ASEE's 123rd Annual • Conference & Exposition • New Orleans, LA • June 26-29, 2016

New Orleans JAZZED about Engineering Education

Paper ID #15752

A Qualitative Study Investigating How First-Year Engineering Students' Value Beliefs Influence their Choice of Selecting an Engineering Major

Mr. Juan David Ortega-Alvarez, Universidad EAFIT, Medellin - Purdue University, West Lafayette

Juan David Ortega Álvarez is an assistant professor at Universidad EAFIT and served as the Head of the Process Engineering Department from 2010 to 2014. He holds an MS in Process Engineering and Energy Technology from Hochschule Bremerhaven (Germany) and is currently enrolled as a graduate student in the Engineering Education Doctoral Program at Purdue University. Before his full-time appointment with EAFIT, he served as Engineering Director for a chemical company for 7 years. His research interests are focused on the practice and teaching of process design, simulation and control and also on faculty and institutional development through engineering education research.

Ms. S. Zahra Atiq, Purdue University, West Lafayette

S. Zahra Atiq is a PhD student at the School of Engineering Education at Purdue University, West Lafayette. Her research interests include: computer science education specifically on teaching computer programming to undergraduates and how to improve their learning experiences. She is also interested in understanding student behaviors and performance in online learning environments specifically MOOCs.

Mr. Hector Enrique Rodriguez-Simmonds, Purdue University, West Lafayette

Raised in South Florida, born in Mexico. Half Colombian and half Mexican; proud Mexilombian. Héctor has an MS in Electrical and Computer Engineering and is currently pursuing a PhD in Engineering Education, both from Purdue University. His research interests include investigating LGBTQIA+ engineering student perception's of the culture of engineering. He's an avid videographer, eater of tasty food, moped enthusiast, and user/tweaker of computers.

Why Do First Year Engineering Students Choose a Certain Engineering Major? A Qualitative Study of Values and Expectations

1. Introduction

Decision making is a complex phenomenon which has been studied by researchers in various fields like sociology, psychology, and neurology[1]. In STEM education, student decision making is often linked to persistence. Hence, theories like the Social Cognitive Theory (SCT)[2,3] and Motivation theory[4] are often employed to investigate students' decision to enroll in a certain major. Such studies repeatedly discuss ideas like interest, values, and expectations as factors that drive student decision making process.

Bandura classifies expectations into *performance* (self-efficacy) and *outcome* expectations[2]. In turn, outcome expectations comprise anticipation of physical (e.g. monetary), social (e.g. approval), and self-evaluative (e.g. satisfaction) outcomes. In a longitudinal study, Matusovich, Miller and Streveler used the Eccles expectancy value theory[5] to understand the reasons why students choose to enroll and persist in engineering majors. According to Matusovich et al, competence beliefs (self-efficacy) have been widely studied, but their impact on persistence is lower than that of value beliefs. Researchers have just touched the surface of value beliefs in the STEM education. Carter provides another perspective on student decision-making process. He found that students' choices are usually driven by three distinctive reasons: 1) interest in the subject, 2) preparation for their professional life after university, and 3) utility to help them with their studies in their major[6].

In the present study, we draw on Eccles´ expectancy value theory to study student selection of a major in the field of engineering. In particular, we explore the reasons that motivate students to choose engineering majors and how those reasons map to their value- and competence-beliefs and expectations. Understanding the reasons for selecting a major can serve as an indicator of student persistence. Moreover, understanding the role of student interests, values, and expectations while selecting a major can also help advisors and first-year engineering administrators to assist students in selecting a major they like and is compatible with their expectations.

2. Background and Context

First year engineering (FYE) programs are gaining popularity across universities in the United States. FYE programs provide freshmen engineering students with fundamental engineering knowledge and diverse opportunities to help them select an engineering major. This multi-phased study drew data from the 2014 FYE cohort of Purdue University. The overall aim of this study was to understand how students make informed decisions regarding their engineering major. Our study has implications for engineering educators, specifically to help them improve the resources they provide FYE students.

