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3380-Object_Oriented_Design

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Github_link: <https://github.com/nicksettoon/3380-xCourse>

Project Proposal for xCourse

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I. Executive Summary

Research shows that college students change their major on average 2.5 times before they graduate, however LSU's Degree Audit program is outdated, inaccessible, and unintuitive. Researching, planning, and scheduling for classes at LSU could be dramatically streamlined. We at xCourse envision an all in one solution for this predicament. Imagine you are new to LSU and you do not know where to look for information on which classes to take or if you take the class you want to, it might make you graduate a semester later than before. Degree progress and planning is very lackluster, especially for non-engineering students. Most students who plan 2-3 semesters ahead spend hours plotting out which classes they will take, all while looking at multiple resources in order to make educated decisions about their degree progress. We believe a one-stop-shop for flowcharts, helpful class summaries, and degree planning is something the majority of students would want and use.

II. Customer Segments

There are 5 main customer segments we seek to serve; freshman students, students looking to change majors, students looking into various minors, normal students registering for their next semester, and faculty.

Freshman students are the most important as they are new students who form the foundation for future graduations. Currently, they experience difficulty scheduling classes, picking degree paths, and in general, understanding their options. xCourse will alleviate these issues by providing an intuitive interface to learn about courses/professors, easy links to advisors and the college websites, comments from other students about courses, and easy submission of flowchart to faculty for review/feedback.

Secondly, xCourse will aid students interested in changing majors. These are students which have been here for a while and will become future graduates. Some of the issues they have with the current system are difficulty comparing multiple majors or concentrations, and the time consuming nature of finding classes which overlap between current major and possible future major. xCourse will allow them to easily switch between major degree program flowcharts, compare multiple degrees with one another, see which courses already taken apply to new major, see overlapping courses between degrees for dual-majors, plan out future semesters with and without change in major, and see comments from other students about major or its courses.

xCourse will be useful for students looking into minors as well. They are a smaller subset of total students which are trying to widen their studies, but must nonetheless be helped. Currently, minors are not clearly laid out like degree programs and are often buried on the college's website. We will have clear, easy to access displays of minor course requirements. Just like with the prior customer segments, these students will see which

courses already taken apply to minors and be able to easily plan out future semesters with minor courses added.

Normal students registering for next semester are the last student based customer segment and all students fall into this category. Many find the registration process to be an annoying, tedious, and unintuitive one. xCourse mainly helps this by distilling the process of registering down to one browser tab. In addition, they will be able to compare different semester plans on the flowchart, request courses for a semester plan with the click of a button, easily see which course requirements have been met, which courses are available for next semester, and who is teaching a course.

Finally, faculty will be our last customer segment. They teach classes and aid students in finding and finishing their degree paths. Pains with the current system include non-uniform input of class data, use of mainframe for accessing student records and understanding what classes are available for the students to take. Finally, they do not have an easily usable common interface with how students are scheduling classes. xCourse will have a unified backend to input class data and deliver to students, auto-generated flow charts based on course dependencies, and as a result provide a common ground for communication with students about their degree paths.

III. Gap in the Market

In order for scheduling and course planning to be a more streamlined process, the course catalog, schedule booklet, schedule request, and degree audit should be wrapped into one application. This is because these processes would work better in conjunction with each other.

The current course catalog at LSU is not suitable as a proper catalog. It needs drastic improvements. It does not allow for easy display of class prerequisites. It is not synced with the schedule booklet. Finally, classes with multiple times and/or different professors could be more streamlined

At LSU, the different colleges don't have a uniform presentation of their degree paths. Some colleges have flowcharts, like engineering, while others just simply list the courses out.

The schedule booklet and schedule request are not synced. There should be added functionality so that a student could navigate the booklet and book a course from there.

Degree audit is very non-intuitive and inaccessible. It has a very linear display of information. It is not connected to the course catalog so prerequisites are not linked. It is not connected to the schedule booklet so a student cannot see when the next chance to book the class is (i.e. Fall or Spring only classes).

