

# ***WolfPal: Your Planning Assistant***

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## **ABSTRACT**

Every student attending a university faces a recurring and baffling task of choosing a limited number of courses from the enormous collection of courses offered by the university. Since this decision directly affects the career of the student, it has to be a well informed one. The students use multiple techniques to obtain information about particular courses that are best fit for them. These techniques can be broadly categorized as university provided resources and peer remarks. Since these resources are scattered over different platforms, the task of selecting courses to make a course plan becomes tedious. A survey conducted by us revealed that students are not being able to make an effective course plan for their graduation. The reasons inferred were the sparse presence of the available resources, lack of knowledge and lack of communication among the students. This paper presents the solution to building an effective course plan using an interactive platform that integrates multiple resources used by the students to help them make a better choice. Along with providing the resources, the platform possesses the capability of recommending a course based on the student's preferences. Additionally, it tries to get students more involved in campus activities by keeping them informed about the upcoming events.

## **Keywords**

Course Planning; Course Recommendation; Peer Help, WolfPal, CSC Graduate Students

## **1. INTRODUCTION**

The United States of America is a home to thousands of universities each of which has a huge number of students pursuing higher degree. These students are required to dedicate most of their time towards the coursework in order to achieve success in their field of study. On top of it, the students have to go through the enrolment process every semester which burdens them with additional work of scrutinizing the gigantic list of courses to find a few that are a good fit for them. This task involves a lot of effort of going through all the available resources, talking to the professors, talking to other students who had taken the course earlier and many other factors that help the students to arrive at a conclusion. Apart from this list of enormous tasks, the students are also expected to get involved in non-academic

activities or events that help them to make a balance between their academic and non-academic life. These variety of tasks are important for a student but consume a lot of additional time. The most time consuming task among these subjacent tasks is selection of courses for enrolment. It tops the list because of its importance in guiding the career of the student. To help college students search courses more efficiently, many coursework recommendation systems [5, 7] and many search tools [2, 3] have been proposed.

As per the online survey conducted by us, a lot of the students talk to their peers or seniors who possess the knowledge about the course and they also read the details of the courses provided by the university before making a decision. Seeing the results of the survey, it can be inferred that there is a lot of room for improvement in the existing systems that will help students to save a lot of time while doing subjacent tasks.

### **1.1 Problem Statement**

There is a lot of information available online which can help student make a well informed decision but this information is sparsely present. Due to the scattered presence, this information is sometimes hard to find which makes it ineffective. Additionally, the students prefer to communicate with their peer who have information about a course. According to our survey, this technique was used by most of the students. The students also reported that sometimes it is hard to find peers with knowledge about a particular subject. Also, the information about the events and activities are available on university's website but still students do not know about it due to scattered presence of every available thing. In this paper, we propose a solution of tackling these two problems - lack of information and lack of communication.

### **1.2 Proposed Solution**

An interactive platform which integrates the resources provided by the university with the remarks of the students on a course, who had taken the course earlier will be ideal for the tackling the problem of lack of information. Apart from connecting student remarks to the information, the system will provide a way to connect to other students for sharing any information or queries. This will improve the communication among the students. To make the course selection more easy for the students, the system will pro-

vide them help with recommendations and suggestions interactively using chat-bot. Also, the system will allow the students to formulate a course plan which lists the courses that they will be taking during their graduation. Since this information is stored in the system, the students would not be required to reiterate through the whole process during the enrollment. They can simply use their prepared list to enrol into courses.

The following use case diagram(Figure 1) represents the user interaction with the system we are proposing.