At the onset of the study, we were granted access to three different data sets: 1) Transition to Major surveys taken by FYE students (TTM), 2) End of Semester survey taken by FYE students (EOS), and 3) a survey conducted by the Environmental and Ecological Engineering department (EEE) as a classroom activity. A brief description of the data sets and summary of results are listed in Table 1.

Table 1. *Data sets supporting the study*

Data Set	Description	Summary of Results
Transition to Major survey (TTM)	Students were asked to pick the resources they found useful from a list of 13 items and rank them in order of importance, putting the most important on top of the list.	Self-led exploration (SLE) constitures the tasks students perform outside their classes to help them decide which engineering major to pursue. SLE is not only the resource most often pointed out by students, but also the highest ranked on average.
End of Semester survey (EOS)	The EOS survey asks students about the usefulness of the ENGR131* course. Students answer an open question: *Did activities in ENGR131* help you decide which Engineering professional school to enter? Please explain.*	From a sample of 178 answers (Fall 2013), responses indicate that: - 54% students found the activities in ENGR131 useful in informing their decision - 9% students believe the activities reinforced their already-made decision - 21% did not find the activities helpful because they already knew which major to pursue - 16% did not find the activities helpful at all
Environmental and Ecological Engineering department (EEE) class activity	The activity is designed to evaluate the ease of access and relevance of the information provided on the webpage of their program. However, we were particularly interested in two questions that students answer as a pre-survey part of the activity: - *When choosing your intended major in engineering (e.g. Civil, Environmental, Mechanical Engineering), what kind of research have you performed on the different majors?* - *What will most influence your decision when choosing your engineering major?*	Structural coding of the open ended responses show that the students are performing research the most in order to decide which major to pursue.

** ENGR131 is offered to first year engineering students during their first semester and is designed to provide a broad range of engineering related experiences to the students.*

During the first phase of the study, we focused on understanding the sources of information students use to inform their decision (RQ1 in Figure 1)[7]. In this phase, we conducted interviews which were qualitatively analyzed to gain insights into the sources of information students use to select a major. In the second phase, presented in this paper, we investigate how students' value beliefs and expectations affect their decision (RQ2 in Figure 1). Both phases of the study used data from the Environmental and Ecological Engineering (EEE) department survey and from different sections of interview transcripts.

We examined the interviews and surveys and found a connection between the sources students use to select a major and reasons why they selected that major. This means that their value beliefs are influencing their decision making process. To understand their value beliefs, it is important to investigate the reasons why students select a certain engineering major. In future studies, we aim to connect findings from both the phases of the study (RQ1 + RQ2) to better understand the student decision making process while they select a certain engineering discipline (bubble in Figure 1).

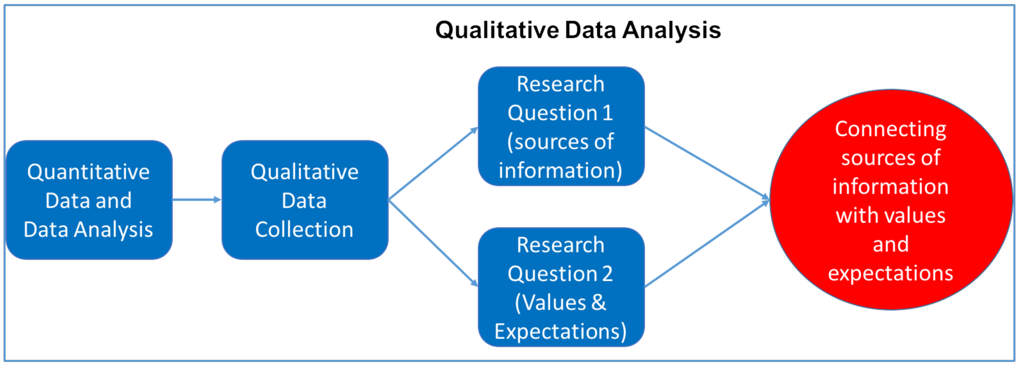

Figure 1: *Phases of the study*

3. Research Question

In this paper, we focus on the second phase of the study, which aims to qualitatively answer the research question: *What student value beliefs and expectations influence their decision of which engineering major to pursue?* The answer to this research question can provide in-depth insights into student's expectancy values, particularly exploring relations between students' expectations and the type of resources they prefer to use.