IV. Meeting the Market's Needs

With a collective app, all the needs of students could be met while also enhancing the productivity for faculty advisors. xCourse would save students time and effort when registering for classes and sifting through the various degree paths. It is our goal to make the information needed more clear and accessible so that they may make the important decisions about their future. As for faculty, it would provide a common ground for talking to students about their degrees. It would also serve as a single system for changing course data and updating it for students to see. Finally, the automated flowchart creation should allow faculty to get a better glimpse at their current degree paths and more easily experiment with new ones or alterations to current ones.

V. Implementation

Management

xCourse will be managed by Ferris DeHart, Seth Richard, and Nick Settoon.

Development

For frontend we will use JavaScript and Bootstrap. For backend we will use Microsoft .NET MVC and Microsoft SQL Server v15. xCourse will be developed in stages with each stage putting us one step closer to production.

Seed Stage; In the seed stage we will create a working prototype of xCourse to ensure that we are on the right path.

Startup stage; We will implement the prototype that we have created so that it is a basic version of the product. We will begin the hosting process to see how the prototype runs on a server and see how the database schema meets demands.

Testing stage and production; xCourse's features will be tested heavily. We will gather a small quality assurance team to use the product and provide feedback on the project

Marketing and Distribution

We will pitch our MVP to the school and seek funding to continue the project from there. However, this project heavily leans on object oriented design principles and LSU's mainframe would not be able to facilitate xCourse's level of coupling.

Monetization

Once built, the project will not need to be monetized as it is a part of the services offered by LSU. Continual funding for improvements and maintenance should come from the LSU budget itself.

VI. The Problem and Our Solution

The problem with the current set of tools is that they are dispersed and not designed to work with one another. Each tool is on a different piece of LSU's website infrastructure and they are all important for making an informed decision. Students must open several pages and have a notepad or note taking software as well to plan out their paths.

Our solution, xCourse, will collect all the resources in one location and implement new tools that aid in planning, thus providing students with a one stop shop for seeing their options and simulating their different paths through their college careers.

VII. Industry Need for Our Tech

This service is desperately needed as almost every student second guesses their degree decision at some point. At the very least it will remove barriers keeping students from properly planning and being on top of their degree progress. Many students may be saved from taking classes they didn't need to, or pursuing degrees that they didn't actually want, or find too difficult as they approach the end.

VIII. Market Analysis

Primary Market

The primary market for xCourse is within the student body of LSU. They are the most frequent users of Degree Audit, Schedule Booklet, Schedule Request, and the Course Catalog. With significant changes and combination, the student body will have an easier time planning their classes and switching majors.

Secondary Market

The secondary market is with faculty advisors and LSU staff. xCourse will allow for advisors to efficiently check a student's progress within their major.

Competition

The current competition for xCourse is the scheduling suit that LSU has: Degree Audit, Schedule Booklet, Schedule Request, and the Course Catalog. However, these products are outdated, unintuitive, and inaccessible.

IX. Marketing Strategies

Overview

xCourse is a tool for students. Since there is no monetization requirement, the foundation of our marketing strategy will be to build the best product we can build. The app must speak for itself.

Primary customer analysis and entry strategy

xCourse, should it be seen through to deployment, will enter the market under no competition and be provided as a free service to all students, prospective and current.

Core competency

The housing of all the functions of degree planning and execution under one application is xCourse's main advantage. It will dramatically reduce the time it takes to make decisions about classes and schedule those classes for the right semester.

Sales strategy

Again, due to it being a service offered by LSU and a relatively static one at that, there is no need to sell copies or subscriptions of this application. It can be hosted at minimal cost once built and the database updated through an easy to use UI for faculty.

X. Barriers to entry

The major barrier to entry for xCourse is LSU's Mainframe system only storing student and course data as text that must be requested and parsed as a String or as hexadecimal. This is tedious and critical for the data to be accurate. LSU's Mainframe would be a major bottleneck for xCourse as it already is for many apps that LSU currently maintains and uses.

