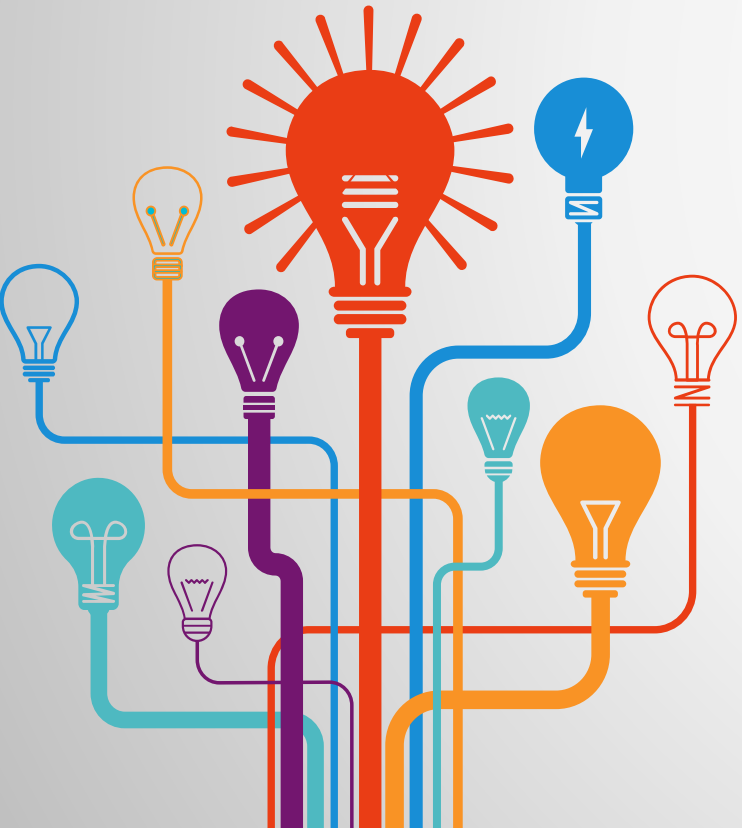
FORMATIVE
Research Report



OVERVIEW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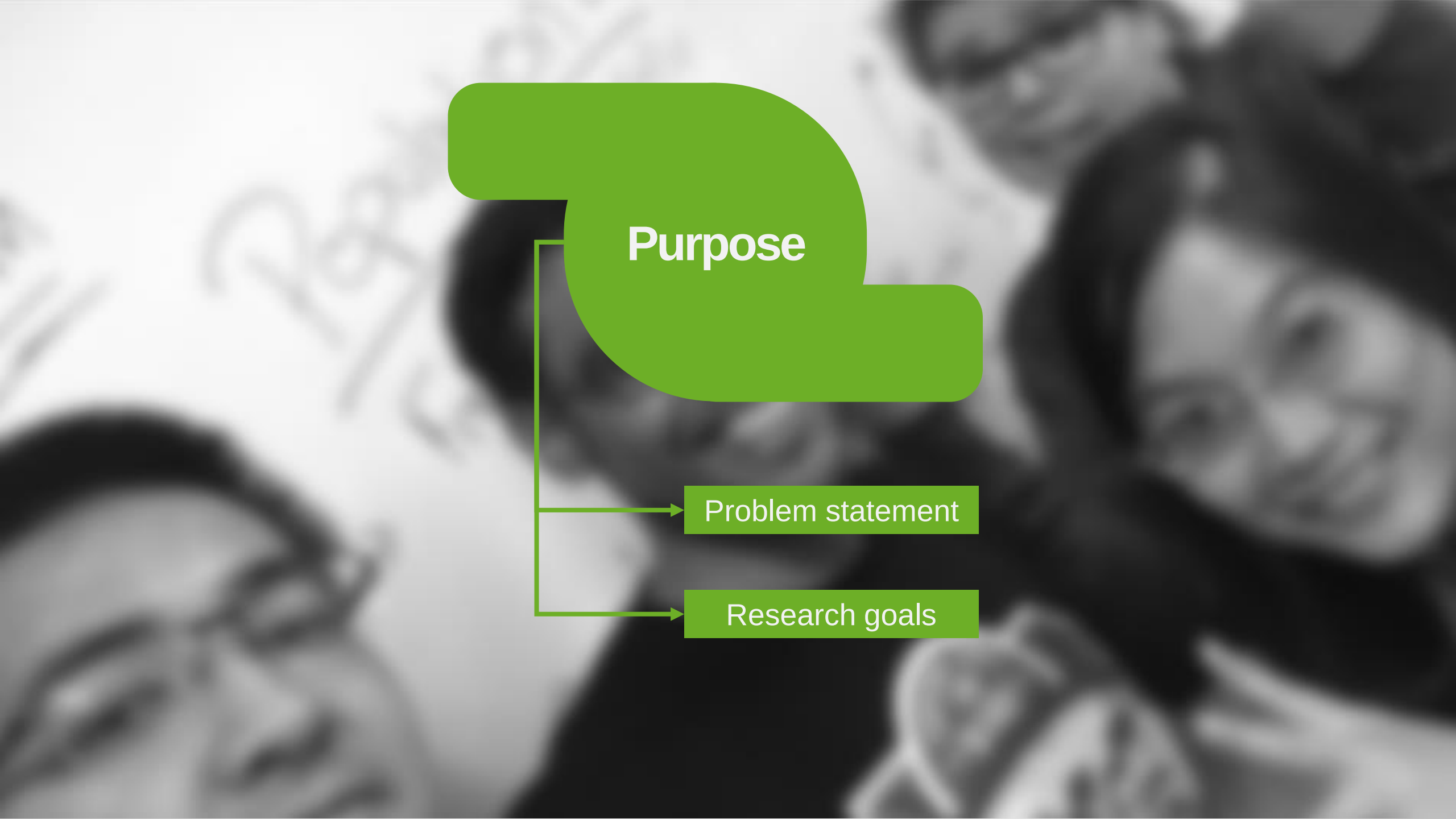

Purpose
Problem statement
Research goals

Purpose

Problem Statement

Research Goals

As students move forward in school they have a hard time developing affective study skills, managing their time, and seeking better advice, leaving students behind academically and unsure about their direction in their major.

Purpose

Problem Statement

Research Goals

Graduation On Time

Late Graduation

NON-FLAGSHIP

19%

81%

FLAGSHIP/VERY HIGH RESEARCH

36%

64%

A report from Complete College America, a nonprofit group based in Indianapolis (2014).

Purpose

Problem Statement

Research Goals

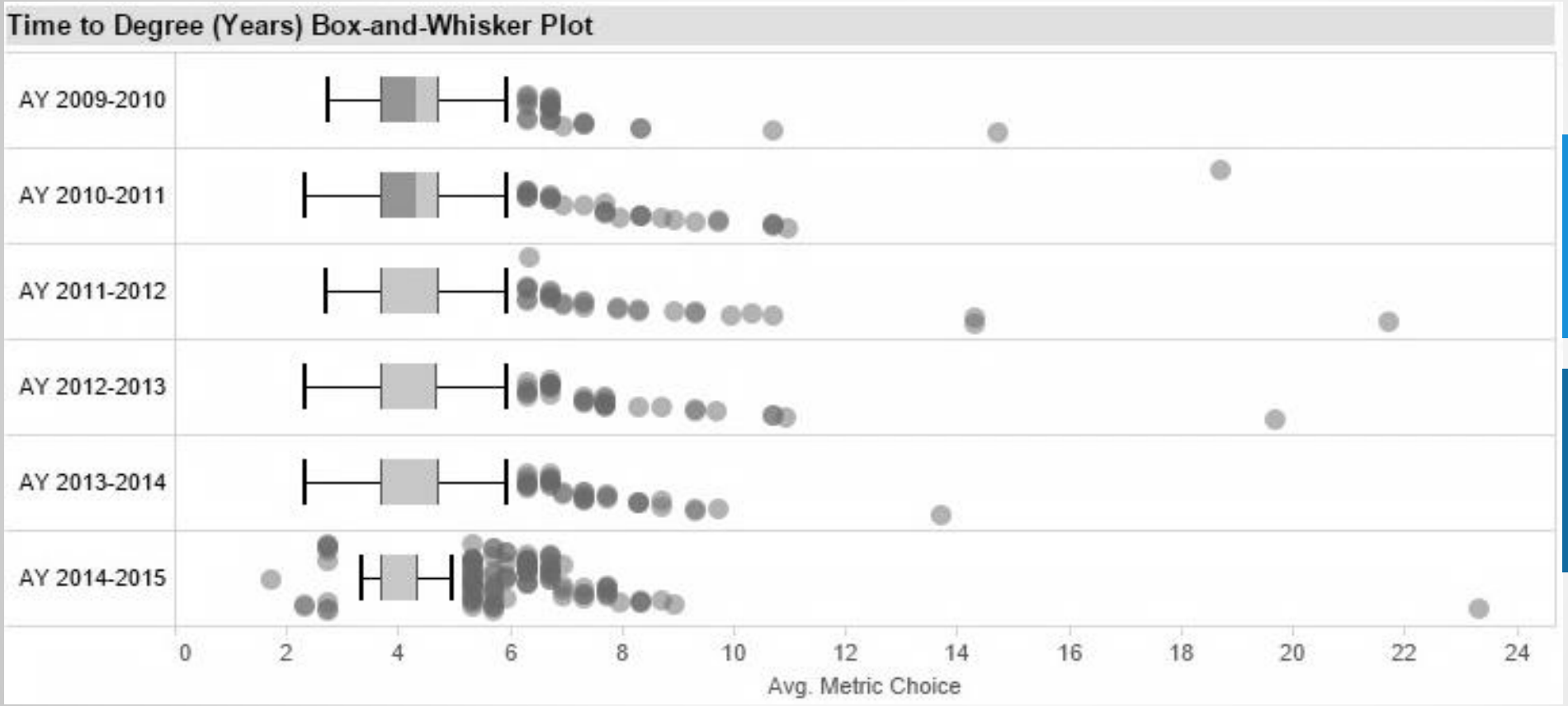


Figure 1. Graduation Rate for Engineering at Purdue University (Engineering 2015).