4. Research Design

Theoretical framework

We used the Eccles' expectancy-value theory as a lens to analyze the findings of this study. According to Eccles', an individual's' choice to perform a task is motivated by two factors: 1) their belief that they can perform a task, and 2) their desire to undertake a task[8,9]. Eccles defines four categories of subjective task values (STV): 1) attainment, 2) intrinsic, 3) utility, and 4) relative cost[9]. *Attainment value* is defined as how an individual's perception of a task reflects on their self-concept. *Intrinsic or interest value* is defined as the enjoyment that people experience while performing that task, 3) *Utility value* is defined as perception a student has in the future engagement of a certain task, and 4) The *relative cost* is the cost associated with engaging in a certain task, in terms of time, effort or the psychological factors associated with it[9,10].

Sampling and Participants

The interview participants were recruited from the 2014 cohort of FYE students. A mass email was sent to the desired population, out of which 40 students volunteered to participate in the study. Purposeful sampling was done to select 12 participants. This sample was representative of the demographic characteristics of the overall population of FYE students.

Data collection methods

Semi-structured interviews were used for the purpose of data collection. The semi-structured interviews allowed interviewers to ask follow-up questions, thus resulting in rich descriptions of user experience. An interview protocol was developed, pilot tested, and approved by the IRB. The interviews were conducted in quiet rooms, with minimal noise and distraction. After the initial introductions and rapport building, the interviewer introduced the purpose of the study to the participant and requested them to read and sign the consent form. The interviews were 15 minutes long on average. At the end of the interview, the participants were provided compensation for their contribution to the study in the form of a gift card.

The interview protocol had six main questions, of which, the first five have already been used to answer the research questions of the first part of the study[7]. Participant responses to the sixth question have been used to answer the research question of the present study: *Why do you want to be a (their choice) engineer?*

Data Analysis Procedures

The audio files were transcribed verbatim and student names were anonymized for security purposes. The transcripts were coded independently by two researchers, using Lincoln and Guba's[11] version of the constant comparative method.

Research Quality

To ensure the quality of our study, some measures were taken . Firstly, the interview protocol was piloted and revised, acknowledging that pilot testing may help uncover limitations and shortcomings of the interview design[3]. Since the protocol was semi-structured, no substantial changes were made to it in order to have enough flexibility to probe participants while remaining within the protocol. Secondly, researcher bias is inherent in qualitative research. Hence, it is up to the researchers to minimize the effects of the bias as much as possible. All researchers in the present study have an engineering educational and professional background, which made it easy for them to understand and interpret any technical jargon encountered during the entire research process. Finally, the interview transcripts were triangulated by at least two researchers for accuracy and correct interpretation. The transcripts were also coded separately by two researchers to ensure inter-rater reliability.

5. Results and Findings

As mentioned, two of us independently conducted multiple iterations of data coding and analysis, which revealed a total of 126 code instances (81 from the EEE survey and 45 from the interview transcripts). Further analysis resulted in the emergence of 26 unique codes, which were grouped into 11 categories.

Table 2 presents the codes that emerged directly from the data after several rounds of coding by two of us, along with their counts and descriptions. The codes extracted directly from the data have been labeled as *stage-0*.