XI. Critical Risks

A critical risk for our application is LSU's acceptance of xCourse. LSU has deals with other vendors that we are not aware of, so they could be in the process of purchasing a similar solution or they could be developing one in house. However, seeing as there has not been significant change to the way that LSU students schedule and plan for courses in the past five years we are confident that LSU is not working on replacing them.

XIII. Interviews

Summary

Our group of juniors/seniors which we interviewed responded largely along similar lines. Five of the group have considered switching majors and three have actually switched. This seems to be a valid representation of our team's anecdotal evidence that switching majors is something many students consider in their college career.

Furthermore, charts appear to be the main tool used for navigating their scheduling, although some talk to faculty as well of course. The base UI for xCourse will be the degree flowchart and as a result satisfy most of these user's scheduling preferences.

Almost everyone is looking for an interactive, visual representation of the classes they have to take with the classes that they have already taken accounted for. In addition, updated timelines to graduation and future semester planning were heavily desired. Classes taken will be displayed, and one's timeline to graduation can be easily calculated and displayed as well once a plan (custom or default) is selected for the degree path.

Many like the coloring system for courses in LSU's Degree Audit. However, several mentioned it was confusing and hard to parse. Others don't like the lack of information about courses, the sections of courses, or unlisted courses that can give credit. Lack of sorting options and GPA woes were also mentioned. xCourse will allow semester plans to be color coded. It will also allow highlighting of classes based on type(MATH, ENG, etc...), degree section (elective, gen ed, phys sci, etc...), hours (1, 3, 5), and availability (can take, can't take, summer only, fall only, etc...).

Many don't like the current workflow for finding and scheduling classes, some think it could be better, those left think it "could be worse". Many state that they wish to search for classes and schedule them on the same page. No sorting options, issues seeing time overlaps, and seeing different sections are other issues mentioned. Classes available for a selected semester will be highlighted and elective slots can be clicked on to select from a list of viable courses. Once a semester plan is laid out, it can be viewed linearly in a table for time conflicts or easy printing. Finally registering is as simple as submitting a saved semester plan to LSU's registration system.

When asked about the course catalogue, most said it was helpful, but could also be improved. They wanted more time, elective, and description information about each course. Finally, better searching, sorting, filtering options were also desired. Professor information will be included in the information popup for each available class. In addition to a description of the course, other students may comment as to why the course should be taken over other courses, or add tips for taking certain courses before others.

Questions

1. What is your name, major, and year?

Name: Person 1: Dylan Govender (email)

Person 2: Stephanie Hines (email)

Person 3: Victoria Liu (email)

Person 4: Brian Gates (email)

Person 5: Ferol Schoonmaker (email)

Person 6: Leopold Frilot (email)

Person 7: Jennifer Dedo (video call)

Person 8: Brandon Brumfield (video call)

Person 9: Jordan Paline (video call)

Person 10: Matilyn Veca (email)

Person 11: Kate Stephens (email)

Person 12: Colin Richard (email)

Major: Person 1: Computer Engineering

Person 2: Computer Science

Person 3: Computer Science

Person 4: Computer Science (Software Engineering)

Person 5: Computer Science

Person 6: Comp. Sci. & 2nd Discipline

Person 7: Kinesiology

Person 8: Physics - Astronomy Concentration

Person 9: Mechanical Engineering

Person 10: Graphic Design

Person 11: Mass communication

Person 12: Landscape Architecture

Year: Person 1: 4th

Person 2: 3

Person 3: 3

Person 4: 4

Person 5: 4th Year

Person 6: 6

Person 7: 3rd

Person 8: 5th

Person 9: 5th

Person 10: 4th

Person 11: 4th

Person 12: 3rd

2. Have you ever considered switching majors, if so to what?

Person 1: Nope.

Person 2: No

Person 3: No.

Person 4: Yes, to Mathematics and Computer Science

Person 5: No

Person 6: Yes, from Civil Engineering to Comp. Sci.

