

Assignment 2

Team Members

Michael Huang
Xiaoyang Wei
Guorui Li

Oct 17th

—
INFO 563.01
—

Contents

| | |
|---|----------|
| Assignment 2 | 1 |
| Team Members | 1 |
| Oct 17th | 1 |
| — | 1 |
| INFO 563.01 | 1 |
| — | 1 |
| Executive Summary | 3 |
| Business Context | 4 |
| Business Objectives | 7 |
| IT Strategic Assumptions | 8 |
| Key IT Initiatives & Roadmap (3-year roadmap) | 9 |
| Key Enabling Capabilities | 11 |
| Risks | 12 |
| Metrics/KPIs | 12 |
| Appendix | 13 |
| VSOM Map | 13 |
| Strategy Map | 15 |
| Capability Assessment | 16 |
| SWOT Analysis | 17 |
| Contributors | 20 |

Executive Summary

In these past few decades, the educational environment has changed dramatically, from an emphasis on fact memorization through “sage on the stage” pedagogy to an emphasis on higher-order and future-ready skills. Due to the COVID-19 pandemic around the world, virtual learning has become very popular in modern society. In the past three years, US colleges have come up with a whole online learning environment and processes. In addition to teaching traditional classes in a classroom, US colleges have started to build online learning systems and collaborate with third parties to facilitate online teaching. The online teaching mode makes high-level education much more flexible than before. Students around the world do not have to worry about location anymore. For those asynchronous courses, students even do not have to worry about time anymore. There are threats in this online environment. Without a quick response to the rapid changes above, school enrollment and the quality of teaching are very likely to get threatened. However, this can also be a big opportunity. If schools can effectively create online degree programs, enrich their teaching methods, and give students a better online learning experience, that will drive student recruitment.

ABC University is a well-recognized and prestigious not-for-profit university that has first-class in-person courses in the midwest. Without any online experience before, the school needs to move to remote and distance learning and online classes. Our team plans to integrate the LMS system, Zoom, Online course catalog, and other technologies, import library and digital resources, and provide infrastructure and service that can support the ABC university’s online programs. We will recruit IT members, and set up an online system management office and an online system service office to help the university move to the online mode more effectively. Through the feedback from students and instructors each year, the system management office will know the new IT requirements, and then the IT organization can update the systems and release our updated system in a restricted time period. To expand the project later, we will enhance the staff’s cloud development ability and establish the cloud services and local systems together. To gain our leading position in online courses, we plan to complete some online courses in the short term to carry out the work in the next few years as a pilot. With such an effective online system, the school can increase its visibility and drive the recruitment of students. That will lead to the final goal of the university to become a leader in online learning while still retaining its position as a premier research and educational institution.

Business Context

In these past few decades, instead of teaching in a traditional class, schools incorporate technology into the educational environment. In a modern education environment, flexible classroom spaces organically integrate technology, helping teachers better engage students and facilitate independent, small-group, and whole-class learning. Modern educational environments have three essential components: connected devices, audiovisual tools, and purposeful furniture.

Starting from 2020, because of the COVID-19 pandemic around the world, virtual learning has become increasingly popular in the past three years. In 2022, colleges in the US have come up with a whole online learning process. Schools have started to use online meeting systems like Zoom, Teams, WebEx, and other online meeting tools to facilitate students' learning experiences, and those online meeting tools enable interactions very similar to an in-person class. In 2022, most colleges reopened their campuses and started to return to normal. However, online courses continue to become much more popular even though students return to in-person. Many professors still prefer virtual meetings for their office hours with students, and many students still choose to meet virtually for their group projects. Through our research, a big portion of colleges in the US make most of their programs in person, but they still keep some of their programs online to support students around the world. Here are some examples:

WASHINGTON UNIVERSITY IN ST LOUIS:

- Mostly in-person, online available
- Offers two fully online degrees, a selection of online certificates, and a variety of fully online and online hybrid courses