Table 2: *Coding scheme at stage-0*

Category	Count	Code	Count	Description
Interest	37	Interest Appreciation	21	Broad desire to invest themselves in the activities they associate with a major.
		Interest Subject	11	Specific interest in the subjects (classes) students associate with certain majors.
		Interest Professional	5	Broad desire to invest themselves in the future activities they associate with the profession.
Profession	20	Profession Job	11	Discipline specific job aspiration.
		Profession Innovation	3	Discipline specific job aspiration that is related with creation and innovation.
		Profession Entrepreneur	2	Discipline specific job aspiration that is related with entrepreneurship.
		Profession Research	2	Discipline specific job aspiration related to having the opportunity for research.
		Profession Unique	1	Discipline specific job aspiration related to doing something unique.
		Profession Teamwork	1	Discipline specific job aspiration related to having opportunities to work in teams.
Practicality	18	Practicality Job	9	Expectations of job availability, likelihood of finding a job in the discipline, stability.
		Practicality Ability	6	Doing what students feel they are good at (competence beliefs).
		Practicality Effort	3	Taking the path of least resistance or better chances of success. Doing what students expect to require them less effort.
Passion	9	Passion Subject	5	Strong enthusiasm for the subjects (classes) students associate with certain majors.
		Passion Overall	4	Strong intrinsic motivation to invest themselves in the activities they associate with a major.
Well Informed	8	Well Informed	8	Having breadth and depth of information based on experiences, people, others, and themselves.
Money	7	Money	7	Expectations of income (salary) and monetary lifestyle.
Contribution	7	Contribution Help	3	Having the opportunity to help other people, help the world.
		Contribution Advance	2	Contributing to the advancement of some field, activity, or challenge.
		Contribution Leader	1	Successfully leading a company/organization
		Contribution Real	1	Contributing to solve real-world problems.
Enjoyment	7	Enjoyment Pleasure	5	Getting pleasure in doing something.
		Enjoyment Subject	2	Enjoy the subjects they consider related to the major.
Breadth	6	Breadth Field	5	Expectations of possible professional fields that a single major allows them to explore.
		Breadth Knowledge	1	Having a wide spectrum of opportunities for learning.
Family	5	Family	5	Following advice from family members (or pleasing them) was important.
Reputation	2	Reputation	2	Reputation of the school offering the major or of the major itself.

To make explicit connections with Eccles' framework, we added two additional stages to our coding structure. *Stage-1* maps the codes found at stage-0 with the *values* and *expectations* categories of the expectancy-value theory. *Stage-2* takes the values and expectations found in stage-1 and maps them to the four categories of STVs defined by Eccles. This mapping is shown in Table 3.

Table 3: *Coding scheme levels 0, 1 and 2*

Code (stage-0)	**Stage-1**	**Stage-2**	**Code (stage-0)**	**Stage-1**	**Stage-2**
Breadth Field	Expectation	Intrinsic	Passion Overall	Value	Intrinsic
Breadth Knowledge	Value	Intrinsic	Passion Subject	Value	Intrinsic
Contribution Advance	Expectation	Attainment	Practicality Ability	Competence	Competence
Contribution Help	Expectation	Attainment	Practicality Effort	Competence	Competence
Contribution Leader	Expectation	Attainment	Practicality Job	Expectation	Utility
Contribution Real	Expectation	Attainment	Profession Entrepreneur	Expectation	Attainment
Enjoyment Pleasure	Value	Intrinsic	Profession Innovation	Expectation	Attainment
Enjoyment Subject	Value	Intrinsic	Profession Job	Expectation	Attainment
Family	Value	Uncategorized	Profession Research	Expectation	Attainment
Interest Appreciation	Value	Intrinsic	Profession Teamwork	Expectation	Attainment
Interest Professional	Expectation	Attainment	Profession Unique	Expectation	Attainment
Interest Subject	Value	Intrinsic	Reputation	Value	Intrinsic
Money	Value	Utility	Well Informed	Value	Uncategorized

Our results showed that most of the codes within the same categories were mapped to the same classification in stages 1 and 2 of the coding structure. On the other hand, some categories did not follow the pattern mentioned. In our interpretation, this is interesting although unsurprising and reflects the fact that our categories emerged from the raw data and not from a premeditated effort to map the findings to the expectancy-value framework.

At stage-1, all the codes were mapped to the overarching categories of the expectancy-value theory. According to Eccles', the competence and value beliefs affect decisions and choices, such as pursuing a particular engineering major[8,9]. Both the EEE survey and the interviews uncovered instances of competence and value beliefs. Additionally, we have also made a distinction between values placed on immediate things (values) as opposed to those placed in a prospective future, based on assumptions (expectations). Following are some excerpts that illustrate Eccles' categories:

<u>Value (immediate):</u>
GEORGE: "*...and construction engineering management, yeah, construction has interested me and like, I've always liked architecture, and that would be really cool to work with*" [INTEREST SUBJECT].