Person 7: Yes, nothing in particular

Person 8: Yes, Undeclared arts -> Business (ISDS) -> History -> Mass

Communications -> Electrical Engineering -> Physics

Person 9: Yes, computer science

Person 10: a) Yes, I changed my major freshman year from animal science to graphic design.

Person 11: Yes, ISDS.

Person 12: Yes, I switched to Landscape Architecture from Mechanical Engineering

3. If you have switched majors, how many times?

Person 1: N/A

Person 2: N/A

Person 3: N/A

Person 4: I have changed my major twice

Person 5: N/A

Person 6: Once

Person 7: N/A

Person 8: 5 times

Person 9: N/A

Person 10: I have only switched majors once, but I am currently thinking about changing my minor from ceramics to visual communications.

Person 11: 1

Person 12: 1

4. How did you figure out which classes you would have to take for this new major?

Person 1: Spring Invitational they go through it with you.

Person 2: N/A

Person 3: I looked at the flowchart online and after speaking with my advisor.

Person 4: Advising sessions, course catalog, catalog flowchart

Person 5: N/A

Person 6: Course Flowchart

Person 7: N/A

Person 8: Physics Degree chart, spoke to head of physics departs, EE flowchart

Person 9: N/A

Person 10: I talked to my advisor and looked at the course catalog and degree audit.

Person 11: Degree audit

Person 12: Degree audit, course catalog

5. What tools do you use to keep track of your degree progress?

Person 1: I use my pen on a copy of the flowchart

Person 2: Degree audit through myLSU, flowchart, semester-cadence meetings with Honors advisor

Person 3: I just printed out my flowchart and put an "X" on the classes I've taken, then add notes to what classes I should take next.

Person 4: My original flowchart that I keep updated/modified (primary), myLSU degree audit (secondary confirmation)

Person 5: Flowchart and degree audit

Person 6: Trello/Lucidchart

Person 7: Semester by semester breakdown given via counselor. Grad school prerequisites

Person 8: Physics chart

Person 9: Degree audit & flowchart

Person 10: I use degree audit.

Person 11: Degree audit

Person 12: Degree audit

6. What features do you want or look for in a degree progress/switching majors tool?

Person 1: I just wish it was more descriptive

Person 2: Current progress in current major, supposed progress in new major, estimated time to graduation for both, required GPA for both, list of requirements to enter new college (if applicable)

Person 3: I would like a 'path guide' from other students to see what classes/route they took in order to graduate in 4/5 years and in a specific concentration. E.g. like those gaming build sites with certain build paths (League of Legends, Warframe, etc).

Person 4: INTERACTIVE PROFILE-MAINTAINED FLOWCHART, pref. updated automatically based on degree audit but I'd still use it if I had to manually input. On this flowchart, I want to see what courses/blocks (Gen. Ed, Area Electives, etc.) I still need to complete, and create a list of courses that will fill a given requirement. Bonus points if it can account for prerequisites from courses I have already completed.

Include an optional field on flowchart elements for putting anticipated semester/year; can be visual only (no logic) for planning purposes.

It might be out of scope, but a visual-blocked schedule for current courses would be great as an alternative for the list schedule. I end up making my own every semester in Excel, but other universities I've attended auto-generate this during/after course scheduling.

Person 5: A simulator where I can check off when I would take a class to map out a multi year schedule, and a list of all classes applicable for certain required credits

Person 6: Which courses transfer over; How many semesters the switch will add to my graduation date; How many semesters are left given my current hours/semester average; a list of all the electives that apply to my Technical electives/humanities/etc.

Person 7: Interactive checklist, something to edit, clearly see what you have to take

Person 8: Semester by semester order, time-frame

Person 9: Courses that I've already taken that could apply to different majors/minors, potential minors you could get based off courses you've already taken, building a degree timeline for you (where you can change the date)

Person 10: I think it's important for the degree progress tool mark off which courses have been completed/are in progress, and I personally have never switched my major myself (I got my advisor to switch it for me) but if it had been more accessible I would have done it myself so I think accessibility is something I would definitely look for.