MASSACHUSETTS INSTITUTE OF TECHNOLOGY:

- Mostly in-person, some online
- Does not offer online degrees but offer thousands of MIT courses online through edX and MIT OpenCourseWare

HARVARD UNIVERSITY:

- Mostly in-person, some hybrid
- Does not offer any fully online degrees but does offer some hybrid degrees and a wide range of online educational offerings

NORTHWESTERN UNIVERSITY:

- Mostly hybrid, some fully in-person or online
- Offers more than sixty online courses and all graduate programs available online

UNIVERSITY OF PENNSYLVANIA:

- Mostly in-person, online available
- Offers lots of options for learning online, including certificates, courses, and degree

In conclusion, even though most university returns to in-person classes, they still offer quite a few online courses or programs that support people worldwide.

Information and Technology

LMS system: Canvas LMS delivers dynamic, engaging learning experiences for all students at any time. Canvas LMS is a robust digital foundation for all aspects of higher-ed learning. Canvas LMS can easily do rubrics, modules, calendars, schedules, quizzes, syllabi, analytics, and speed grader. The Canvas API buddies right up with tools like google classroom, Microsoft teams, zoom, adobe, and hundreds of other technology partners to deliver one centralized learning hub. Canvas LMS has top-rated mobile apps for teachers and students that give everyone access to what they need on the go. Teachers can engage with students whenever and wherever through native mobile notifications and Canvas apps that boast best-in-class data security and accessibility.

Zoom video conferencing technology: Zoom delivers the best combination of usability, reliability, performance, safety, and features needed to get work done remotely. Its free plan is great for freelancers and small-business owners, and its paid tiers provide all the extras that support bigger businesses to get connected.

Online course catalog: As we explained above, Canvas is one mature system that can provide all online course catalog needs. For the online course catalog, we are using Canvas course catalogs. The catalog product allows you to centralize your continuing education programs or professional development offerings in an attractive online marketplace.

Server and storage systems: For a short time, we can use the AWS system; it does not require installation and pay as we go. At the beginning of the program, we only had 300 students and 28 faculty members. That is not a large size, and we can use a pay-as-we-go plan. In this case, we can achieve the most cost-effectiveness. The AWS promises a 99.99% Monthly Uptime Percentage, which fulfills the 99% MUP requirement. In the long term, universities can still use AWS if it is the most cost-effective server and storage system. Suppose the university considers having a higher data security requirement and feels it is not safe to put data on other firms' storage, they can build their own server and storage system in school for online courses.

Library and Digital Resources: The ABC university is a well-recognized university in the Midwest, so it should have its own library. If the university does not have an online library, it can seek to collaborate with another university that has one online library for the short term. This can fulfill the requirement for the coming spring semester to make sure students can have library resources even if they are online. In addition, ABC university should start to build its own online library in the long term.

Business Objectives

Here are the business objectives of ABC University:

- Increase the visibility of the University and drive student recruitment
- Provide a more flexible learning environment and give access to students worldwide
- Explore more online courses and degree programs and enable students that are unable to afford in-person program tuition to join the program
- Make sure that the systems maintain their uptime without disruptions caused by systems
- Provide students with good online collaboration tools for interaction
- Make some online courses as “*pilot*”, preparing for expanding the offering later

IT Strategic Assumptions

Here are the IT Strategic Assumptions:

- IT will provide basic data capture and analysis support for R&D while new system capabilities are being developed
- Courses Product Lifecycle Management will be deployed to support R&D with the help of system implementation & integration partners
- Increment development process to enable the deployment systems in R&D while developing agile delivery skills
- Consulting skills will be needed to guide the team to develop integration capability with courses information systems
- Third-party assessment and testing will be needed to ensure confidentiality of students data and cybersecurity of the entire solution
- IT devices and systems will be able to get recovered if they meet issues because of human failure or natural disasters
- Additional IT faculties should be recruited so that school can keep their IT systems working well even when some faculties cannot work
- The university should know whether they can keep the course contents after the retirement of professors
- The university should when to wipe out information of those graduated students after their graduation to create enough database spaces for incoming students
- IT will provide support international students when they are in their home country with VPN and other system access tools
- Digital copyright for course materials & Authorization (pay or free)
- Collaborations with other universities should be enabled to improve the connections between the university and other universities
- Online library and stores will be needed for students to get enough online study materials and resources
- Data center is needed to store high volume of data and information of students and faculties of the university

Key IT Initiatives & Roadmap (3-year roadmap)

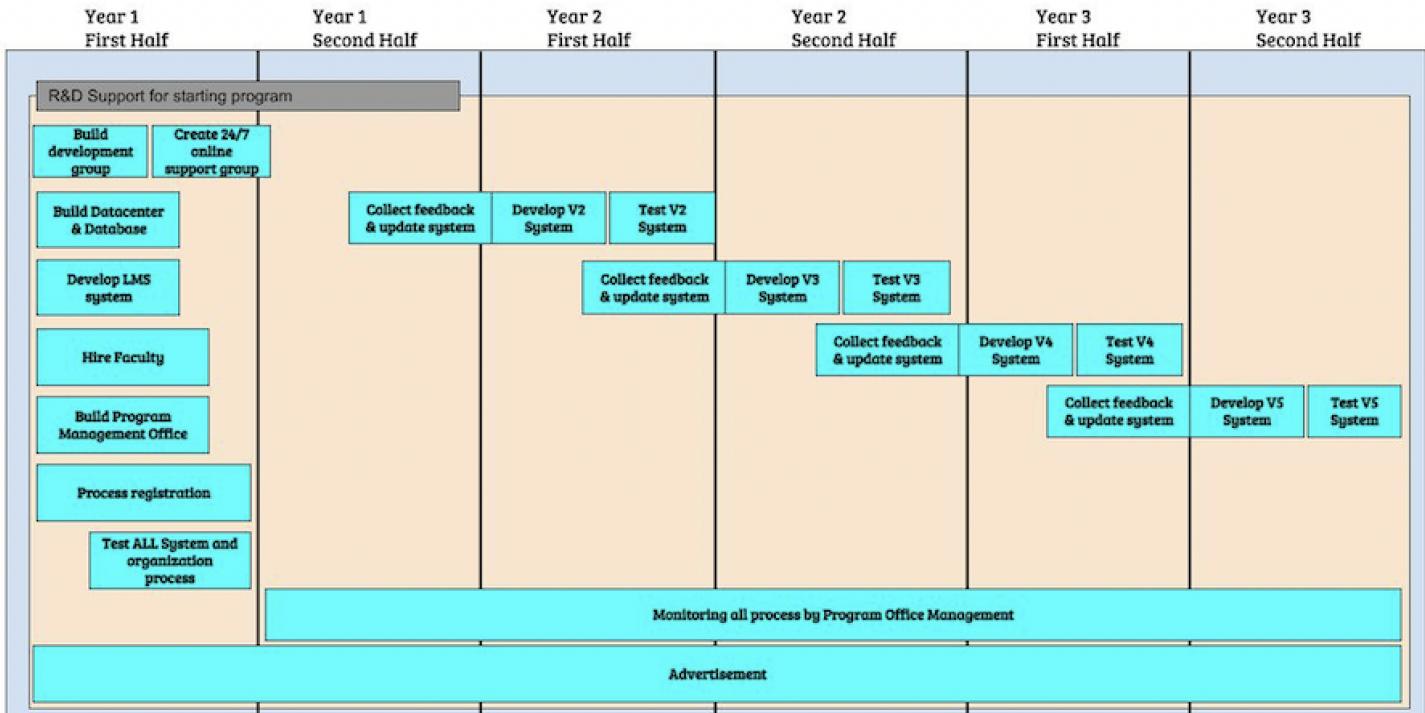


Figure 1 - 3-Year RoadMap (Page 19 for larger chart)