01 The average time for graduation is around 4.3 years (Purdue University, 2015).

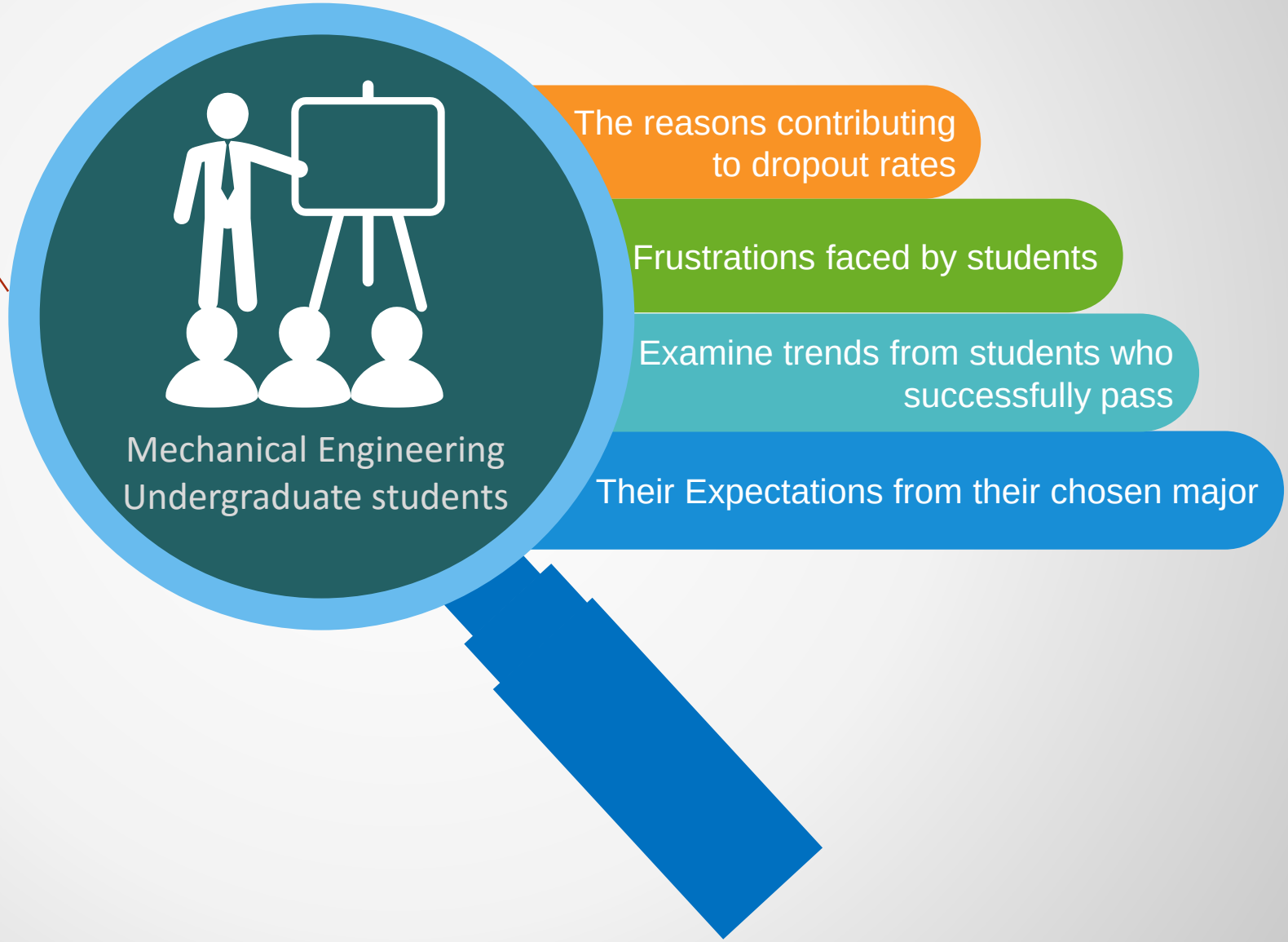
02 This in turn increases the expense of student resources as well as university.

Purpose

Problem Statement

Research Goals

The goal of this research is to determine …



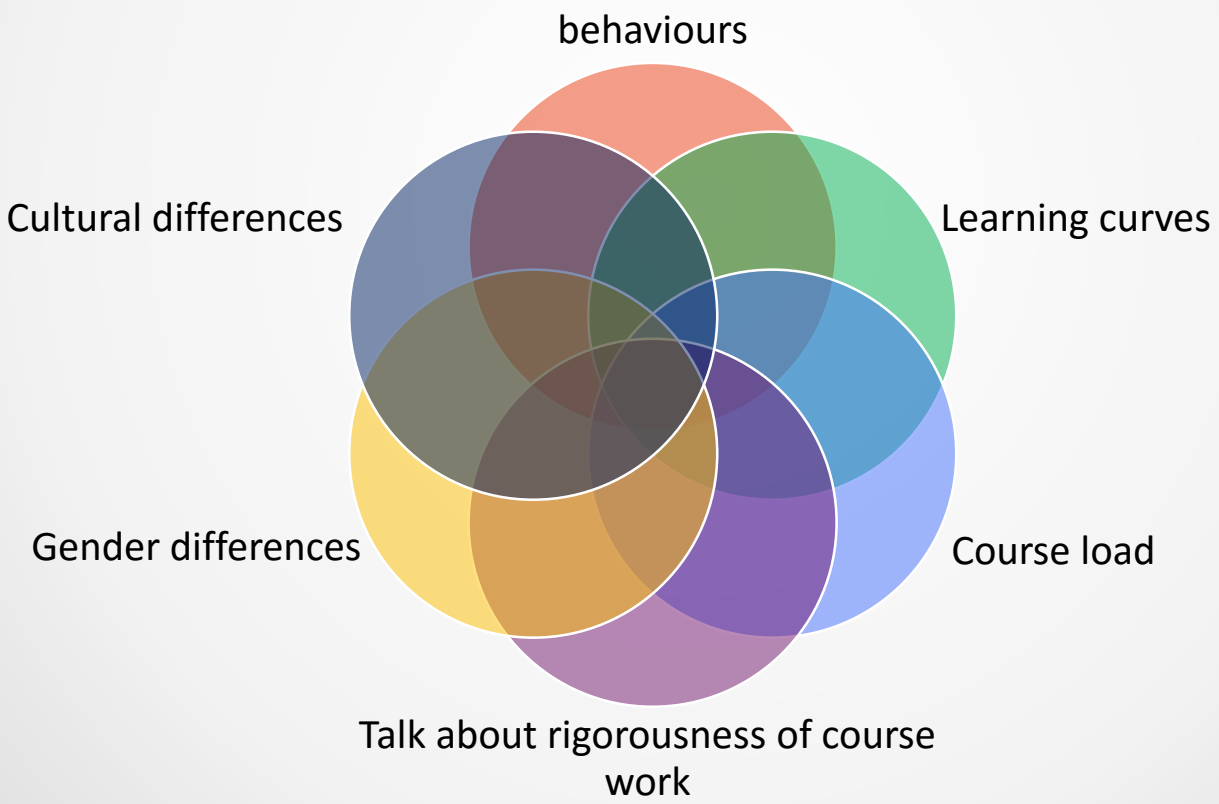
Methods and process

- Research
- Interviews
- Questionnaire

Method

Research | Interview | Questionnaire

All members of the team sought out articles that represented any data that showed reasons for causing retention rates, this included



Method

Research → Interview → Questionnaire

Budny, LeBold and Bejdov, 1998

"There is a strong correlation between first-semester GPA and graduation rate."

"A U.S. Department of Education (DOE) longitudinal study of undergraduate engineering programs, however, reports that only 8.5 % of the students who leave engineering do so because of grades below C."

Budny, LeBold and Bejdov, 1998

The academic performances of undergraduate students will influence their initial majors and the possibility of graduation on time.

Thomas , Juan, Davis, Timothy, & Gregory, 2006

"Colleges with a high share of minority students, part-time students, and women have lower graduation rates"

"Students at the private university, particularly females, were quicker to switch out of engineering majors."

Borrego, et al., 2005

Seymour & Hewitt, 2000

"Students at all types of institutions cited structural or cultural reasons, lack or loss of interest, poor teaching, and pace and workload concerns."

The additional minors, jobs/works, gender and instructor's teaching will affect undergraduate students' decisions of switching their majors and success of graduation.

Method

Research → Interview → Questionnaire

Boyer & Sedlacek, 1988; Wolfe & Johnson, 1995; Foster, 1998

The possession of high self-confidence, self-control, and having an achievement-oriented personality are associated with a higher academic performance.

Students who are adaptive perfectionists tend to adjust better to college and as a result, have higher rates of retention.