<u>Value (immediate) + competence:</u>
ALAN: "*I've always been fascinated with flight* [PASSION SUBJECT] *and in school I figured out that I'm pretty good with math and science* [PRACTICALITY ABILITY] *and so aerospace and aeronautical are kind of like the merging of those two different interests.*"

<u>Expectation:</u>
ERNEST: "*So mechanical engineering, I feel, has a wide variety of different jobs to choose from* [BREADTH FIELD] *as well as there's always going to be a job open for mechanical engineers somewhere.*" [PRACTICALITY JOB]

We also performed a simple content analysis to count the codes. The result of content analysis showed that values (both immediate and expectations) are predominant over competence beliefs. Similarly, immediate values are predominant over expectations, as shown in Figure 2.

Not surprisingly, many students reported reasons for choosing a major that included values and competence beliefs along with expectations. It may seem that values and expectations may encompass all the reasons reported by some participants. However, none of them provided reasons related exclusively to competence beliefs as the drivers influencing their decision making process. This means that not a single student based their decision solely on their perception of self-ability in relation to the major. This is consistent with the observation of Matusovich et al., who suggest that the less studied value beliefs exert a bigger influence on career choice and persistence than the widely examined competence beliefs (self-efficacy)[5].

Some of our findings did not perfectly fit into the framework of STV. We classified stage-1 codes (except competence belief), under the four categories of STV. From this classification two codes emerged, which are not a part of STV: family [FAMILY] and being well informed [Well Informed] and hence they have been marked as "Uncategorized".

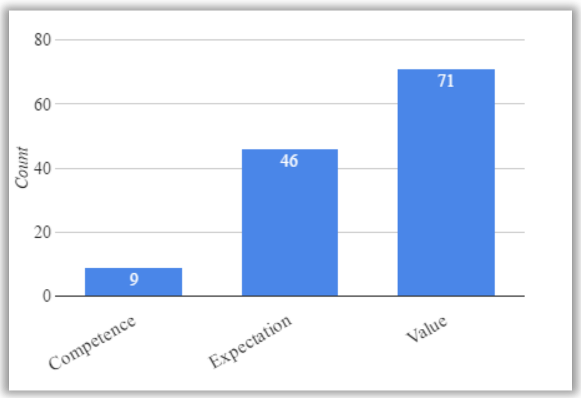

Figure 2. Results of content analysis performed on the codes extracted (N=126)

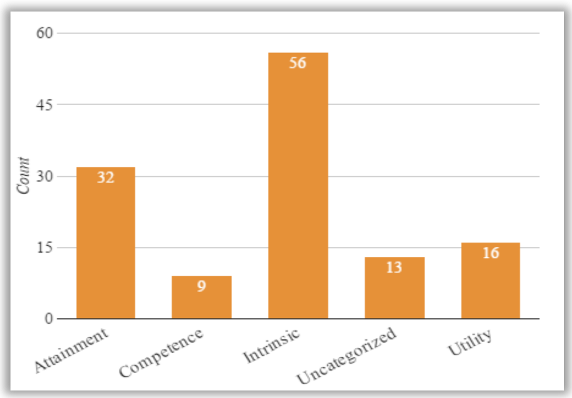

Figure 3. Results of content analysis performed on the codes extracted using STV (N=126)

6. Discussion

Stage-0 coding uncovered common themes in the interview transcripts. This categorization allowed us to identify the predominant values and expectations that students have in mind when choosing a major. *Interest* is a predominant category at stage-0. Moreover, students broad desire to invest themselves in the activities they associate with a major, proved to be the most often mentioned value as a reason to pursue that major. On the other hand, reasons associated with future aspirations also play an important part in students' decision making process. For instance, discipline specific job aspirations and profession are two themes which are mentioned the most in the interviews. We believe such themes to be *expectations* in light of Eccles' expectancy value theory, which leads to the next stage of our coding.

Stage-1 focused on mapping students' values and expectations to the broad categories of the expectancy-value theory. We found harmony between the themes of our coding scheme and Eccles' broad categorization as value-beliefs and competence-beliefs. Similarly, stage-2 mapped students' values and expectations to Eccles' four STV. Moreover, as suggested by Carter[6], we observed that interest emerged as the theme most frequently mentioned, followed by expectations of a future professional life and practicality (utility) concerns.