For the online education program, we want to use the life circle system to manage the program development lifecycle. We plan to have our own development group and program management group. The development group is responsible for building our own LMS system and renting the data center and database. For the short term, we plan to rent the data center and database from AWS, we have a limited amount of students and faculty in the first year, and the capacity is low, AWS is the best solution because it is pay-as-you-go. For the long term, we plan to build the school's own database and data center, because we can keep our data safer with a lower cost and better performance. If we keep using AWS, the rate of having emergency problems will rise as the student group size keeps growing. The cost would rise, and it will take longer to solve those emergency problems. The *PMO* (Program Management Office) is needed for the entire lifecycle of the project. The PMO is responsible for hiring faculty, processing registration, and monitoring all processes during school starts. At the later stage of our LMS system development, we will need one system test before the second half of year 1. This step is significant to ensure everything is on track before school starts and for students and faculty to have a good experience during teaching and studying.

We also plan to collect feedback from instructors, students, and school faculties each semester and use those collected data to upgrade all systems related to the program. For example, the data

should collect at the end of the first semester, and we use that data to upgrade the system during semester two and release updates at the beginning of the third semester. Data should be collected every semester and used in the next version update. At the end of the first half year, our system is first time released to public use, so we should have one 24/7 online support group ready, for emergencies such as students can not log in, or faculty who need emergency needs. This group should be online 24/7 during school starts.

Key Enabling Capabilities

Here are the key enabling capabilities of the university now:

- New infrastructure (server and storage system)
- Systems development
- Lifecycle management
- Data management
- Security Architecture
- System integration
- Usability engineering
- Online courses quality management
- Customer service - provide support for current students and instructors to utilize online teaching and learning systems

Here are the key enabling capabilities of the university for the future:

- Cloud engineering - transform local services to cloud services
- Video recording tools - facilitate asynchronous online courses
- Customer service - provide resources for new students and instructors to use online teaching and learning systems
- Expand databases - accommodate more students and faculties
- Data protection and control systems - protect research or other private data being hacked
- System maintenance

Risks

Here are some of the risks:

- Low on-campus experience
- Ineffective advertisement
- Cybersecurity breach
- Human error/failure
- Cloud service storage
- Unable to measure students' learning
- High expenses of building a whole online system
- Risk of execution with multiple concurrent courses and high volume of students

Metrics/KPIs

Here are some of the metrics:

- Number of online courses that are available
- Number of supported people at the same time online and different locations
- Number of available additional tools
- Circle of expanding online learning tools and courses
- Number of staffs available for related projects
- Availability of online learning systems
- Number of firms that support career fair
- Hire & salary rate after graduation with certificate

