

Background Report

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Introduction

With the advent of economic globalization and the information age in the 21st century, computer technology, communication technology and computer network technology have developed rapidly, and the ability and level of automated information processing has been continuously improved [1], and it has been widely used in various fields of people's social activities and life. It is hard to imagine how our society and life would be if there were no "computers" or "software." And the digital transformation for enterprises and school is imminent. The institution who has finish the digital transformation can stand out in the fierce competition. It's the high time to utilize advanced network and information technology to integrate resources and build an advanced, efficient and practical higher education information infrastructure. If our school can catch the opportunity this time. QUB will take on more responsibilities and will attract more talent students.

Background to Digital Transformation

Nowadays, more and more enterprises and government departments are under the pressure of digital transformation. [2] From the beginning of traditional IT and security to the new era, the environment has undergone tremendous changes. In this pressure, we must make a "Leaping Development" for school's informationization to enhance the school's management and service capabilities as soon as possible.

IoT and Intelligent Buildings

The "single spark" of the Internet of Things is starting a prairie fire .UK has formed a basic and complete IoT industrial system, and has formed a certain market scale in some areas [3]. Internet of Things is an inevitable trend of IT development. The Internet of Things is not far away, it is by our side, it is not an illusion that is inaccessible and distant. So we must have the confidences to implement it.

Background Research

Review

After years of informatization construction, QUB has completed the establishment of the backbone of campus network. Some application systems have been implemented, and these informatization construction contents have achieved many good practical application effects in the Ashby Building, Computer Science Building, and also provided a good environment for the school's information construction. But after research, the existence information construction still has the following problems:

1. There are "Information Isolated Islands". The systems and data of the Academic Affairs Office, the Finance Directorate, and the Human Resources are not totally linked together. Some of department data cannot be effectively and timely interacted, resulting in loopholes in financial revenue and expenditure.

Freshman's data cannot be synchronized to various departments on time, which makes it difficult to carry out effective work in various departments;

Changes in student status, personnel changes, lack of information exchange, resulting in financial revenue and expenditure loopholes;

The information of the student office and the logistics department is not uniform, and it is difficult for students to deal with unexpected situations. For example, some student's personal tutor has resigned but their data was not updated in time.

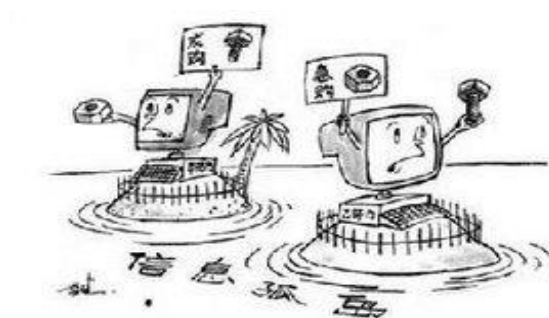


Figure 1 - Information Isolated Islands [4]

2. Lack of a platform for campus information centralized application and display, independent application system leads to lack of collaborative work ability, and lack the ability to provide users with personalized information services. Information services for teachers and students may not have a good application experience.

When students enter the school: a few students cannot be obtained the information of registration process in time, and the MBC's welcome scene is hard to find;

When students study at school: For all kinds of application services students need to fill in a lot of duplicate information, which is very complicated;

When the student leaves school: Student not clear the detail of the school leaving procedure on Queens Online, and still need to go to each school department to wait for a seal;

When teachers at the end of the year: For filling the end of the year summary, it is still necessary to go to each department to calculate the workload and scientific research. It cannot be obtained and generated through the information system.

3. Individual departmental information systems (such as system of educational administration, library management, asset management, etc.) are difficult to execute comprehensive information inquiry and decision analysis for the entire school because only base on their own information sets. And also the influence that each application system could exert but didn't mining better.

The overall statistics of the whole school situation are not comprehensive, timely and accurate;

The statistics of enrolment rate and tutor-retention rate is quite difficult.

The assessment of student award loan has no reference data;

The personal tutor and advisor of studies are not easy to get newest information about students, including their Scholarships, loans, arrears, attendance and so on.

Talk about the material provided plus overview of other sources

Table 1: Arbitrary Table – above the table

Opportunities

Those you have identified and imagined. Outline potential areas that could be addressed.

1. Need of One-stop service

The existing application on QUB focuses on the management but not services, and the information services provided to tutors and students are not comprehensive.

The existing model invests and organizes the implementation of educational informationization engineering projects according to the classification of management and teaching. The “technology-oriented” thinking mode has shown obvious “focuses on the management rather than services” in the implementation process, which is not only leads to inefficient investment in education informationization, but also cannot promotes the quality of education.

So it is necessary to realize the integration of each works and provide one-stop service for tutors and students through the information portal.

2. Need of Standardization

Lack of unified technical system standards and detailed overall construction planning, which is not good for long-term development

In the process of informatization construction, the business system is led by various departments and lacking long-term planning of technology and functions. We currently just meet the local requirements and each department construction maintenance independently without a unified management, and it even caused repeated construction of the system which is resulting in serious waste of resources.

It is necessary to carry out long-term planning through unified standards and system construction.

3. Need of Openness

The development and maintenance model of the business system is not uniform, and it is difficult to update and maintain.

The development platforms, databases and operating environments of the various application systems on each school vary widely and do not have a unified consideration. With the increasing use of campus online applications and resources, our applications lack an effective organizing and management. And there are risks on technology upgrades, thus has the problem of increasing maintenance costs of business systems.

The need for a digital campus is an open platform that provides for future changes and expansions of the school's requirements. We can continuous improvement through an open platform, and have the ability to achieve more convenient system maintenance.

4. Data sharing requirements

Lack of data standards, data between business systems is difficult to share, and it is difficult for collaborative business processing in various departments.

Due to the lack of standards for data, existing systems are unable to provide mutual data exchange capabilities, which makes some data need to be used across departments, and also rely on manual delivery or semi-manual delivery via email. This inefficient way of information sharing cannot meet the needs of departments to obtain information from other departments in a timely manner, and it is also impossible to build business process systems across business units.

It is necessary to establish a data sharing mechanism and specifications to achieve the joint construction and sharing of campus data and coordinated development.

Data sources

Overview of what is available from where, what could be available and how it could be gathered

Possible features

Initial thoughts on features that could be incorporated within a potential solution

Benefits

1. The effect achieved for students
2. The effect achieved for the teacher
3. The effect achieved for the leader

References

A list of references to documents (books, papers, web pages etc.) which are referred to in the main body of the text. Use the IEEE citation style as detailed here <https://www.ieee.org/documents/ieeecitationref.pdf>. There is some guidance on referencing at

<http://www.qub.ac.uk/cite2write/home.html>.

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[1] How to write a background research for paper

<http://www.51lunwen.org/shlwzmex/lw201803261642497596.html>

[2] How does the government respond to the new challenges of digital transformation?

<http://www.lwinst.com/hongguan/4954.htm>

[3] UK ENTERPRISE & THE IOT August 2016

<https://iotuk.org.uk/wp-content/uploads/2016/10/EnterpriseandIoT.pdf>

[4] Information Isolated Islands

<https://baike.baidu.com/item/%E4%BF%A1%E6%81%AF%E5%AD%A4%E5%B2%9B>

Appendices

Anything that breaks up the flow, but keep in mind this is not marked. It may be referred to briefly by the assessor.