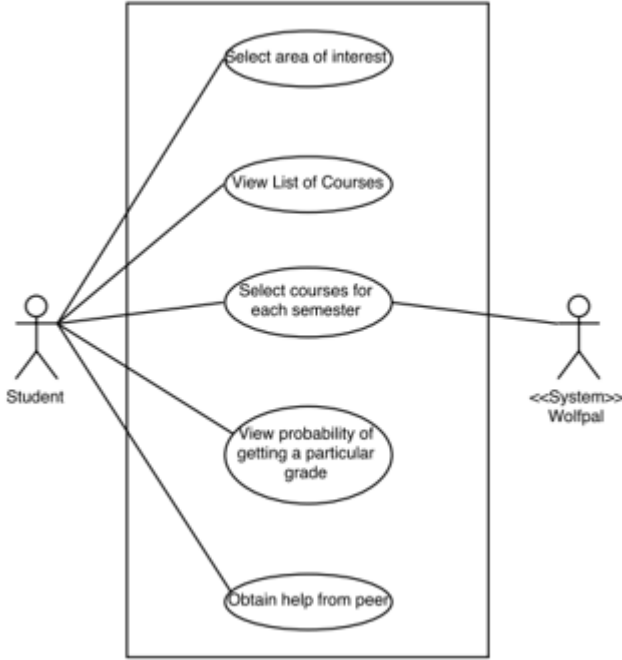


Figure 1: Use Case Diagram: WolfPal

Figure 2 shows the system architecture envisioned for our system implementation.

## 2. LITERATURE SURVEY

Despite steady work done related to course recommendation and feedback system, course selection remains a challenging process for any graduate student. Considering the course selection as the crucial part of the graduation, and extensive list of courses offered by the university, the existing system needs to demonstrate a good level of assistance to student. In the following section we will discuss the previous works related to course recommendation and feedback system along with a few drawbacks in them.

### 2.1 Course selection and recommendation system

“Course selection and recommendation system” [7] creates a common forum on popular platform “Piazza” in which senior students can post their reviews for each course. Each review includes five criteria: professor rating, grades, content, job perspectives, and workload. With those reviews, students can look-up keywords to gather information for the course in which they are interested. This paper also provides

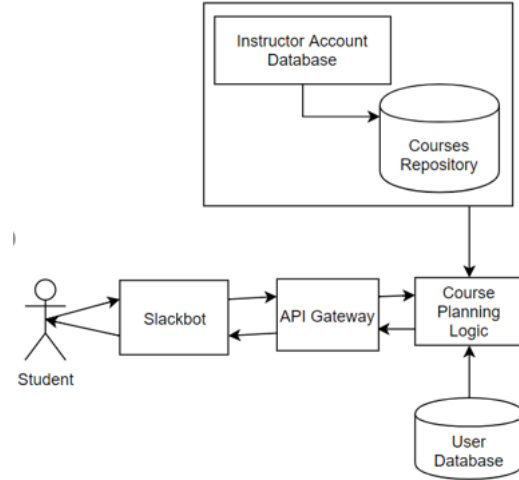


Figure 2: Envisioned System Architecture: WolfPal

another solution targeting the students that know what criteria they want but have no clue which courses match them. Using text mining algorithm through all reviews on Piazza, it can give a list that matches a student’s choice for the five criteria. Although this paper provides a good way to gain information about the courses, there are concerns like some students not following the guidelines when they grade this five criteria, or mistype scores. However, we think forum is still a good way to exchange information.

### 2.2 Course feedback system

“Course feedback system” [4] provides three features. One is a forum that can share short reviews for each course with like and dislike button that can increase its reliability. The second feature is a feedback system that senior students could answer eight questions for each course, such as numbers of project, number of assignment, course knowledge and so on. The third feature is a suggestion system that helps student search courses by 8 filters based on the data from second feature. We think this system is a more reliable and a more feedback friendly system than the previous one, because of its separate review and feedback, as well as grading criteria (questions) by multiple choice to prevent typing errors.

### 2.3 Graduate progress tool

“Graduate progress tool” [6] aims to help a student track their courses, grades and the progress of degree based on the profile the user has provided. This system is provided as a mobile app, a desktop app, and as an extension of the existing system - MyPack portal which is more comfortable to use because of the familiarity aspect for NCSU students. This track system is one of our goals. We would like to reduce some input information that can be provided by the internal database such as course credits.