Appendix

VSOM Map

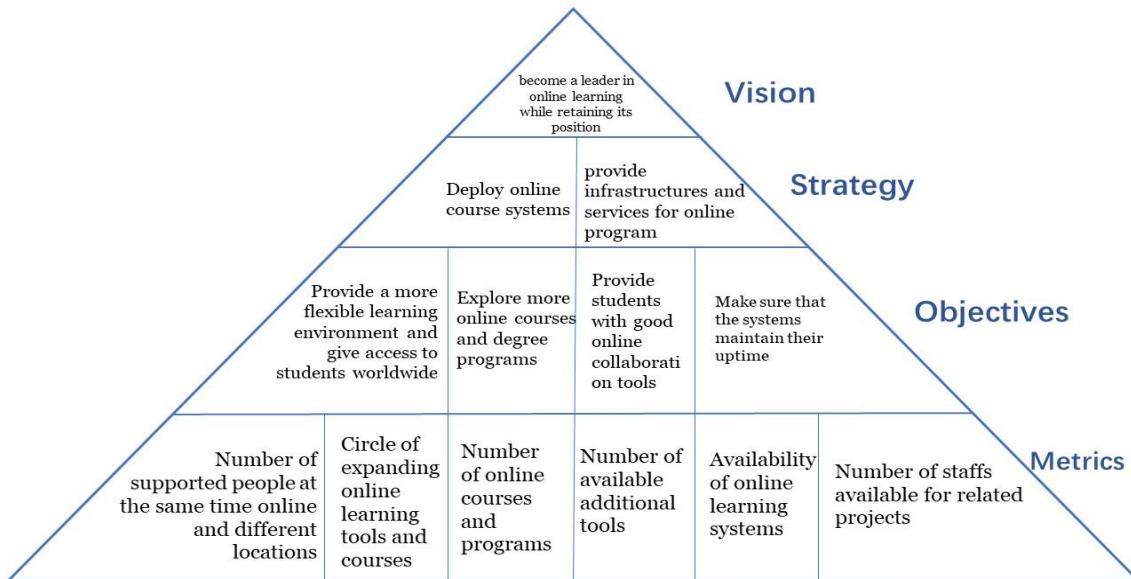


Figure 1 - VSOM Map

Vision - The vision of ABC university is to become a leader in online learning while still retaining its position as a premier research and educational institution.

Strategy - There are basically two strategies for ABC university. First, the university needs to deploy online course systems that support the delivery of course content and interaction between instructors and students. Second, the school should update and provide infrastructure and services for online programs. That would enable the systems to improve user experience.

Objective - There are four main objectives of ABC. First, the ABC university wants to provide a more flexible learning environment and support students worldwide. With an advanced online system, time and space will not become issues anymore. In addition, the ABC university wants to explore more online courses and degree programs to enable students who are unable to afford the tuition normally. Online courses or programs are normally much less expensive than on-campus ones. Making online programs and courses available will attract more students to join this university and enable many students who cannot afford the tuition to receive their education. Furthermore, the university must make sure that the systems maintain their uptime without disruptions caused by systems. Nobody wants to get interrupted by the system. The system should enable a high volume of students,

instructors, and faculties to use it at the same time without any disruptions. Finally, online learning prevents normal class interactions between students and instructors. Therefore, the ABC university should provide students with good online collaboration tools to enable interactions like a normal class.

Metrics - Based on what we have above, our team has come up with six metrics. They are listed as below:

- Number of online courses that are available
- Number of supported people at the same time online and in different locations
- Number of available additional tools
- Circle of expanding online learning tools and courses
- Number of staff available for related projects
- Availability of online learning systems