Rice & Mirzadeh, 2000

The positive psychological characteristics or personalities, such as high self-confidence and self-control, seldom cause the major switching or failure in graduation.

Pappas & Loring, 1985

Anxiety has been consistently found to predispose students to dropping out.

"Personal adjustment and integration into the social fabric of campus life play a role at least as important as academic factors in student retention."

Gerdes & Mallinckrod, 1994

Gerdes & Mallinckrod, 1994

"For students who were struggling academically, apparently, satisfaction with extracurricular activities, freedom from anxiety, and an absence of thoughts about dropping out were the best actual adjustment predictors of retention."

Non-academic activity and emotional health (e.g. Anxiety) will negatively influence academic performance and retention.

Method

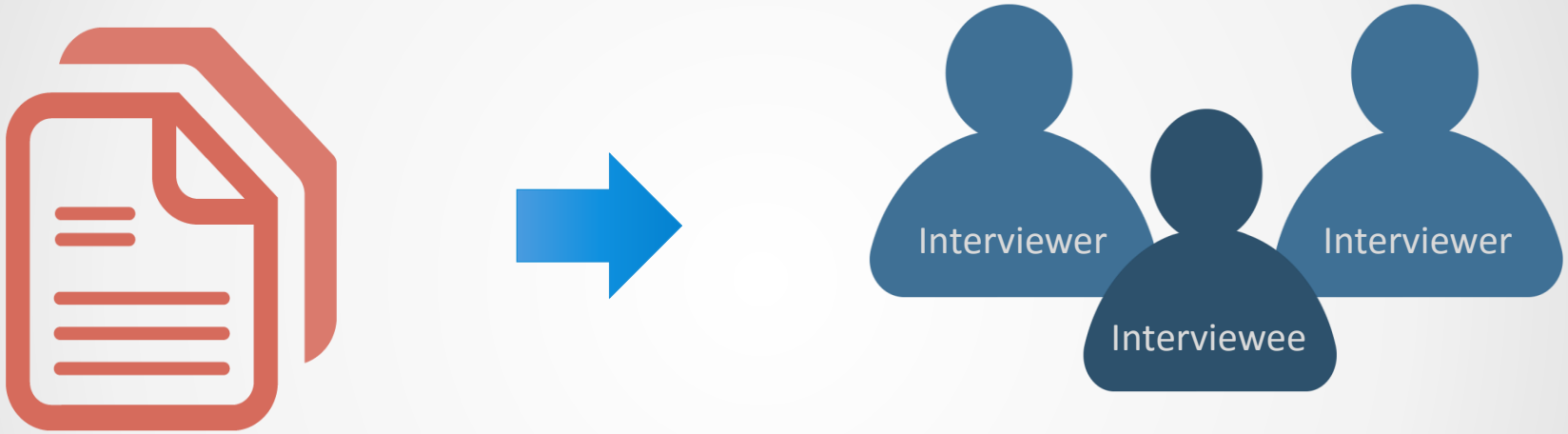
Research | Interview | Questionnaire

Wessell, Engle, & Smidchens, 1978	“Students who have made relatively early decisions to identify clear, purposeful educational goals tend to persist as compared with those who delay academic planning.”
Baker & Siryk, 1989	Motivation to learn, taking action to meet academic demands, a clear sense of purpose, and general satisfaction with the academic environment are also important components of academic adjustment.
Seymour & Hewitt, 2000	“Students at all types of institutions cited structural or cultural reasons, lack or loss of interest, poor teaching, and pace and workload concerns.”
Terenzini & Wright, 1987	Quality of informal contact with faculty, another form of support, has also been found to play a role in maintaining enrollment.

Active/motivated students, who pay attention to their academic plans/requirements, identify purposeful goals and automatically look for resources and help, and are more likely to persist their majors until graduation.

Method

Research | Interview | Questionnaire



After trends and patterns were seen in the research, the team began to develop questions. Keeping in mind the student's volunteered time, only 6 questions were chosen as the main information to be gathered during the interview.

Method

Research | Interview | Questionnaire

Sample

*Sample of undergraduate students in Mechanical Engineering were chosen by recruiting inside of the ME building at Purdue. Students had no connection to the interviewers. They were either in their Freshman or Sophomore year.

Interview Questions

1. How many years will you have been in school once you receive your diploma?
2. Why did you choose mechanical and are you having second thoughts on about your choice?
3. What affected your decisions when it came to choosing courses for your plan of study?
4. What overwhelms you during the academic year? Do these feelings affect your performance in classes?
5. What kinds of support or resources have you gotten to help boost your motives?
6. Which program requirements are or are not well defined?

Demographics

3 male

A freshmen and two sophomores were interviewed

2 female

All of them were sophomore students

Method

Research | Interview | Questionnaire

The Interview Breakdown

Interview setup

Two members of the team paired up in order to interview one volunteer at a time. There was a total of 5 volunteers.

Duration

Each interview took about 15-20 min

Results

Team members quickly observed information that was being gathered was not of much help in answering the research goal questions.

Retrospection

We did a retrospection to see that data was nowhere near saturation and it would take lot more interviews. And the current data would introduce inaccuracy.


What to do now?

Method

Research | Interview | Questionnaire

The Problem

Limited Time

(wasted a whole day of interviewing)

Interviews gave no valuable information. Not much could be derived.

Our sample population was too small and without saturation.

The Solution

Reevaluate Research plan and goals

Go back to the plan of passing out questionnaires

Target specific questions that will help give more information to match the research goal.

Change the requirement for sample population from freshman & sophomore to all students in Mechanical Engineering

Method

Research | Interview | Questionnaire

The Survey Breakdown

Sampling

As a team, questionnaires were divided amongst each member. One location was chosen within the Engineering Mall and then floor by floor of the building, the team members went searching for anyone who would volunteer their time to fill out the sheets of paper.

Duration

5 – 10 min per session*

*Multiple samples could be gathered at once

Post survey

Questionnaire was given a coded sheet and divided amongst team members to input into a shared Excel file.

Implication

A lot of information was gathered in one day from going around and asking for participants. Analysis of the data was gathered in order to look for trends or patterns that were occurring.

Method

Research | Interview | Questionnaire

Questionnaire summary

Questionnaire structure

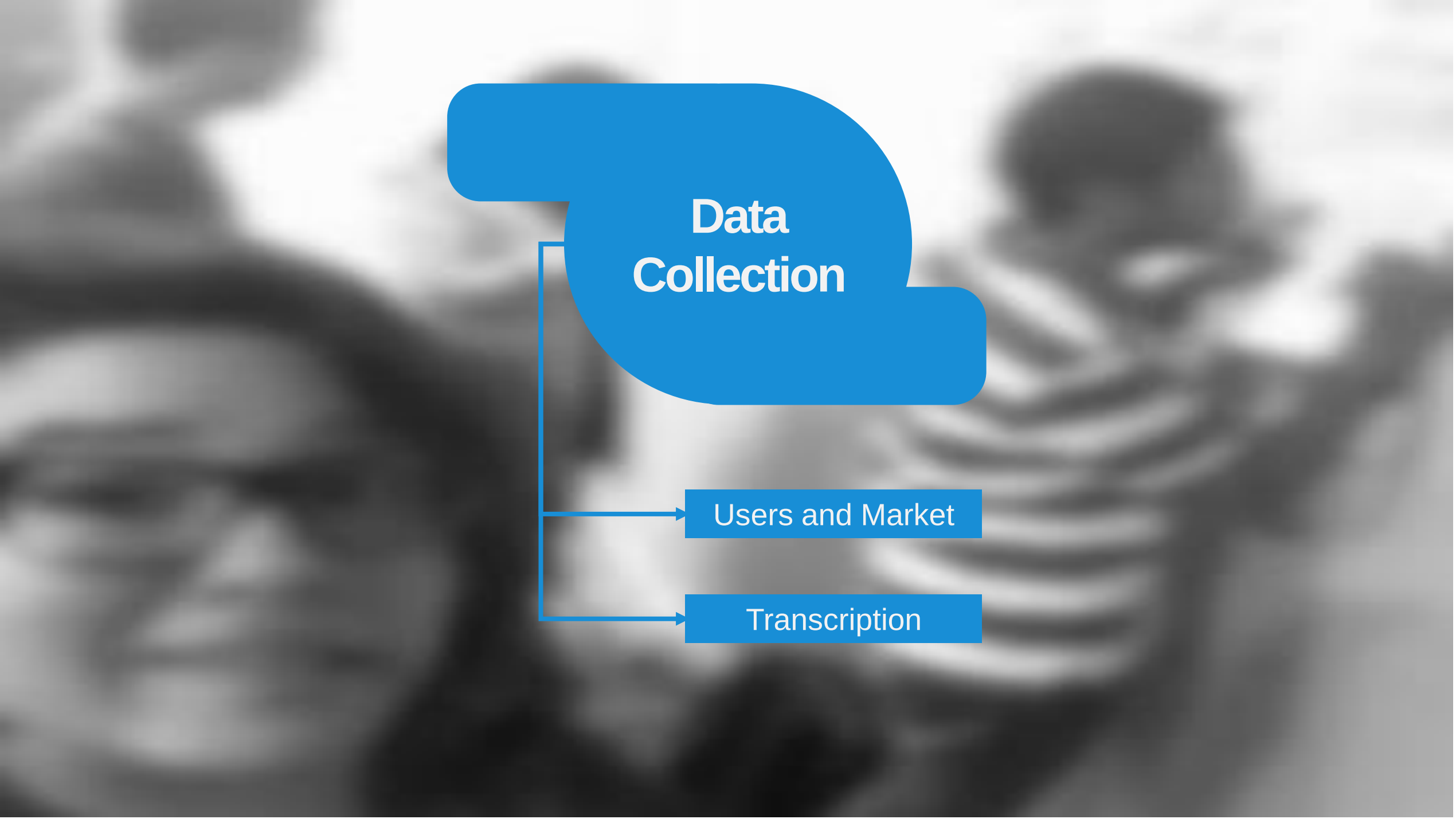
The questionnaire was about 14 questions. 10 of the questions were on a likert scale. This allowed for a range within in the question to be answered in order to get a little more deeper understanding of the different behaviors a user may have. This brought the questionnaire back to the research goal of understanding behaviors.

