers. Ji Xuehua constructs and analyzes the evaluation index system of campus express service quality by using SERVQUAL and LSQ model.

Wang h et al. Constructed the evaluation index system of express service quality and analyzed the potential failure factors. Li B et al. Constructed the financial performance evaluation index system of listed companies, and used the entropy weight mutation progression method to evaluate China's express delivery, and used the entropy weight mutation progression method to evaluate China's express delivery. Jiangxue uses SPSS to analyze the influencing factors of campus express service quality, and constructs the evaluation index system of express service quality. Zhongcheng Liu has constructed the service quality evaluation index system of express industry based on enterprise competitiveness.

In terms of improving the quality of campus express service, most scholars at home and abroad conduct research on express service from a certain research point, while there are relatively few studies on putting forward solutions from the overall situation from the perspective of providing convenience for students. This paper puts forward corresponding and comprehensive solutions to the specific problems of campus express. So as to provide students with more reliable and efficient logistics services.

3. Methodology

3.1 Index selection

China's universities account for about 6% of the country's total parcels, and efficiency is a key factor in improving customer satisfaction. However, in many cases, the delivery time of express delivery conflicts with that of students or teachers in class. As a result, customers cannot get the express delivery at the first time and have to carry out the second delivery, which increases the delivery cost. And if you do not take delivery for a long time, there will be a large number of backlog, warehouse explosion, and even security risks, so logistics enterprises have to make the decision to return the express delivery to e-commerce enterprises. Due to the characteristics of the campus, the distance between students to pick up items is generally far. It can be seen that there are many problems in the quality of express service in colleges and universities. Therefore, customer satisfaction evaluation and service quality improvement are the main contents of the study. A large number of researchers also began to introduce service quality into the express service industry. Due to the different angles of research, the dimensions sought are also different. However, there are relatively few researches on express delivery in universities. The following summary table is obtained by summarizing scholars' research on the dimensions of express service quality in colleges and universities(Table 1).

Through literature research and summarizing the research of scholars, based on the research of relevant experts, this paper constructs the evaluation indicators of express service quality: pick-up distance, site distribution, pick-up efficiency, pick-up mode and overall service, and divides the evaluation dimensions of College express service quality into convenience, reliability, efficiency Personalization and safety standardization are five aspects, and the questionnaire is designed based on this.

Table 1. Summary table of express Service industry standards in colleges and universities.

The research direction	Evaluation of Angle	scholars
The SERVQUAL model	Reliability, responsiveness, tangibility, collaboration	Zhou Zhengsong et al. (2012)
	Responsiveness, reliability, efficiency, convenience, empathy	Zhang Xiaohua et al. (2016)
	Tangibility, reliability, assurance, responsiveness, empathy	Che Guocai et al. (2018)
	Reliability, responsiveness, assurance, empathy, tangibility	Zhang Meng et al. (2015)
Delivery cycle	Quality before service, quality in service, quality after service	Yu Baoqin et al. (2013)
	Before, during and after school	Xu Wei et al. (2015)
flexibility	Reactivity and flexibility, reliability, value-added, information quality, human communication, corporate image and credibility, error handling, price	Yang Xiufang et al. (2016)
	Flexibility, delivery, communication, responsiveness, economy	Huang Yu et al. (2018)
security	Including safety, delivery time, express delivery costs, publicity, service attitude	Chen Pinget (2014)
	Safety standard, economic price, service attitude, service efficiency	Zhang Yahua et al. (2019)
	Reliability, confidentiality, green, timeliness, economy	Wei Shengmin et al. (2020)
	Security, mailing ability, convenience, problem solving, customer service	Shi Jiang Et al. (2018)
Problem solving ability	Mailing capacity, distribution and transportation capacity, pickup capacity, service process	Xiao Zhiwei et al. (2017)
	Delivery, response, service, error	Yang Xiaohong et al. (2015)

Source: Compiled from relevant literature

3.2 Questionnaire design

The main methods of investigation are questionnaire and field random interview. Field full investigation on delivery site, after know the truth, in the first living quarters, the living quarters, canteens, teaching building, library, etc to distribute the questionnaire, and interview a customer perception of express service and evaluation, and ask support express service to broaden what fields, on the basis of the practical provide solutions to the research in this paper.

The survey included students whose dormitories were different from the delivery site, as well as freshmen, sophomores, juniors, graduates and faculty members. The main content of the survey is the satisfaction of students and teachers with express logistics services. It mainly includes the convenience, rationality, efficiency, individuality and standardization evaluation of express service. During the field visit, we also investigated customer needs and expectations for the future development of campus express.