Strategy Map

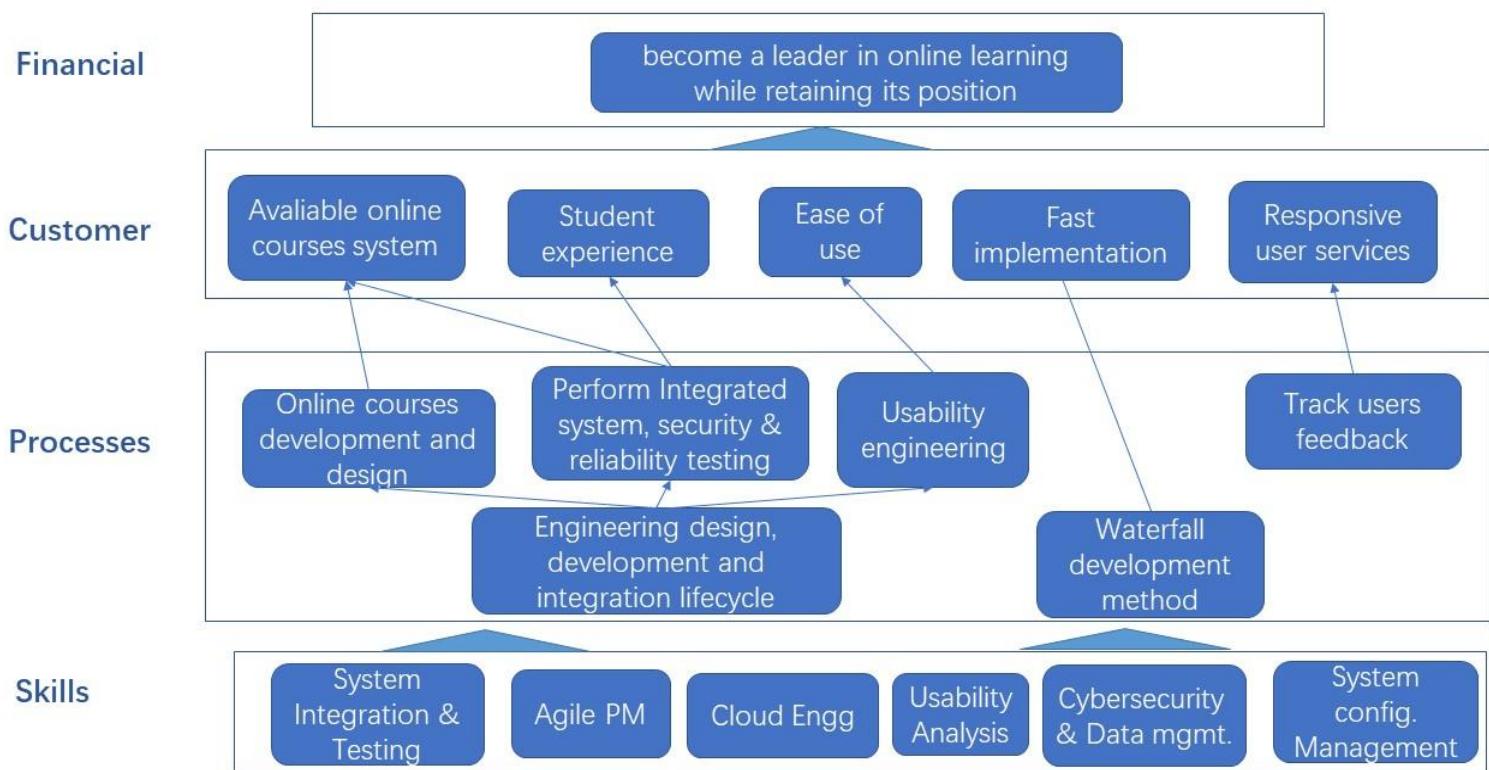


Figure 2 - Strategy Map

ABC University hopes to become a leader in online learning while still retaining its position as a premier research and educational institution. For this reason, they need an easy-used, 99% available online course system and also require the system to bring good experience to students. To achieve this goal, we need to establish an Engineering design, development, and integration lifecycle from the beginning and then further develop and design online courses for our systems. After completing the systems, we need to test security and reliability and provide a process to track user feedback so that customers can respond. We also need the usability engineering process to make the product easy to use. In addition, because the customer hopes to put the product into use in the spring semester, we can use the Waterfall development methodology to develop the first phase of the product. To achieve the goals above, we are required to have the ability to implement systems and tests and know agile development, cloud development, and usability. We also need to understand the management of cybersecurity, data, and system configuration.