Sample breakdown

A total of 47 surveys were gathered. There were 5 freshmen, 10 sophomores, 16 juniors and 16 seniors

Sample significance

Throughout the interview process it was noted that freshman and sophomore students were not very adamant about responding to research. With this known information from the previous day, the population was then extended to all Mechanical Engineering students. After analyzing the data and breaking up the population, it was noted again that Freshman and Sophomores were a smaller number in our total sample.


Data Collection
Users and Market
Transcription

Data Collection

Users & Market

Transcription

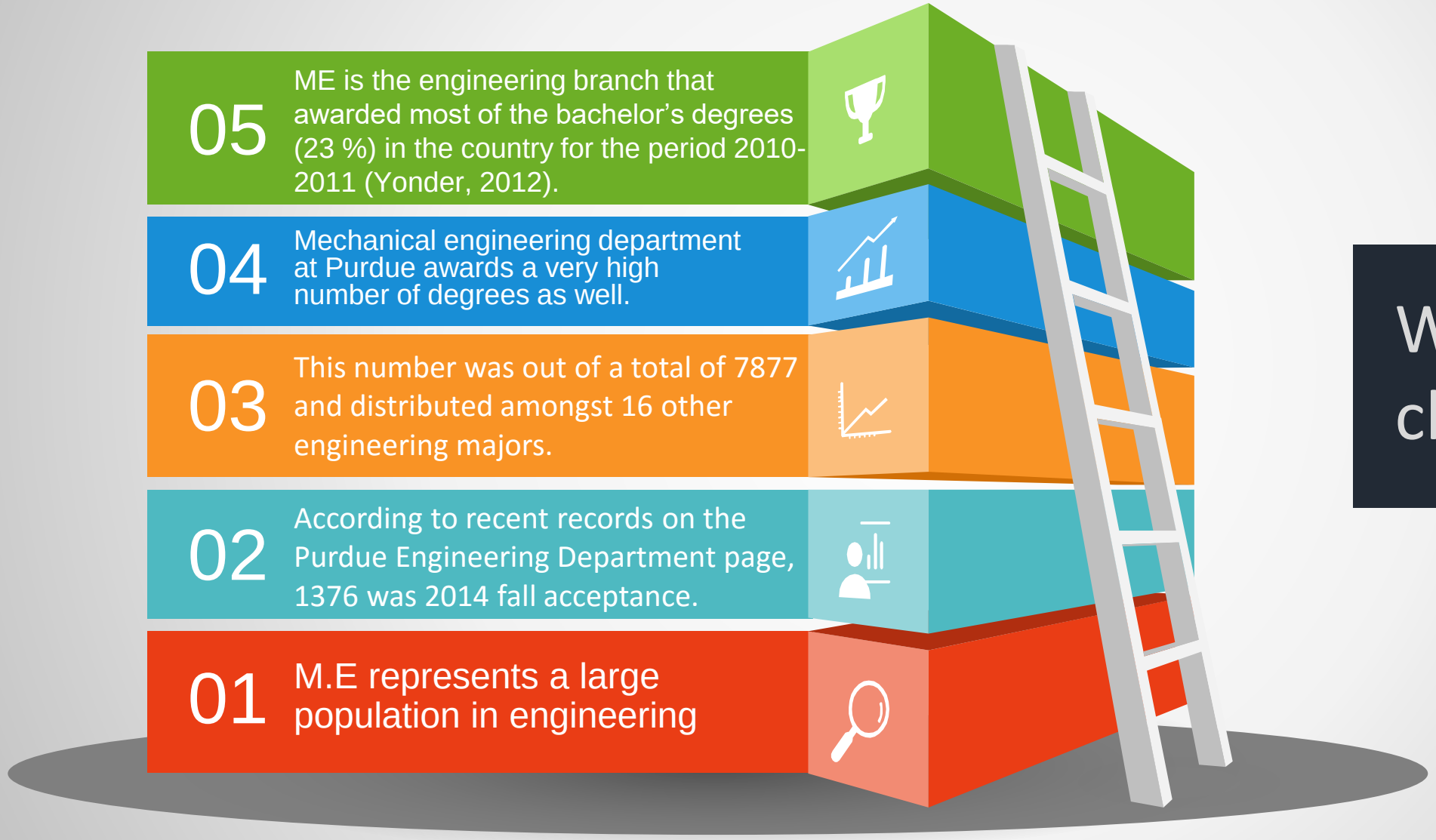
05 ME is the engineering branch that awarded most of the bachelor's degrees (23 %) in the country for the period 2010-2011 (Yonder, 2012).

04 Mechanical engineering department at Purdue awards a very high number of degrees as well.

03 This number was out of a total of 7877 and distributed amongst 16 other engineering majors.

02 According to recent records on the Purdue Engineering Department page, 1376 was 2014 fall acceptance.

01 M.E represents a large population in engineering



Why did we choose M.E?

Purdue Engineering Degree Programs

Undergraduate Only						
Program*	Fall 14 Enrollment	ABET Accredited	Degrees Awarded in Previous Academic Year			
			Fall 2013	Spring 2014	Summer 2014	Total
Aero & Astro Engineering	559	Yes	36	94	9	139
Agricultural Engineering	81	Yes	4	16	1	21
Biological Engineering	158	Yes	2	40	0	42
Biomedical Engineering	259	Yes	8	41	0	49
Chemical Engineering	552	Yes	11	127	2	140
Civil Engineering	399	Yes	68	109	13	190
Mechanical Engineering	1376	Yes	78	259	24	361
Interdisciplinary Engr St		No	0	1	1	2
Materials Science & Engr	156	Yes	3	34	3	40
Mechanical Engineering	1376	Yes	78	259	24	361
Multidisciplinary Engineering	59	Yes	3	13	1	17
Nuclear Engineering	81	Yes	5	27	2	34
First Year Engineering	2309	n/a				
Pre Agr & Biol Engineering	49	n/a				
Totals	**7877**		**348**	**970**	**69**	**1387**

* Enrollment numbers for the professional engineering programs excludes students in First Year Engineering and Pre Agr & Biol Engineering.

Mechanical Engineering Program

Fall 2014 enrollment: **1376**
ABET Accredited: Yes

Degrees Awarded in previous year

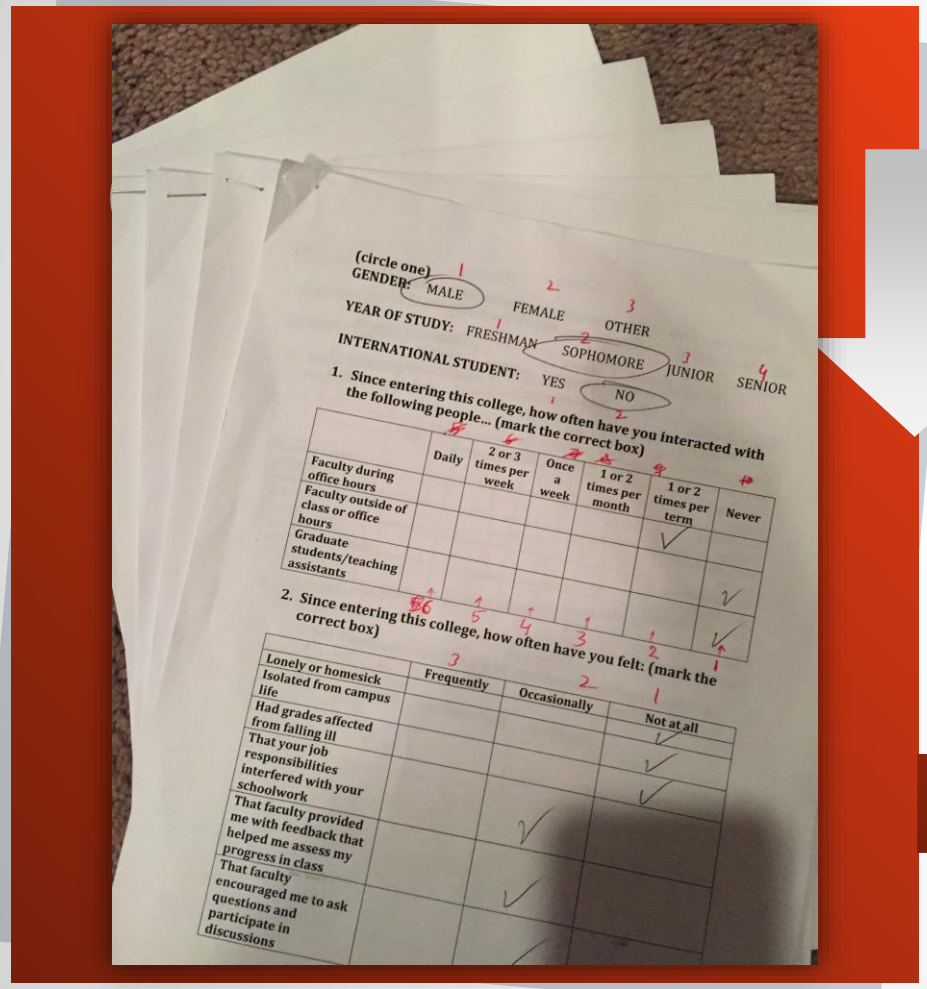
Fall 2013	: **78**
Spring 2014	: **259**
Summer 2014	: **24**
Total	: **361**

Figure 2. Purdue Engineering Degree Programs, Purdue University (2014).