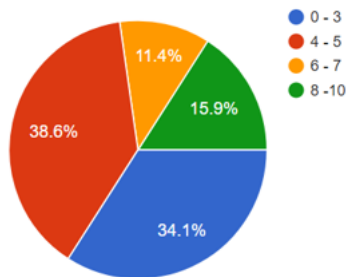
## 3. USER STUDY

We surveyed 44 students about the importance of the scope of our project, and the responses were very helpful for us in narrowing down the objectives of what we needed

to do for a successful implementation of our project idea. We observed that communication between the vastly diverse community of NC State students is the major issue which we felt should be handled, so we tried to broaden our search for data as much as we could. We got the opinions of students from even outside NC State, to check if the principles of our solution would be properly valid as widely as possible. We were able to make our inferences based on the data we received, and we have explained those according to each question we asked the users.

### 3.1 Plan for list of courses

We found that 72.7% (Figure 3) of the students had planned about enrollment in 5 or less courses for the duration of their graduation, which is less than half of the number of credits required for completing the criteria for graduating from most NC State programs. If a student had a specific plan to complete 10 different courses depending on a certain track planned for him/her, then proper enrollment into courses could be planned in a better way based on the availability of courses and proper balance of the student workload.



**Figure 3: Did you plan a list of specific courses to enroll into before coming to the university? If so, how many courses were on the list?**

### 3.2 Success of plan

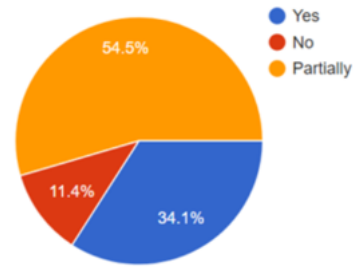
We found that 65.9% (Figure 4) of the students could not completely follow the course plan they had in their mind before joining the university. This can be resolved by providing a proper solution for any student to follow a specific plan of courses by mitigating the factors which can make enrolling into a course impossible. These factors include availability of a course per semester, core courses requirement for a specific major, strength of classes conducted by the professor in the past semesters, etc.

### 3.3 Awareness of suitable courses

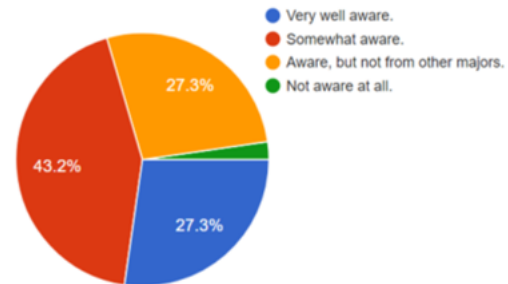
We found that 70.5% (Figure 5) of the students were not fully aware of the courses that were suitable for the specific graduation track through which they wished to graduate. If the students are not even completely aware of the courses which were properly suitable for their area of interest, then completing those courses with a good grade is very hard to be even considered.

### 3.4 Source of course information

We found that getting course information from peers and seniors was the most prioritized way (Figure 6) of getting course information by the new students. This method is currently limited by unavailability of a proper network to speak



**Figure 4: Were you able to follow the course plan you made?**

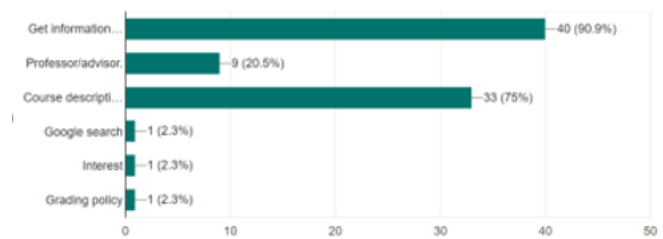


**Figure 5: How aware are you about the list of courses relevant to your area of interest offered by the university (including courses from other majors)?**

to the required people. If student has no proper method to even find the people who can provide the most relevant information about the topics he/she wants, then getting information becomes very hard immediately.

The second most used way to get the information about specific courses was to read the course description present on the course catalog. This information is very limited though, with no proper syllabus available in the description, grading policy absent, and workload impossible to decipher.