In the design of questionnaire survey, the design questions should be simplified as far as possible, so as to avoid the resistance of respondents to tedious questionnaire and improve the recovery rate. A total of 600 questionnaires were issued and 588 were actually recovered, with remarkable effect(Table 2).

Table 2 Customer satisfaction questionnaire of Linyi University Express Service.

The dimension	Service mode	The title number
convenience	Take a distance	2
rationality	The site distribution	2
High efficiency	Collection efficiency	3
personalized	By pick-up	2
Safety standardization	The overall service	7

Source: This article organizes

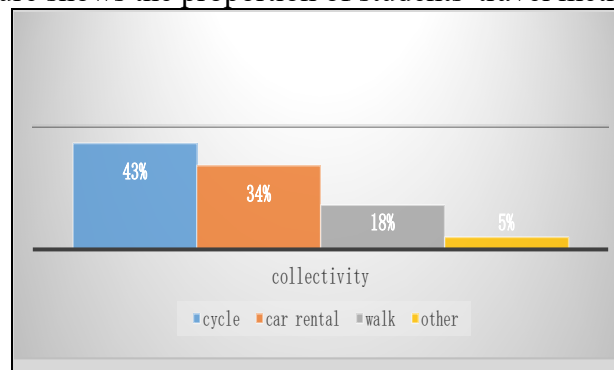
4. Findings

This paper analyzes the present situation of express service in Linyi University. The field investigation and study of Linyi University has the following problems.

The campus of Linyi university has more than 33000 students and more than 2000 faculty and workers. The express delivery volume has doubled in recent years. The average daily express delivery volume reached 21000 in 2021, three times that of 2016. Especially during the annual e-commerce Festival, the express delivery volume is 3-4 times that of daily delivery. At present, the logistics operation mode of colleges and universities is mainly franchise agency, among which Yuantong, Shentong, postal and Baishi are separate stations, and other express brands are collected by rookie post station. The rookie post station is similar to Yuantong. The way of picking up parts is for customers to pick up parts and sign. Self-service picking up parts can reduce customers' picking up time, but it can increase the risk of loss or damage. Shentong, Baishi and post provide customers with picking up codes to staff and queue up for picking up parts. This way of picking up parts will increase customers' picking up time and cause traffic congestion. The delivery methods of the express station of Linyi university are similar. Customers need to fill in the delivery form, weigh and pay by themselves, but the prices are different. Yuantong and rookie post station are 12 yuan within three kilograms, Shentong and Baishi are 9 yuan within three kilograms, and postal service is 8 yuan within three kilograms.

4.1 Long distance to pick up parts

The last mile of logistics distribution focuses on convenience and speed. The distance of the centralized station is located in the south of the whole school, and it is not easy for students to pick up things from and to classes. The survey found that most customers pick up items from the site by means of transportation. In 2019, from the perspective of safety, the school cancelled the school bus system, and students can only buy bicycles, electric bikes or rent cars to meet their transportation needs. The following Figure shows the proportion of students' travel methods(Figure 1).



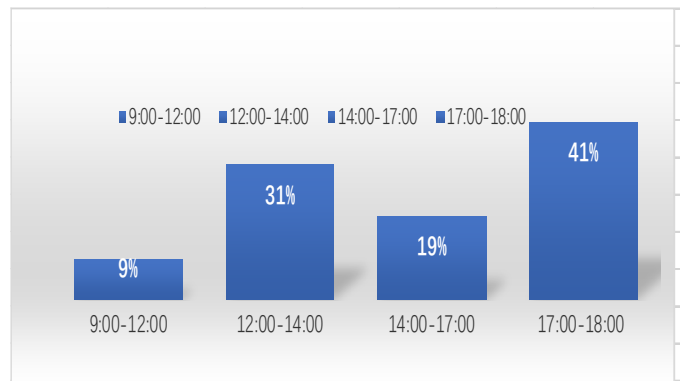
Source: This article organizes

Figure 1. Proportion of customers' travel mode of picking up items

4.2 Low efficiency of mail collection

Due to the large customer base of Linyi University, the number of people flow determines the efficiency of picking up. Through the statistics of most pick-up time of customers in Linyi University, the peak pick-up time of every day is obtained (see Figure 2).

As can be seen from the figure, the peak periods of customer pick-up in Linyi University are 12:00~14:00 and 17:00 ~ 18:00, which are exactly when students are in class and the pick-up rate is higher after class in the afternoon. In the process of the survey, many respondents said they tried their best to avoid these peak pick-up hours, but to no avail, especially for graduate students or freshmen who have too many courses, they had to wait in a long queue.