Data Collection

Users & Market

Transcription



(circle one)
GENDER: MALE FEMALE OTHER
YEAR OF STUDY: FRESHMAN SOPHOMORE JUNIOR SENIOR
INTERNATIONAL STUDENT: YES NO

1. Since entering this college, how often have you interacted with the following people... (mark the correct box)

	Daily	2 or 3 times per week	Once a week	1 or 2 times per month	1 or 2 times per term	Never
Faculty during office hours					✓	
Faculty outside of class or office hours						✓
Graduate students/teaching assistants						✓

2. Since entering this college, how often have you felt: (mark the correct box)

	Frequently	Occasionally	Not at all
Lonely or homesick			✓
Isolated from campus life			✓
Had grades affected from falling ill		✓	
That your job responsibilities interfered with your schoolwork		✓	
That faculty provided me with feedback that helped me assess my progress in class			✓
That faculty encouraged me to ask questions and participate in discussions		✓	

Participant	Gender	Year of	International	Q1			Q2					
				a	b	c	a	b	c	d	e	f
ME01	1	2	2	2	1	1	1	1	1	2	2	2
ME02	1	1	1	1	1	4	1	1	1	1	3	3
ME03	1	3	2	3	3	4	1	1	2	2	3	2
ME04	2	1	2	3	1	4	2	2	1	1	2	3
ME05	1	4	2	2	2	5	2	2	2	1	2	3
ME06	1	3	2	6	5	4	1	2	1	2	1	1
ME07	1	2	2	1	1	2	1	2	1	2	1	1
ME08	1	4	1	3	1	3	2	1	1	2	2	2
ME09	2	2	2	3	1	6	1	1	3	2	3	3
ME10	2	4	2	3	2	5	1	1	1	1	1	2
ME11	1	3	2	4	2	3	2	2	1	1	2	3
ME12	1	3	2	5	3	3	1	1	2	2	2	2
ME13	2	1	2	5	4	5	2	1	1	2	2	2
ME14	2	4	2	2	1	1	2	2	1	3	2	2
ME15	2	3	2	5	4	5	2	1	2	1	3	2
ME16	2	2	1	5	1	4	2	2	2	1	3	2
ME17	1	3	2	2	2	4	2	2	2	3	2	3
ME18	1	3	2	3	2	3	1	2	2	2	1	2
ME19	1	3	2	2	2	4	1	1	1	2	2	3
ME20	2	3	2	3	2	5		2	2	2	2	3
ME21	1	3	2	2	2	5	1	1	1	1	2	3
ME22	2	4	2	2	2	1	1	1	1	1	1	3
ME23	1	4	2	3	2	4	2	1	1	1	1	2
ME24	2	2	2	5	1	1	1	1	1	1	1	1
ME25	1	4	2	1	1	5	2	1	2	1	2	2
ME26	1	4	2	3	4	5	2	1	1	1	2	3
ME27	1	4	2	4	2	2	1	3	1	1	2	3
ME28	1	3	2	2	1	5	1	1	2	1	2	3
ME29	1	3	2	3	2	3	1	1	2	1	3	3
ME30	1	3	2	4	1	2	1	1	1	1	3	3

In order to analyze the results, the answers from potential users were broken down into simple codes. The figure on right represents the code sheet of our survey.

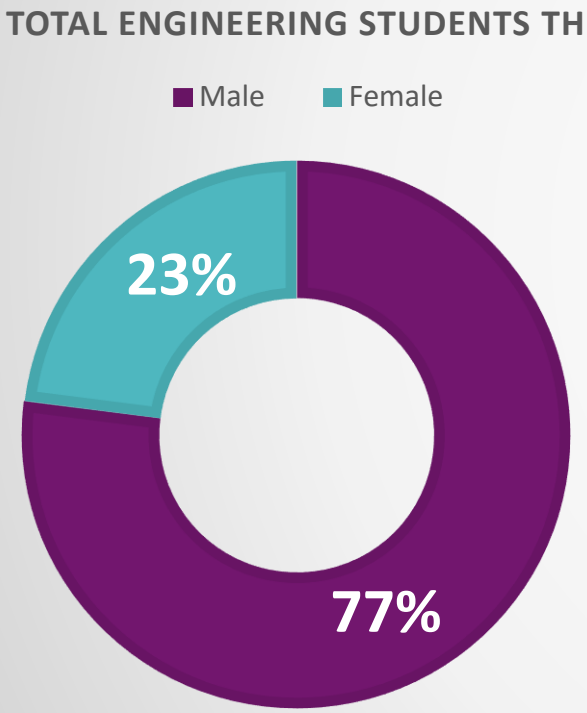
Affinity Diagraming

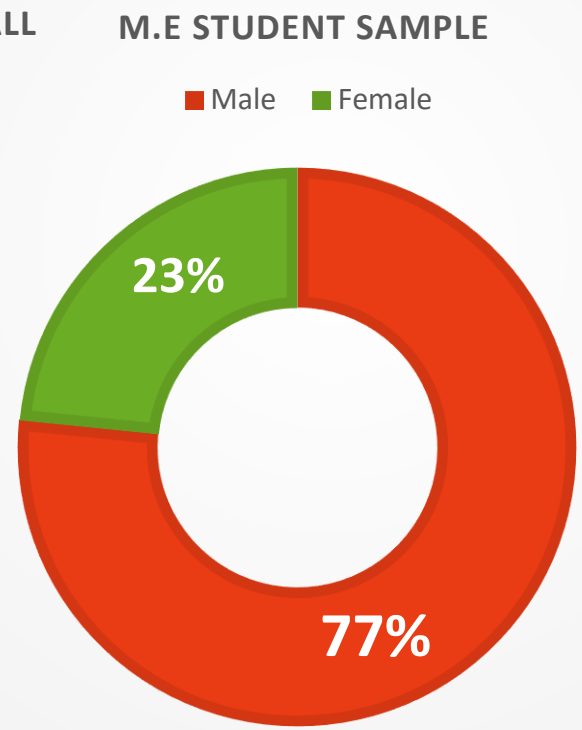
After all the data was gathered from the questionnaires, it was placed into a sequence where averages were taken and placed in categories to create an affinity diagram. This helped to define personas.


Results
Survey analysis
Personas
Conclusion

Results

Total engineering population vs Mechanical engineering student sample

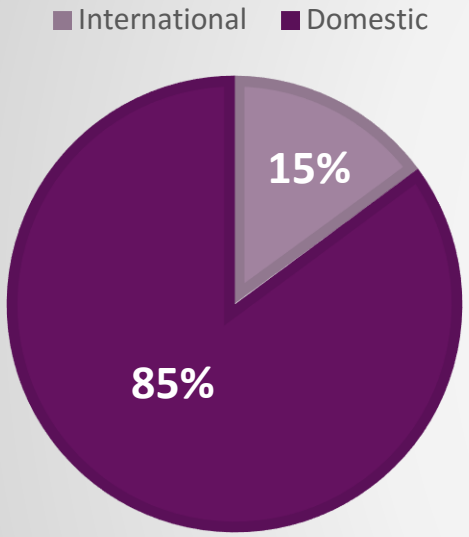




- About 47 students filled the questionnaire and submitted, of which 23% (11) were females and 77% (36) were males.
- This ratio holds true with general engineering population at Purdue as well. The total engineering students admitted this fall, it was indeed 23% (2556) female and 77% (8563) male.
- This ratio is true with little difference in all the terms, and in each department under College of Engineering (Purdue Data Digest).