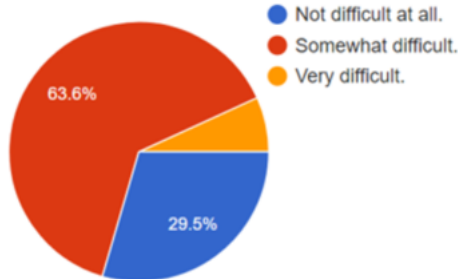
Grading policy and professor/advisor advice were used minimally by students to reach a decision. Information about these details could be helpful in reaching a decision over enrollment in a course.



**Figure 6: How do you gather information about the courses while choosing a particular course?**

### 3.5 Difficulty in connecting people with same interest

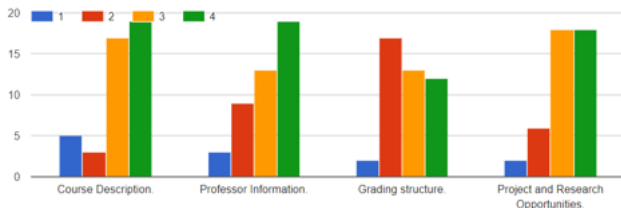
We found that 70.5% (Figure 7) of the people did not find it easy to find relevant people to speak about the various details of the courses they wished to learn about. Talking to relevant people freely and in detail about the intricacies of different courses is an extremely important requirement before deciding to enroll in a course.



**Figure 7: How difficult was it to find relevant people to gather information about the courses you were interested in enrolling?**

### 3.6 Important factors for deciding course

Students picked grading structure as the least important factor considered for deciding about a course (Figure 8), while course description and information about project and research opportunities in a course were considered to be amongst the most important factors for reaching a decision about enrollment in a course. Improving the availability of information of these important topics for new students would be crucial for proper consideration of interest in a course.



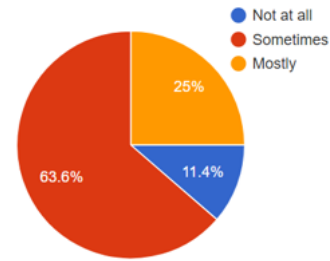
**Figure 8: How important are these factors for deciding to enroll into a course?**

### 3.7 Evenly distributing your academic workload

A whopping 88.6% (Figure 9) of the people do not find it easy to balance the workload of a semester based on how tough the coursework can be. If proper time and effort cannot be divided between the multiple courses in a semester, then successfully completing them can become very hard.

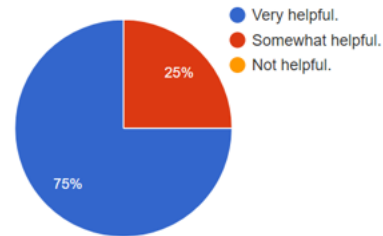
### 3.8 FAQ's related to course selection

100% (Figure 10) of the people think that it will be helpful to have a well answered FAQs section about specific courses available along with the course entry in course catalog. This



**Figure 9: Do you find it difficult to pick the courses for a semester on the basis of the workload?**

will take care of most doubts a new student has about enrolling in a course.



**Figure 10: Do you think a list of well answered FAQs for a course would be helpful to know before enrolling in a course?**

## 4. GOAL

After analyzing the responses of the survey conducted by us, we come to the conclusion that the system we are planning to implement will be crucial to new students. Providing effective solutions to the problems mentioned by the students would be extremely helpful in easing the course selection process for new students. So we plan to create a system that helps students to efficiently formulate a course plan for their graduation. We have listed the important features of our proposed system as follows:

### 4.1 Graduate Plan Formation

It will be formulated in an interactive way using multiple criteria, which include:

1. Area of interest in the specific domain.
2. Courses suitable for each semester based on factors like workload.
3. Core courses requirement.
4. Course details like syllabus, schedule, instructor, workload, grade distribution, projects, papers, fieldwork etc.
5. Conversation with peers[1].
6. Peer remarks.

With the help of this plan, a new student can be provided with a proper blueprint of his entire university schedule till

he/she graduates. Having access to such a significant resource before even stepping foot on university premises will show a marked upturn in a student's academic performance.