There were some inter-category differences between *Breadth*, *Interest*, and *Practicality*. *Breadth* of and within the discipline was found to be an intrinsic value of students and an expectation that showed itself when students are selecting a major. For example, in stage-2 we categorized the expectation students have of possible professional fields that a single major allows them to explore as an intrinsic value as opposed to a utilitarian or attainment driven value. Similarly, we found a students' desire to have a wide spectrum of opportunities for learning within a given major to be an intrinsic value. While both of these examples are under the category of breadth, students' intrinsic value of breadth also takes the form of an expectation for breadth in the major.

Interest for the subject, for professional aspects of the major, and for future activities, presented themselves as intrinsic values of students (enjoyment for and of the discipline) in stage-2. *Interest* also manifested as expectations related to the attainment potential students have of themselves as aligned with the discipline. This could be contrasted with utility value or *Practicality*, a more extrinsic value[9]. Nevertheless, we found these values to be present in the decision making process of the same student.

While many of the codes mapped across the various stages of coding, two of them did not map to the STV categories: *Family* and *Well Informed*. The percentage of these uncategorized codes in stage-2 coding is shown in figure 3. With the *Family* code, we attempted to capture the importance students give to pleasing family members or wanting to follow their advice when choosing a major. This codes mapped from stage-0 to stage-1 as a value; we speculate that students reflect the values of their family. We could not place *Family* in one consistent category in stage-2, i.e. it could potentially be mapped to more than one STV category. Student's consideration of family in their major decision could be related to their interpretation of their families' concept of them, to their intrinsic or utilitarian values, or as a way to manage relative cost. During our interviews, we did not explore this concept of family in terms of task motivation.

We found the *Well Informed* category to be a value for students. Students value having breadth and depth of information from experiences and other people in order to pick a major. This value was difficult to map to STV stage-2. In this case, being *Well Informed* is a value, but could not readily be categorized as belonging solely to one STV code. Students could be leveraging the value of being well informed for any combination of STV codes. The value of being well informed ties back to SLE: students are self-motivated to seek information regarding which major to pursue because the value of this task aligns with their goals, needs, and personal values[5,7]. Students reporting information as a valuable asset when choosing a major could be most likely to engage in SLE. Being well informed could also be related to the *Practicality* category. Being well informed may make it easier to select a major.

Figure 3 shows a dominance of *intrinsic* values followed by *attainment* in students' narratives. *Intrinsic* value, according to Eccles, is similar to the idea of flow, a feeling of enjoyment someone gets from doing a task or an anticipated enjoyment one could expect to experience when performing the task[8]. Intrinsic values could also be driven by a curiosity or interest to learn. *Attainment* value, according to Eccles, is a student's personal attachment to the task, whether the student deems the task as central to their sense of themselves. The high frequency of these codes, in the narratives we collected, illustrates that students seek flowing experiences, enjoyment, and personal attachment to the discipline they choose. We believe that the sources of information needed to give a student such feelings could be motivation to engage in SLE. SLE is a very important, highly personal, self-motivated, method of information gathering students use when selecting a major[8].

The values students have might not be actualized by the majors they choose. Student's expectations might be unrealistic. They can use more information to clarify and produce a more comprehensive view. Information gathered by students may bolster or change expectations they have of certain majors. Expectation and sources of information are linked together by the values students have. Students' value beliefs influence the information sources they seek. In other words, students seek *value-oric* information: information they perceive as valuable. As shown in the content analysis shown in figure 2, students place a hefty weight on the importance of values.

7. Limitations and Future Directions

As with any research study, our study also has some limitations:

- All the EEE data come from students of the same major (Environmental and Ecological Engineering) and, although not planned, most of our Participants chose Mechanical Engineering as their preferred major. This could have affected the relative abundance of certain codes or prevented the emergence of different values, perhaps more closely related to other engineering disciplines.
- The duration of the interviews was short and we feel we may have missed an opportunity to investigate some important themes (e.g., what is the importance of family in a student's decision making process and the importance of talking to practicing engineers).