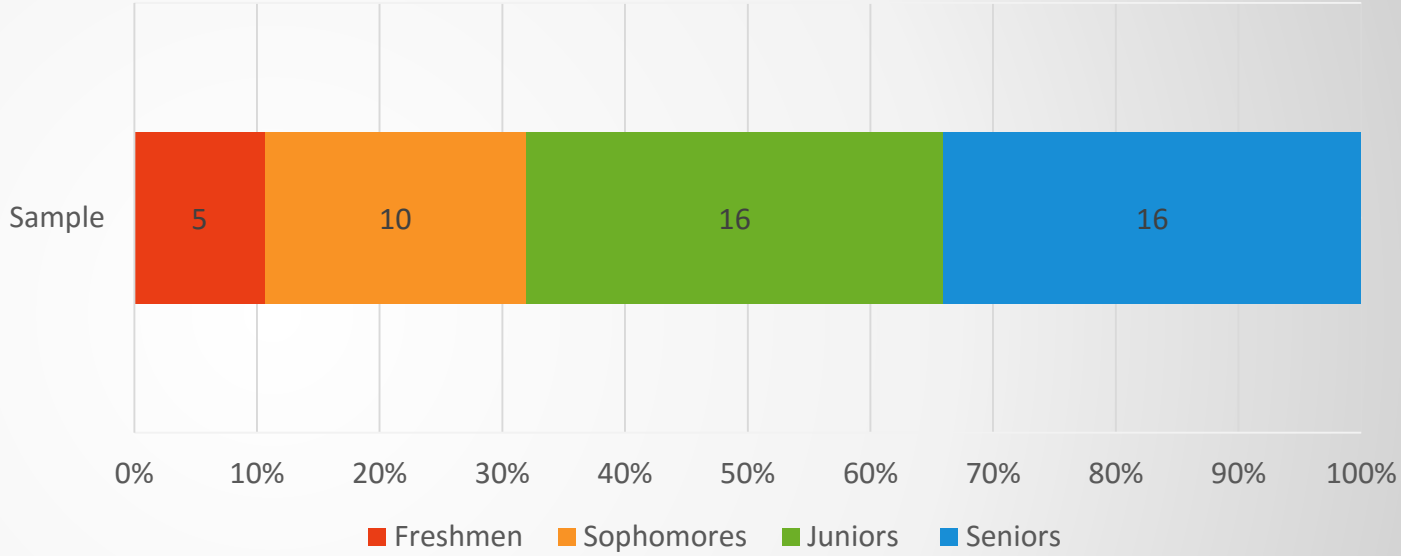
Results

SAMPLE SUMMARY



- There were about 15% international students and 85% domestic (in-state and out-of-state) students.

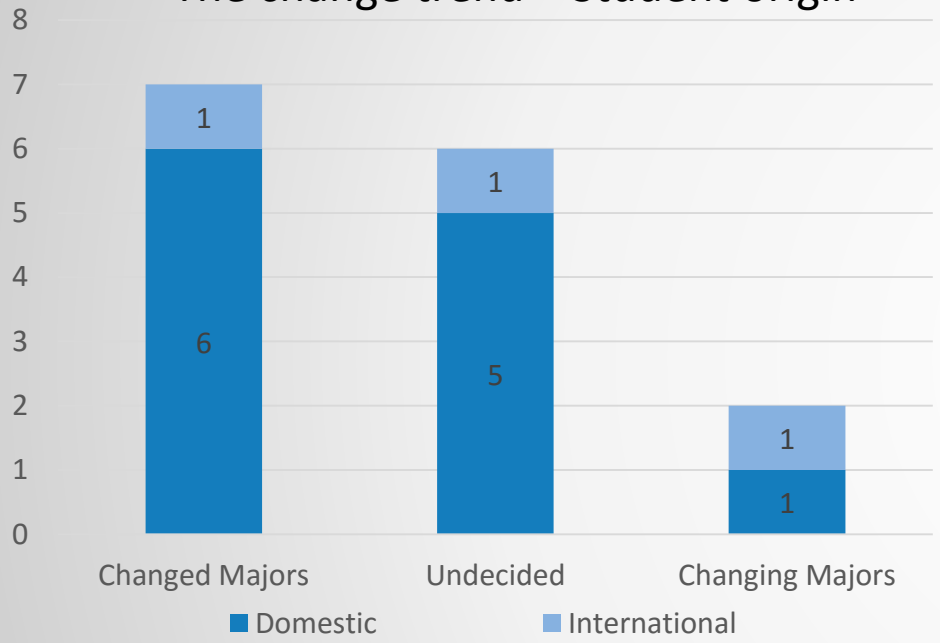
Mechanical Engineering Undergraduate students



- Out of the total sample, about 10.64% were freshmen, 21.28% were sophomores, 34.04% were juniors and remaining 34.04% were seniors.

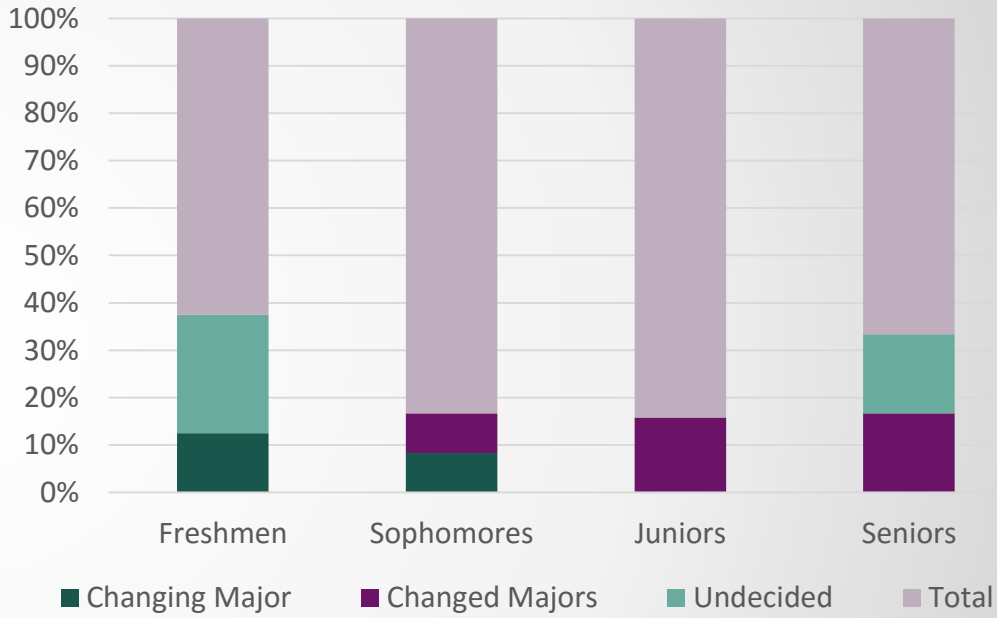
Results

The change trend – Student origin



- Out of the students who changed majors, 85.7% were domestic students.
- Out of students who were undecided about anything, 83.33% were domestic students.

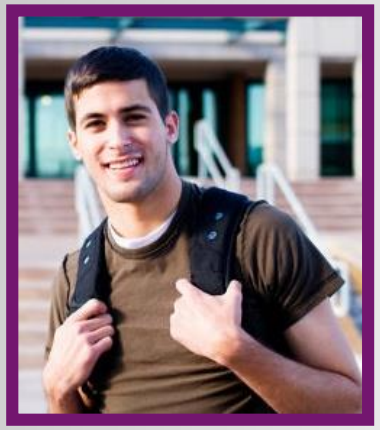
The change trend - Student year



- 20% of freshmen were thinking of changing majors and about 40% percent remained undecided.
- 10% of Sophomores were thinking of changing majors and 10% had changed majors
- 18% of Juniors had changed their majors.
- 25% of Seniors had changed majors and another 25% still remain undecided.