Capability Assessment

| Relative Position | | | |
|-------------------|--|--|-----------------|
| Strategic | <ul style="list-style-type: none"> • System Development • System Lifecycle Management • System Analysis Development • Cloud Engineering • Data Management | <ul style="list-style-type: none"> • Operations Management • System Planning and Control | |
| Core | | <ul style="list-style-type: none"> • Security Architecture • Customer Service • System Integration • Usability Engineering • Quality Management | |
| Support | | | |
| | Weaker | Equal | Stronger |

Figure 3 - Capability Assessment (Current State)

| Relative Position | | | |
|-------------------|---------------|---|---|
| Strategic | | <ul style="list-style-type: none"> • Operations Management • System Planning and Control | <ul style="list-style-type: none"> • System Development • System Lifecycle Management • Analysis Development • Cloud Engineering • Data Management |
| Core | | <ul style="list-style-type: none"> • System Integration • Usability Engineering • Quality Management | <ul style="list-style-type: none"> • Security Architecture • Customer Service |
| Support | | | |
| | Weaker | Equal | Stronger |

Figure 4 - Capability Assessment (Future State)

SWOT Analysis

| | |
|---|--|
| Strengths: <ul style="list-style-type: none">• Easy to access resources• Flexible time on lectures, distance no longer a problem• No time cost on commute time• School capacity no longer a problem• Lower cost for students | Weaknesses: <ul style="list-style-type: none">• Professor considers quality problem• Students may not offer devices• Email responding can't reach expectation• Takes a long time to develop courses• Poor relationship connection |
| Opportunities: <ul style="list-style-type: none">• New learning opportunities for students• Pandemic changes people's behavior• Online course becoming more popular | Threats: <ul style="list-style-type: none">• System may turn down accidentally• Validity of the online course could be questioned• Enrollments may decrease• Students can not offer computers |

Figure 5 - SWOT Analysis

Strengths:

- Students can access study resources anytime and anywhere.
- Students can study it from home, with flexible time on lectures. Students who work in the daytime, are more willing to take online courses.
- No time cost on commute time. Students who spend more than one hour on the way to school can save time.
- Release school space, schools now can hold more students and faculties, and physical school space is no longer a problem.
- Lower cost for students, the online course usually is less costly compared to traditional education, and students can have lower pressure on the tuition fee.

Weaknesses:

- Some excellent professors refuse to teach online courses because they worry about the quality of online courses.
- Students who can not afford online devices such as computers can not take online programs.
- Many students have unrealistic expectations of responding to emails in a timely manner.
- It takes a lot of time to develop and offer distance learning courses. The first effort usually requires a second or third adjustment.
- Students may complain about poor connection with classmates and professors and lack of social interaction

Opportunities:

- Online education programs can provide students with new learning opportunities. The interactivity of technology makes learning easier and more fun.
- Pandemic changes people's behavior. Students and faculties require online study or job opportunities.
- Computer science and data science are becoming more popular, and demand for the online course are rising.

Threats:

- If the system is down, schedules have to change. Therefore, students and faculty's time are wasted.
- Firms may reject the authority and effectiveness of the online courses.
- On-campus enrollments may decrease.
- Students can not afford computers.