## 4.2 WolfPal: The bot for automated help

We plan to deploy a bot to carry out these duties for a student in an automated way. This bot will be trained extensively with each aspect of the required data about course enrollment. The bot will use the input data of the user to match with its trained data-set, and give out the most efficient plan possible which would suit the certain student uniquely. Each plan will be unique as data about current and future interests of a student would be used in tandem with data pertaining to the past experience of the student. To help a student be certain about going through with this plan, the bot will also set up a way to discuss with peers who have been suggested similar plans or subjects, or peers who have similar areas of interests. Supplementing bot data with feedback from students going through the similar process would give us the best solution. Previous experiences of the students who have studied the same subject will also be extremely beneficial for any student who wished to study it.

## 4.3 Revamped student communication

We have observed that communicating with relevant peers in the university can be a bit tough to do, especially for a newly admitted student. This is due to the absence of a perfect platform for the students to help with this predicament. The proposed system [5] promotes communication by providing a public platform to interact with all students. This can help resolve any doubt a student possesses. A university wide open forum will promote communication between the students to a previously unprecedented level. Academic study will be helped if we create department-specific and course-specific threads on this forum, to provide an open platform for communication. Additionally, the system will help keep the students more involved in campus life by keeping them informed about the upcoming events in the university. Specific threads of communication can also be created for this.

# 5. EVALUATION PLAN

## 5.1 Questionnaire

Our goal is to help students to efficiently formulate a course plan for their graduation. Present survey indicates that only 26% of students are able to pre-plan for more than 50% courses and only 27% of the students are fully aware of the list of all courses and course details offered by the university. Our target is to improve these stats and make sure that at least 50% of the students are able to plan courses for the graduation and are fully aware of the list and details of the courses offered by the university. Our project can be evaluated on the basis of the improvement in these stats.

Moreover, presently 70% of the students face difficulty while finding relevant people to gather information about the courses they were interested in enrolling. Our plan is to provide a platform and initiate the connection between the people interested in the same field to improve this statistic and make sure that less than 70% students face difficulty while finding relevant people.

Lastly, 100% students claim that a list of well answered FAQs for a course would be helpful to know before enrolling in a course, so our application will provide a list of well answered FAQs relevant to the subject.

## 5.2 Analysis method

For now, our database will only consist of the graduate courses information offered by **CSC department** of NC State. So, our project can be evaluated on the basis of the working of the below functionalities for CSC graduate students.

1. Student is able to plan list of courses through the following:
  - (a) Area of interest/Master track. For example: Networking, Security, Gaming, AI/Machine learning, Data Science, Software Engineering, etc.
  - (b) Course suitable for each semester i.e. possible number of courses, workload distribution, etc.
  - (c) At least 3 core courses i.e the minimum requirement for graduation.
  - (d) Course specific details like syllabus, schedule, instructor, workload, grade distribution, projects, papers, fieldwork, etc.
  - (e) Peer help.
2. Student is able to see the probability of getting a particular grade in each semester which depends on the subjects picked by the student for each semester.
3. Students is able to connect with other students interested in the same courses or domain. Our bot (WolfPal) will help students to find out the relevant peers and if allowed will initiate the conversation between them.

# 6. REFERENCES

- [1] *An-introduction-to-Slackbot*, <http://engineering.purdue.edu/~mark/puthesis>.
- [2] *Mypack Portal of NCSU*, <http://mypack.ncsu.edu>.
- [3] *Computer Science Course Catalog*, <https://www.csc.ncsu.edu/academics/>.
- [4] R. Bhatt, D. Desai, L. Shi, and C. Zhao. Course feedback system. *Software Engineering*, 2017.
- [5] C.-M. Chen, L.-J. Duh, and C.-Y. Liu. A personalized coursework recommendation system based on fuzzy item response theory. *e-Technology, e-Commerce and e-Service, 2004. EEE'04. 2004 IEEE International Conference on. IEEE*, pages 305–308, 2004.
- [6] A. A. B. John, J. Jose, S. Sharma, and S. Nanda. Graduation progress tool - enhancing the portal of north carolina state university. 2016.
- [7] F. Luan, F. Misarwala, and Z. S. Thampi. Way to improve course selection and recommendation at north carolina state university. *Software Engineering*, 2017.