Person 11: An easy-to-read list of classes.

Person 12: Potential minors, more flexibility for working students

7. What do you like about LSU's Degree Audit? What features would you keep?

Person 1: I like the formatting

Person 2: I like the display of past and current courses - make sure to differentiate between past, current, needed. Also hours taken that aren't applied is useful.

Person 3: I like that it shows you a green or red dot to indicate if you've completed a class or not.

Person 4: Current degree audit is reasonably easy to access. I like the summary at the top. Color coding for sections/clusters that aren't completed is good, though the scheme might be different.

Person 5: Tells me what classes sub in for what credits (that have been taken)

Person 6: I like the color system. I like that it's easy to reach and all the data is under categories

Person 7: Like that it shows what other class she should potentially take. Shows possible classes – feature to keep

Person 8: Nothing, the colors for requirement progress

Person 9: Nothing, none

Person 10: I like that it shows the difference between completed/in progress/and needed courses. It helps to keep track of how many courses I have left.

Person 11: I like the color coding (red, yellow, red, grey).

Person 12: Easy to access, displays past and current courses

8. What do you dislike about LSU's Degree Audit? What would you change?

Person 1: I dislike the LSU v Cumulative GPA. I had to find out what that meant

Person 2: UI[User Interface]/layout is not nice - could be better formatted to display progress - maybe offer different layouts: like sort by course type (ex. CSC, Electives, HNRS reqs, MATH minor reqs, GEN ED) or by completed vs needed, or by highest grade to lowest idk

Person 3: Don't like how it doesn't show you much info about other classes and the minimum requirements in order to take a class.

Person 4: Simple true/false view for completion. As an example, I have 3.0/6.0 hours completed for Area Approved Electives, but because I am not currently enrolled in an elective, this block has a red 'X' for not completed. Furthermore, blocks can only show one output - I haven't taken Compilers (CSC 4351) yet, but this is not visible from the collapsed view of Software Engineering Core/Concentration folder. This output could be a little confusing, particularly if the blocks are larger/encompass more courses.

The degree audit is good for viewing courses you've already taken (which is, admittedly, its designed purpose), but very bad for proactive planning/pre-schedule work for future courses. No such tool presently exists within the LSU toolkit for students to simplify/enhance the pre-scheduling experience.

Person 5: Doesn't tell you all of the classes available for a required credit

Person 6: I wish there was a GPA average that applied to just my current degree audit if that makes sense.

Person 7: I find degree audit very confusing, can't remember the last time I looked at it, very hard to read, layers, need a counselor to translate. I want to add a legend

Person 8: Not very easy to read or understand, change - easier to see what you need (class wise)

Person 9: Everything (confusing, hard to follow, misplacement of information), make it more user friendly & easier to read, make it more visual (like on the actual flowchart (colorful flowchart))

Person 10: I think it could be more readable, and also the color differentiations could be greater.

Person 11: Not easy to read; very cluttered.

Person 12: A legend, fill in the blank for courses, simplify it only display courses for the year you are going into

9. Do you use the College of Engineering flowcharts?

Person 1: I use the Comp E ones

Person 2: !!!!!!!!!!!YES!!!!!!!!!!!!!!

Person 3: Yes!

Person 4: Yes, I use the CSC flowcharts extensively each semester.

Person 5: Yes

Person 6: Yes

Person 7: no

Person 8: No, but it was useful when I did use it

Person 9: yes

Person 10: No, I am an art major.

Person 11: No

Person 12: No

10. If your current major doesn't have a flowchart, would you like them to create one?

Person 1: N/A

Person 2: N/A

Person 3: My boyfriend's major does NOT have a flowchart and it was 100x harder for me to help him figure out what classes he needed to take when he was a freshman.