Some directions that this study can lead to in the future are:

- Our interview data also does not provide adequate insights about two of our themes: 1) Well Informed and 2) Family. As a next step, we would like to investigate further these categories to determine if they fall under one of the pre-defined category of the Eccles′ expectancy value theory or are these new ideas worthy of a separate category.
- Findings from the first and second phase of the study (Figure 1) can be used to connect students' value beliefs and expectations, and the types of resources they use to inform their decision, leading to the research question: *What is the relation between students' value beliefs and expectations of the engineering disciplines and the type of sources they use to inform their decision of a major?*

8. Conclusion

This study investigates how students' value- and competence-beliefs and expectations map to their decision of a major. In order to interpret our findings, we used Eccles' expectancy-value theory as a framework. We devised a three-stage coding scheme to link emergent categories from interview transcripts with student expectations and value beliefs, that influence the major they wish to pursue. We identified 26 different themes comprising value beliefs, expectations, and competence beliefs. Consistent with findings of previous studies, value beliefs and intrinsic values predominate competence beliefs and utility values as the reasons supporting students' decision of a major[5]. Although most of our findings can be assimilated by the framework of Eccles' expectancy value theory, we found two themes that do not readily fit in this framework: *Family* and being *Well Informed*. Family could be regarded as a broad category encompassing intrinsic and extrinsic values. For students it may be important to consider and reflect whatever values their families appreciate. *Well Informed* includes students' appreciation of having multiple sources of information about the major they wish to pursue. Through this code, we found a connection to the paramount importance of SLE discussed in an earlier phase of this study[7].

References

1. Krieshok, T. S., Black, M. D., & McKay, R. A. (2009). Career decision making: The limits of rationality and the abundance of non-conscious processes. *Journal of Vocational Behavior*, *75*(3), 275–290.
2. Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
3. Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior*, *45*(1), 79–122.
4. Seymour, E., & Hewitt, N. M. (1997). *Talking about leaving: Why undergraduates leave the sciences*. Boulder, CO: Westview Press.
5. Matusovich, H. M., Streveler, R. A., & Miller, R. L. (2010). Why do students choose engineering? A qualitative, longitudinal investigation of students' motivational values. *Journal of Engineering Education*, *99*(4), 289–303. http://doi.org/10.1002/j.2168-9830.2010.tb01064.x
6. Carter, J. (2001). What they think: Students' preconceptions of computing. In *International Conference on Engineering Education* (Vol. 7E8, pp. 4–9). Oslo, Norway: Citeseer. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.10.2352&rep=rep1&type=pdf
7. Donnay, D. A. C., Morris, M. L., Schaubhut, N. A., & Thompson, R. C. (2005). *Strong Interest Inventory manual: Research, development, and strategies for interpretation*. Palo Alto, CA: CPP.
8. Rodríguez-Simmonds, H. E., & Ortega-Alvarez, J. D., & Atiq, S. Z., & Hoffmann, S. R. (2015, June), *Identifying Sources of Information That Students Use in Deciding Which Engineering Major to Pursue* Paper presented at 2015 ASEE Annual Conference and Exposition, Seattle, Washington. 10.18260/p.24214
9. Eccles, J.S., T.F. Adler, R. Futterman, S.B. Goff, C.M. Kaczala, J.L. Meece, and C. Midgley. 1983. Expectancies, values, and academic behaviors. In Achievement and achievement motivation, ed. J.T. Spence. San Francisco, CA: W. H. Freeman.
10. Eccles, J.S. 2005. Subjective task value and the Eccles et al. Model of Achievement-Related Choices. In Handbook of competence and motivation, eds. A.J. Elliot and C.S. Dweck. New York: The Guilford Press.
11. Wigfield, A., & Eccles, J. S. (1992). The development of achievement task values: A theoretical analysis. *Developmental review*, *12*(3), 265-310.
12. Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry* (Vol. 75). Sage.
13. Turner, D. W. (2010). Qualitative Interview Design: A Practical Guide for Novice Investigators. *The Qualitative Report*, *15*(3). Retrieved from http://www.nova.edu/ssss/QR/QR15-3/qid.pdf