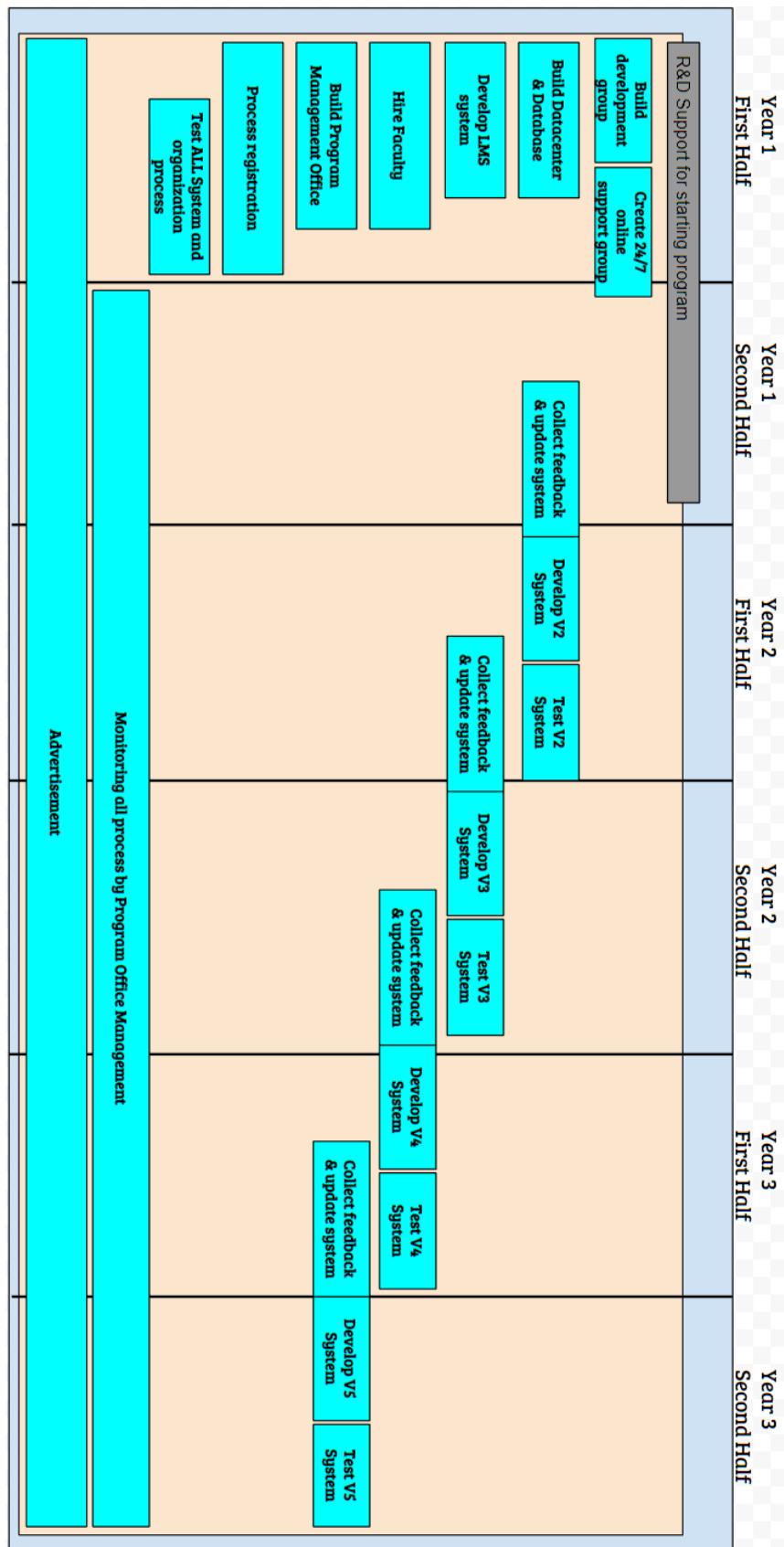


Figure 1 - 3-Year RoadMap

Contributors

Identify the team members and each individual's contribution to the paper:

Michael Huang: Information and technology research, Key IT Initiatives & Roadmap (collaborate with Xiaoyang and Gray), Risks and metrics (collaborate with Xiaoyang and Gray), Enabling Capabilities (collaborate with Xiaoyang and Gray), SWOT analysis.

Xiaoyang Wei: Business context, Capability assessment, Risks and Metrics (collaborate with Gray and Michael), Executive Summary (collaborate with Gray), VSON Map (collaborate with Gray), IT Strategic Assumptions (collaborate with Gray), Business Objectives (collaborate with Gray), Key Enabling Capabilities (collaborate with Michael and Gray)

Gray Li: Strategy Map, Risks and Metrics (collaborate with Xiaoyang and Michael), Executive Summary (collaborate with Xiaoyang), VSON Map (collaborate with Xiaoyang), Key IT Initiatives & Roadmap (collaborate with Michael and Xiaoyang), IT Strategic Assumptions (collaborate with Xiaoyang), Business Objectives (collaborate with Xiaoyang), Enabling Capabilities (collaborate with Michael and Xiaoyang)