Person 4: N/A

Person 5: N/A

Person 6: N/A

Person 7: no

Person 8: Major has a chart but it could be prettier

Person 9: N/A

Person 10: I think it could be beneficial to have one. Especially since people in my major are more visual learners.

Person 11: Yes

Person 12: Yes

11. Do you like the current method for looking up and scheduling classes through the schedule booklet and request?

Person 1: Hell no

Person 2: Ehh, could be streamlined - prettier/have more info on classes in actual description instead of having to go to department webpage

Person 3: No. I hate having to select the dropdown menu every time I want to go select a different course major. Then I have to look tediously to see the class I need to take, write down the days/hours it happens, then go back to select the dropdown menu and figure out if another class fits in this time schedule.

Person 4: Comments were related to scheduling methodology instead of user interface and experience, which while important, was excluded due to our team's lack of control over LSU policy on scheduling.

Person 5: I think it is passable, 5/10 it works

Person 6: No

Person 7: Yes

Person 8: Could be worse, not as smooth as it could be, upset with lack of professor postings, hard to get a feel for the times

Person 9: Its okay could be better, but could also be way worse

Person 10: I think that its relatively simple, so I don't have any complaints

Person 11: Yes

Person 12: Yes

12. If not, do you have suggestions for improving the way classes are found and scheduled?

Person 1: They should be scheduled in the same step

Person 2: More info in one place, also prettier - would prefer to have redirects or links on each class name to more info, or like an expandable thing with a description and past professors

Person 3: Be able to add classes to another window as you search for other classes and make it turn red if there's an overlap in time.

Person 4: The schedule booklet is fine but might benefit from readability improvements for classes with multiple sections/labs.

Person 5: Put the course booklet in the same system as scheduling

Person 6: The worst part is selecting electives. The program should look at the course offerings and then your course flowchart and mark classes as "Core classes" vs "Potential elective"

Person 7: Kicks you out too quickly when you request a schedule. Can't waitlist a class you're already in for a different section

Person 8: Could schedule all on one page

Person 9: Sort by level (1000, 2000, etc), still see time, section number professor columns

Person 10: I think changing the schedule booklet so every other line is a different color would help make it easier to read and keep track of.

Person 11: It would be nice if the schedule booklet highlighted the background of the class listings white and yellow or something so class information is easier to distinguish

Person 12: Have an option to only display courses for your selected year.

13. Is the course catalogue actually helpful to you?

Person 1: It is but I hate that it is

Person 2: Ehh, maybe for times

Person 3: What is that?!

Person 4: The course catalog is less useful than the schedule booklet, but I still use it occasionally.

Person 5: Yes

Person 6: On a surface level, yeah I guess. It could improve substantially.

Person 7: Yeah, I think so

Person 8: It does its job

Person 9: no

Person 10: It has been helpful with me figuring out what to take when looking up different minors.

Person 11: No

Person 12: Yes

14. What would you change about it if you could?

Person 1: be more obvious about what is a tech elective, dsn[Design] elective

Person 2: More info all in one place - description

Person 3: So I just looked at the course catalog. I don't think it's as useful as a flowchart (imo) since I like seeing exactly how one class transitions from another. I would definitely make a flowchart for all majors rather than scrolling up and down constantly to see what classes I would need to take.

Person 4: Better filtering/usability changes at the Degree selection page, better cross-referencing, particularly listings for Social Science/Humanities requirements. These are locatable on the course catalog (if you already know where to look), but it's highly obfuscated by miserable design, and it's not searchable directly from the degree listing (for CSC at least).

Person 5: Nothing

Person 6: Section time periods; where the class will be; why to actually take each course rather than just a general description of what is taught

Person 7: Summer was confusing between session A & B, lines between the classes

Person 8: Fix readability, time comparison tool

Person 9: Make it easier to find information

Person 10: I think it would be more helpful if they listed both the course names and numbers, instead of just the numbers then forcing me to look them up in the schedule booklet.

Person 11: ? I have never used it, so I have no answer.

Person 12: Add a legend to it.