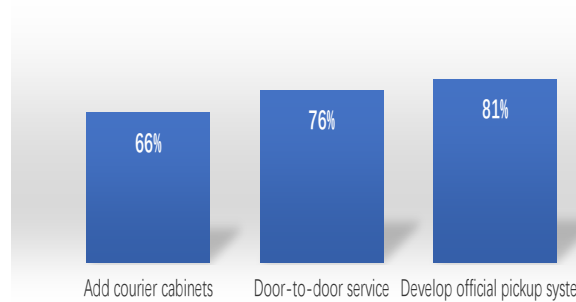


Source: This article organizes

Figure 2. Customer pick-up time distribution

4.3 Single way of Posting and collecting

At present, Linyi University express only supports customers to pick up from the point, lack of home delivery service. At the same time, the application of digital technology of express delivery sites is too backward, many survey objects have experienced lost items, wrong delivery, etc., and the express delivery is already in the state of receipt, and the representative party has also made it clear that they will not be responsible for any problems behind the low price, which makes many customers suffer heavy losses. Its shows the survey results(Figure 3). It can be seen that the existing service mode can no longer meet the needs of customers, and the logistics service mode is in urgent need of detailed reform.



Source: This article organizes

Figure 3. Proportion of express service items expected by customers

5. Analysis

5.1 Descriptive statistics of survey data

In this paper, the data of the questionnaire were analyzed by SPSS software, mainly by descriptive statistical analysis, reliability and validity analysis, variance analysis and correlation analysis.

The number of the respondents living in the first and second living areas is even, and the proportion of male and female students is balanced. The data obtained are of certain reference value. In this survey, 83 percent of customers think the distance to pick up goods is too far. Seventy-seven percent of customers said that site inconsistency caused them problems. When the express arrives, the customer must first inquire the logistics company, in order to go to the corresponding site to pick up, if many express from different logistics companies, but also to different sites to pick up, time-consuming and laborious. Seventy-nine percent of customers have experienced lost or broken items, and half of them believe that the handling process of lost or broken items is not satisfactory and that the site does not have the appropriate service personnel to deal with such problems.88% of customers said that they have picked up items during the peak hours, and the queue for picking up a parcel was jaw-dropping. Sometimes, it took 20 minutes to pick up a parcel, which was extremely

inefficient.68% of the customers think that the express delivery service is not humanized enough, the way of picking up and returning is single, there is no official pick up and delivery service, and the pick up organization set up by students or individuals has a high loss rate.

5.2 Reliability test

From the analysis results, the clonbach reliability $\alpha = 0.921$, greater than 0.7, indicating good stability and reliability of the scale (see Table 3).

Table 3. Reliability analysis results.

The dimension	Clone Bach Alpha	The title number
convenience	0.902	2
rationality	0.911	2
High efficiency	0.91	3
personalized	0.899	2
Safety standardization	0.905	7
Scale as a whole	0.921	16

Source: This article organizes

5.3 Validity test

Through data analysis, the KMO coefficient obtained is 0.778, and the P value of Bartlett sphericity test is 0.000, indicating that the validity of the scale is ideal and factor analysis can be performed(Table 4).

Table 4. KMO and Bartlett tests.

KMO sampling suitability quantity		0.778
Bartlett's sphericity test	About the card	1688.526
	Degrees of freedom	120
	significant	000.

Source: This article organizes

Based on the condition that the factor analysis meets the verification, the principal component analysis method is adopted to conduct exploratory factor analysis on the variables of five dimensions, and the result coefficient commonness of the measurement object is higher than 0.8, indicating that the measurement object can fully explain the impact on customer satisfaction of linyi University express service.

5.4 Analysis of variance

From the group statistics of variance analysis of satisfaction of different genders, identities and regions, the values are all greater than 0.05, so there is no significant difference in the impact of gender, identity and regional factors on the evaluation of express service satisfaction.

From the analysis of the number of complaints, different complaint frequency, customer satisfaction is different, therefore, there is a certain correlation between the number of complaints and customer satisfaction(Table 5).

Table 5. Variance analysis of different complaint times.

Service quality satisfaction	Sum of squares	df	Mean square	F	significant
Between the groups	7110.164	4	1777.541	24.403	000.
Within the group	43486.321	584	72.841		
A total of	50596.485	588			

Source: This article organizes

5.5 Correlation analysis

By analyzing Pearson's coefficient of five dimensions related indicators, the values are all greater than 0.600, indicating that these indicators have a significant correlation with satisfaction (Table 6).

Table 6. Analysis of the five service modes.

Service mode	Pearson	Significance (two tails)	N
Take a distance	743 **	000.	588
The site distribution	767 **	000.	588
Collection efficiency	783 **	000.	588
By pick-up	722 **	000.	588
The overall service	749 **	000.	588
**. The correlation was significant at 0.01 level (double-tailed).			