Results

Survey Analysis | Personas | Conclusion



Name: Jeffrey E. Nelms

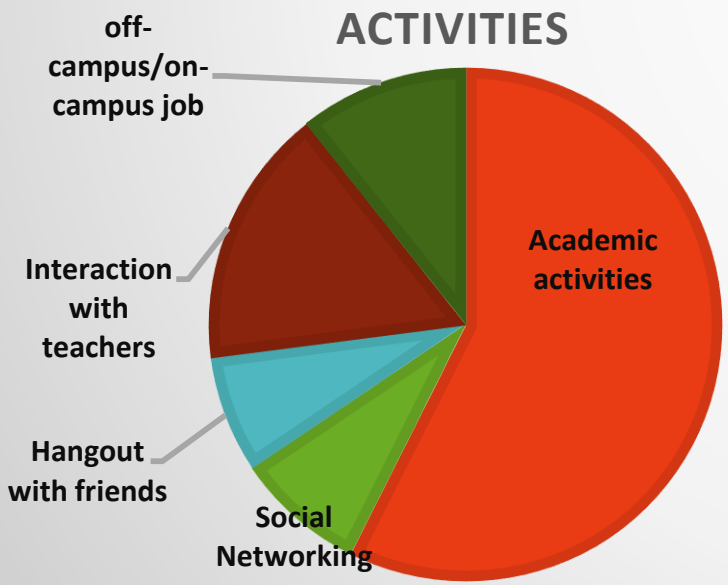
Year: Junior

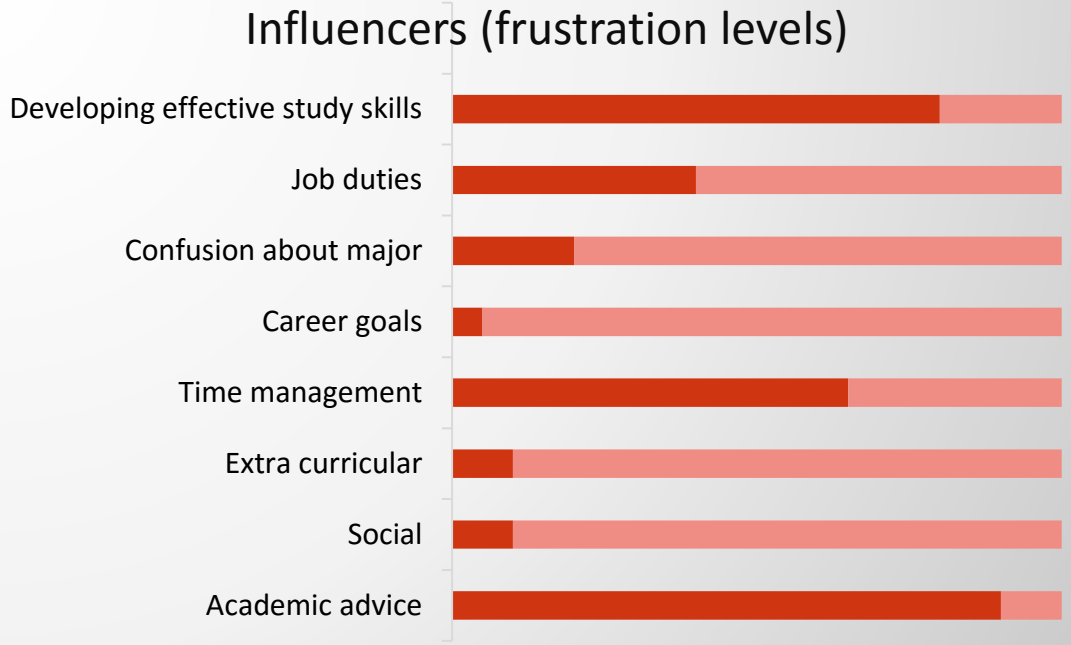
Major: Mechanical Engineering

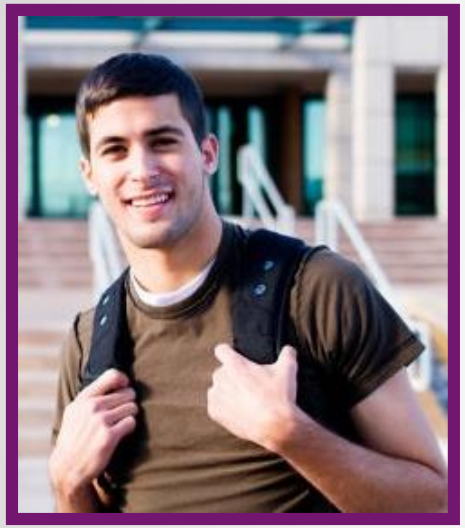
College: College of Engineering

University: Purdue University

"I need better advice from teaching community and better time management to help me graduate on time"





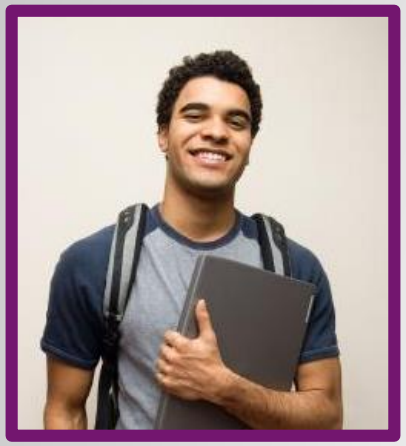


Name:	Jeffrey E. Nelms
Year:	Junior
Major:	Mechanical Engineering
College:	College of Engineering
University:	Purdue University

Jeffrey is self-confident about his intellectual and social abilities. In his previous years he had thought lot about changing majors, but now he has enough ideas about what to pursue. He feels that he has attained required maturity in his thought process about future careers and believes that his current major will aid well. He has better self understanding about himself more than ever; however, he encounters some difficulty in developing effective study skills. He often tries to find some help or instructions from his professors.

He is more focused at studying and fulfilling his tasks as an undergraduate junior but sometimes he feels that he lacks help from the teaching community. He strongly believes that his professor's advice and help plays a very important role to successfully graduate. He believes that on several occasions, help and guidance from his teachers helped him significantly in understanding topics and thinks that understanding professor's expectation is an important task for on-time graduation. Another major problem he often encounters is time management. He is not involved much in extracurricular activities, but has job duties and believes that this might contribute to his improper time management.

Results



Name: Bryan C. Tobin

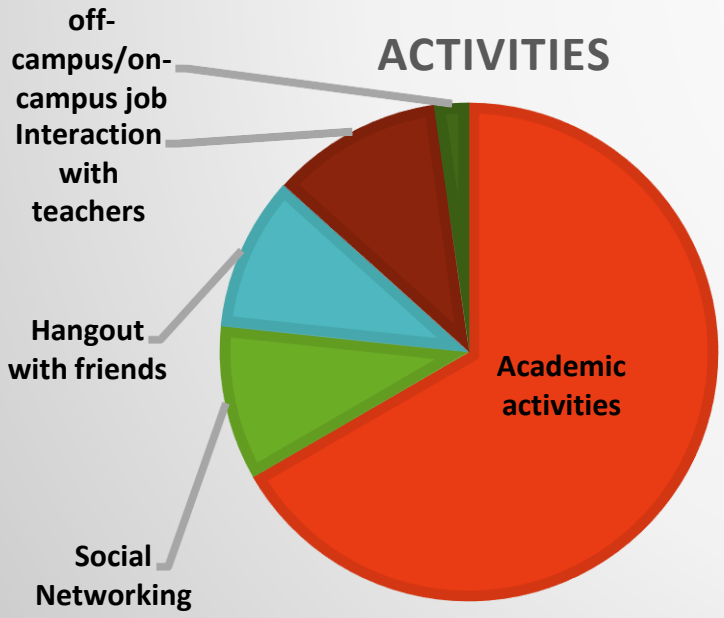
Year: Freshman

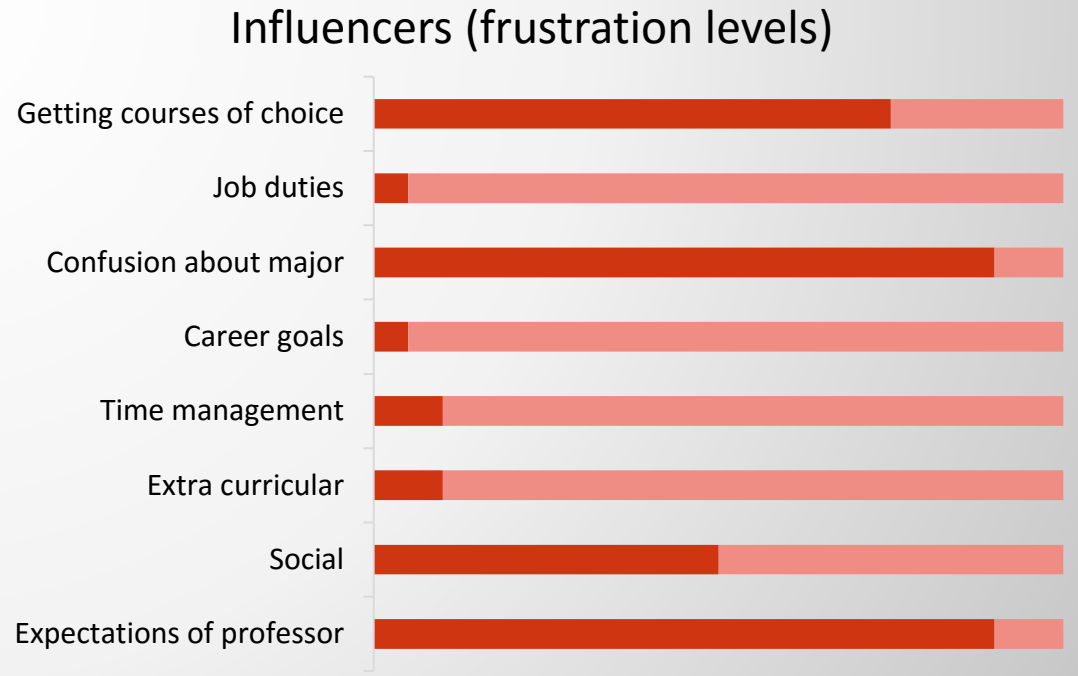
Major: Mechanical Engineering

College: College of Engineering

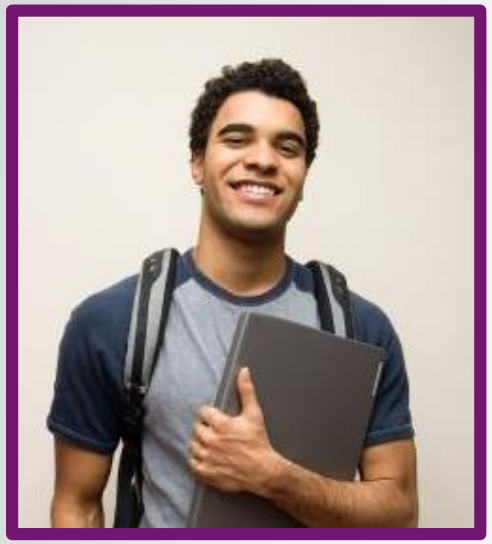
University: Purdue University

"My major problem is choosing suitable major and I have no idea what teachers expect"





Results



Name: Bryan C. Tobin

Year: Freshman

Major: Mechanical Engineering

College: College of Engineering

University: Purdue University

Bryan is new to this college and is slowly adapting to this new phase of his academic life. He has moderate intellectual and social self-confidence and is somewhat less caring about his future career. His major problem is not time management or developing effective study skills, but understanding the expectation of his advisors, professors and sometimes even academic expectation seems difficult to understand.

He works off campus/on campus job and feels that it does not affect grades or school work. He remains mostly undecided about his major and frequently wavers between multiple majors and finds it very hard to fixate his view. He often finds difficulty in choosing the courses of his interest. Since most of the times he remains undecided what to choose, by the time he looks up courseshe is interested in, they are already filled.