Source: This article organizes

6. Discussion and measures

This study constructs an evaluation index system of fast reading service quality in colleges and universities from five dimensions of convenience, reliability, efficiency, individuation and safety standardization, and focuses on the situation of service mode. SPSS 22.0 and AMOS 24.0 were used for reliability and validity analysis, variance analysis and correlation analysis of 588 sample data. The analysis results show that the Pearson coefficient of pickup distance is 0.743 and the significance is.000 ($P < .05$), indicating that it has a great influence on customer service quality. Pearson coefficient of site distribution is 0.767, significance is.000 ($P < .05$), indicating that site distribution has a positive impact on customer satisfaction. The Pearson coefficient of pickup efficiency is 0.783 and the significance is.000 ($P < .05$), which has a great impact on customer satisfaction, indicating that pickup efficiency has a positive impact on customer satisfaction. The values of pick-up method and overall service are both greater than 0.700, and the significance is.000 ($P < .05$), so it can be concluded that all the five dimensions have a positive impact on customer satisfaction.

6.1 Add express cabinet, UAV and other equipment

With the rapid growth of the number and flight time of UAVs, the navigation of UAVs has developed rapidly. UAV logistics distribution has many advantages, which can not only improve the efficiency of distribution, but also save a lot of labor costs. Customers can note in the order and deliver it directly to the dormitory when the express arrives. The application of intelligent express cabinet in campus also has great advantages. Students have limited time between classes. Logistics enterprises can distribute express mail to the express cabinet downstairs according to the needs of customers. During the survey, many students said they were willing to pay a reasonable fee for this service.

6.2 Building an Intelligent Storage System

6.2.1 Integrate express delivery agencies

According to the survey, 85% of respondents believe that express delivery agencies are too messy, so that many times they have to go to multiple stations to pick up goods. Once they pick up goods in the peak hours of every day, the only way to each station -- the commercial streets in hutongs will be crowded, increasing the time and difficulty of picking up goods. From the perspective of logistics enterprises, the integration of express delivery sites is not to share the pie with others, but to cooperate with each other to improve customer satisfaction and achieve a win-win situation.

On the basis of integrating express agency, intelligent WMS is applied to optimize intelligent cargo access operating system. Although the integration of express delivery agencies will make the amount of express delivery in colleges and universities concentrated in a site, but the participation

of the school staff into standardized management, the development of more reasonable pickup business, the use of science and technology to make the pickup service more intelligent, compared with before, the profit will be significantly increased.

6.2.2 Optimize the warehousing process

After the integration of express sites, the number of customers is bound to rise. The personnel of the technical department can develop and apply the app specially serving the customers of M University according to the needs of customers, develop the functions of advance reservation and payment, and realize the function of intelligent reservation. After integrating the campus Express Service Center, it will be divided according to its functions to form five functional areas: entrance buffer area, mailing area, pick-up area, free express package area and express area. When customers choose to pick up parts by themselves instead of pick-up service or door-to-door service, they can give customers a better service experience. Through the intelligent warehouse management system, optimize the service processes such as reservation, payment and pick-up, and realize the face brushing, delivery and rapid delivery through digital intelligent operation, so as to realize digital collaboration and achieve the integrated operation and collaborative operation of logistics.

6.3 Developing Value-added Services

Through digital twinning and other technologies to collect and integrate the data of express delivery cabinet and APP, the precise matching of time demand and pickup salesman is realized, and efficient pickup and other services are provided. This can pave the way for students to start their own business in the future, cultivate their sense of responsibility, and improve their working ability through work-study programs. Do a good job of after-sale services. Follow up broken express, clarify the responsibility and compensate the customer for the loss in time.

6.4 Promote Green Logistics Recycling

According to one of the five development concepts proposed by General Secretary Xi Jinping in his speech: green development strategy, university logistics system should also attach importance to green recycling. There are many customers in the express site unpacking, garbage with a throw, extremely not environmental protection. At this time, logistics enterprises need to enforce regulations, pay attention to environmental protection, carry out garbage classification, and design green recycling boxes. Digital identification and collection technology is used to realize fast identification of recycling photos, fast and efficient processing of express garbage recycling process. At the same time you can use the face or scan and other functions to give different levels of rewards. Green express delivery can be realized through digital empowerment.

7. Conclusion

In this paper, the satisfaction of Linyi University express service was investigated and studied. Data were collected through questionnaires and analyzed by SPSS software to verify the important indicators affecting the satisfaction of Linyi University express service. Problems were found and improvement strategies were put forward to solve the existing problems. Improving the overall quality of campus express service, standardizing the service personnel's business ability and improving the service efficiency will not only benefit the management of campus express industry and the business of various businesses in the business circle, but also facilitate the teachers and students working and living in the campus. Improve the service quality of linyi University campus express.

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