Results

Survey Analysis | Personas | Conclusion

Name: Jordyn A. Marshel

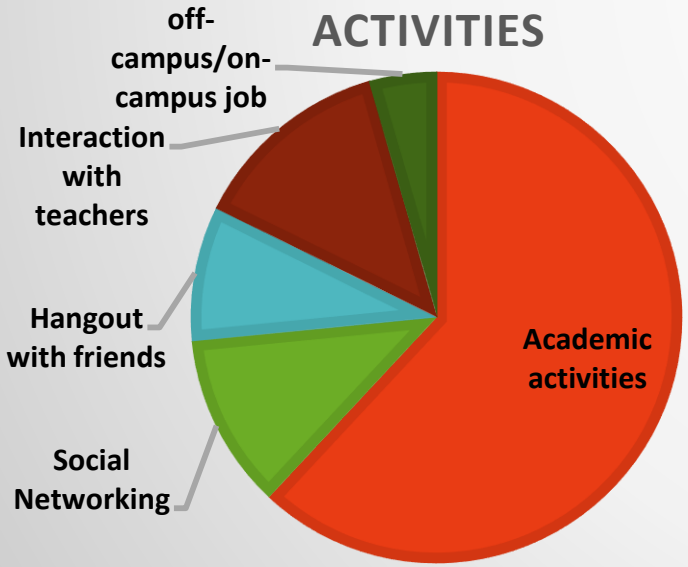
Year: Sophomore

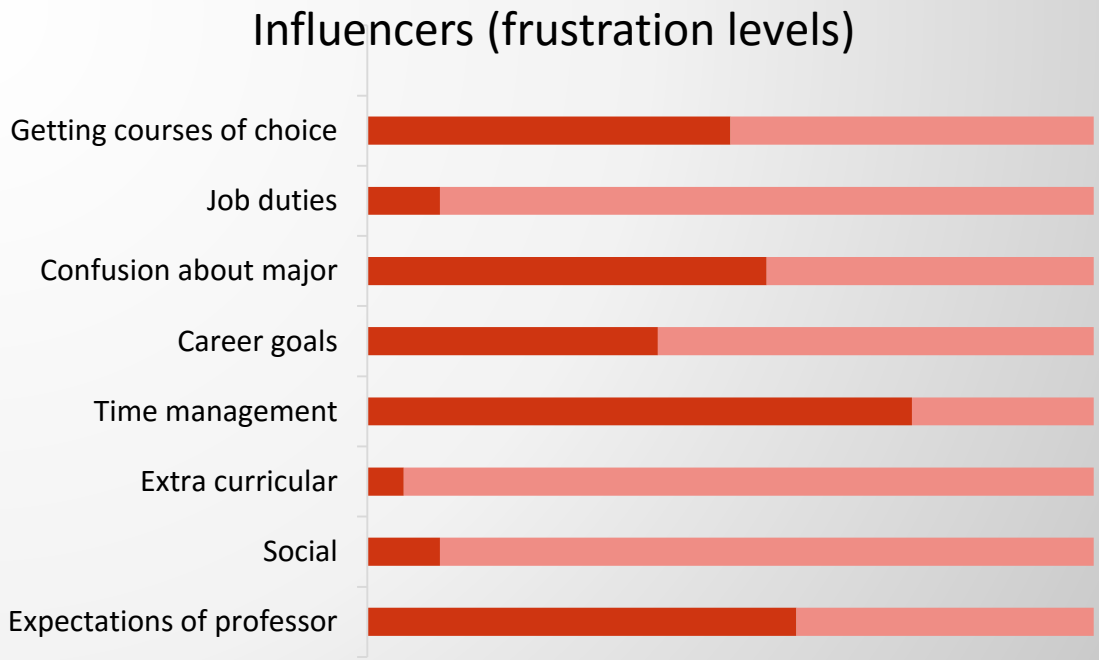
Major: Mechanical Engineering

College: College of Engineering

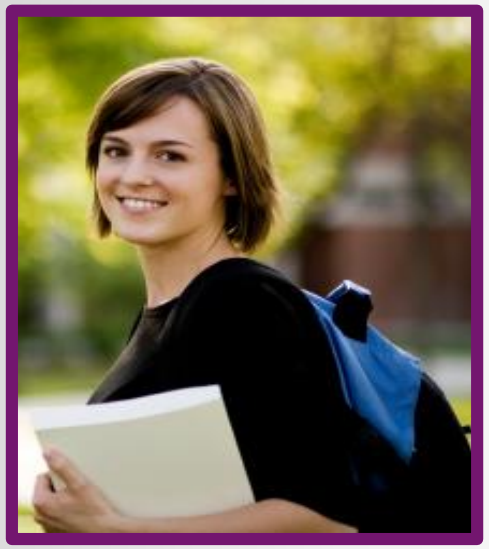
University: Purdue University

"Study related extra-curricular activities and peer help aids me greatly to understand the subject"





Results



Name: Jordyn A. Marshel

Year: Sophomore

Major: Mechanical Engineering

College: College of Engineering

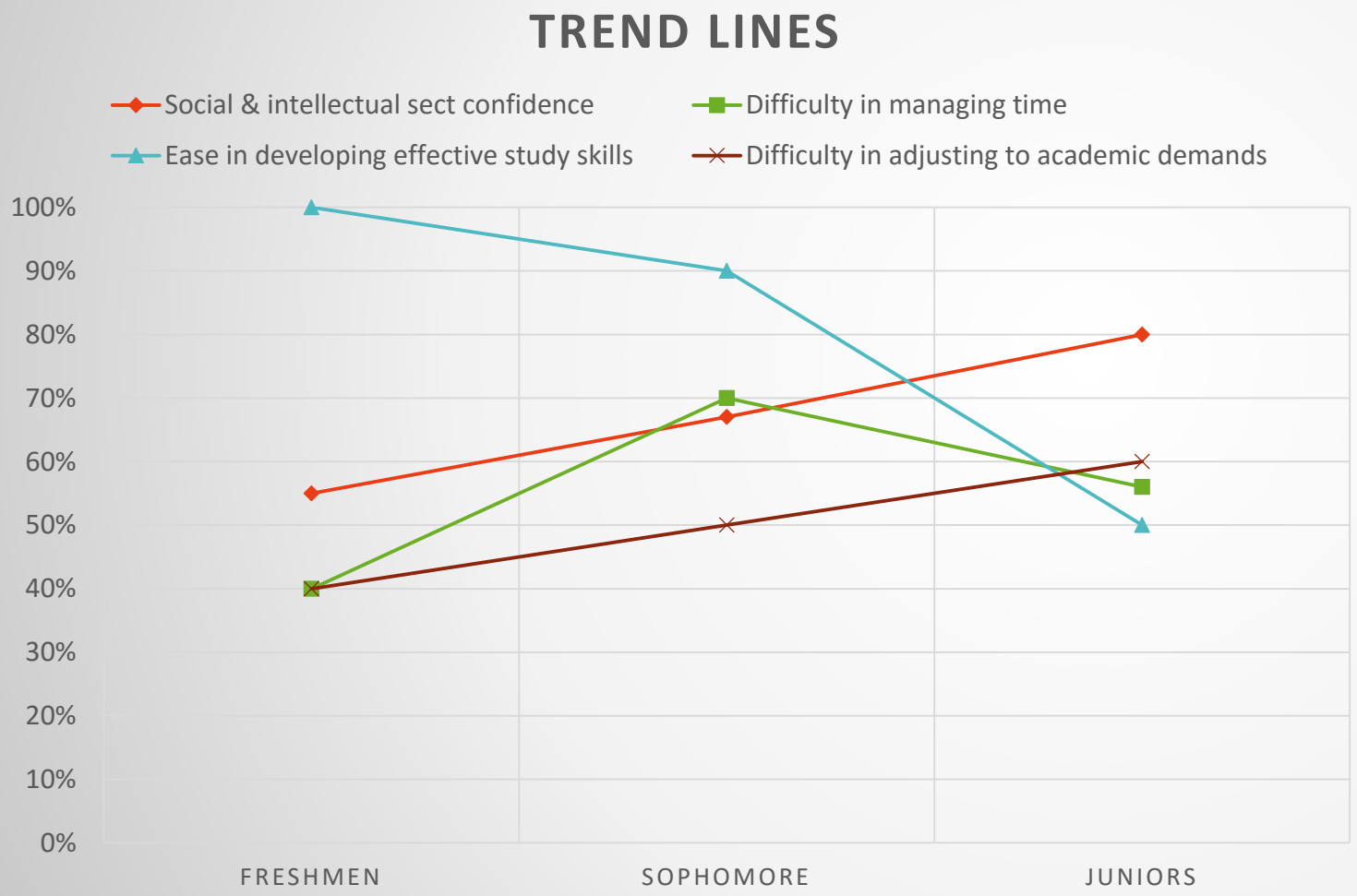
University: Purdue University

Jordyn is in her sophomore year and she is frequently encouraged by her professors. She has good intellectual self-confidence and great social self-confidence. She thinks its good to work along with studies, and claims her grades wont get affected by this. She believes that by finding a way to get involve in non-academic but study related engagements, it will help her to better prepare for her future career.

She also believes that peer help plays an important role in choosing subjects and also for academic help in classes. She frequently texts in classes due to her multiple engagements, and sometimes finds it difficult to manage her time. Jordyn finds it occasionally difficult to get course she needs and sometimes feels confused about her major.

Results

Survey Analysis | Personas | Conclusion



- It can be noted that as year increases student's social self confidence increases as well.
- Students find difficulty in managing time in their second year but recover fairly well in their junior year.
- Student's ease of developing study skills decreases over the years and their difficulty in adjusting to academic demands increased slightly.

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