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UW Academic Challenge and Engagement Study (UW ACES): Economics

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INTRODUCTION

Research on learning in college shows that learning is profoundly shaped by the goals, practices, cultures, and values of the academic disciplines[1], particularly the disciplinary practices in students' majors. Therefore, if we are to understand the kinds of experiences that students find intellectually rigorous (and, thus, engaging), we need to examine challenge in the major. Understanding challenge in the major is important because at every stage of their college experience, students report that they want to be challenged, that they perform better in courses that are challenging, and that they value classes that stretch their thinking and ask them to demonstrate learning more than they value classes that ask little of them.[2] Although learning about where students experience challenge is important, asking students to describe challenging learning experiences in their majors requires some prior understanding of how those majors operate. The Office of Educational Assessment (OEA) designed the UW Academic Challenge and Engagement Study (UW ACES) to accommodate these needs.

METHOD

Qualitative methods are recommended when researchers are seeking to understand the complex learning experiences of students, as well as the meaning they ascribe to those experiences[3]; therefore, we designed the UW ACES to be primarily an interview study.[4] Using a "citizen science" model, OEA asked departmental advisers if they would be willing to volunteer to interview seniors in their departments who came in to advising to apply for graduation. Advisers are knowledgeable about their academic programs, understand disciplinary practice in their departments, and are trusted by students in the major, so they have the best chance of gathering good information from seniors about their experiences in the major.

Sixty-six advisers from 32 undergraduate programs volunteered to participate. During the 2012-13 academic year, the volunteer advisers asked students if they would participate in brief (5-10 minute) interviews about challenge in the major. If the students agreed, advisers asked them to respond to four open-ended questions, entering students' responses directly into a Catalyst survey form that OEA researchers had designed for that purpose. The questions were as follows:

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1 Beecher & Trowler, 2001; Bransford et al., 2000; Beyer et al., 2007; Donald, 2002; Pace and Middendorf, 2004; Wineburg, 2001, 1991; Neumann et al., 2002; Shulman, 1988; Biglan, 1973.
2 Beyer, et al., 2007.
3 Merriam, 2001.
4 One participating department asked students to respond to the open-ended questions in writing.

1. What do you consider to be the most challenging work that you had to complete in this major? And by "challenging" I mean doing the work that stretched your thinking the most. This can be anything—a project, a paper, an exam question, homework, something else you did related to the major.
2. What made the project/class/activity challenging?
3. What did you do or learn that enabled you to meet those challenges?
4. What do you think you learned by completing this project/class/activity?

In addition, advisers asked students in what course the challenging work took place and how many quarters they had until they graduated.

Researchers in OEA conducted training workshops in interviewing skills with all participating advisers, provided individual departments with survey customization if required, and monitored all resulting interviews, reporting back to advisers about the interviews they had conducted. By the end of the academic year, departmental advisers had interviewed 1,237 students. Students' responses were analyzed using a constant comparison method[5], an inductive process designed to let themes emerge, rather than imposing assumed categories on students' comments.

STUDY LIMITATIONS

If we interviewed students post-graduation, they would be likely to identify their capstone courses or their advanced senior-level courses as the ones asking for their most challenging work. However, because we wanted to attach the interview to a time when students would normally see their academic advisers, we interviewed students when they came into the advising office to apply for graduation, which often meant that they were two or three quarters away from graduation. Senior-level courses, particularly capstone or capstone-like classes, are those which students often say are their most challenging and satisfying. Although interviewing students as they applied for graduation meant that we might not gather information about late-senior year courses, we felt that it would be interesting to departments to learn the kinds of challenges that lead to and prepare students for those more advanced experiences.

ECONOMICS DEPARTMENT RESULTS

The Economics Department was one of the UW ACES' 32 participating departments. Ahna Kotila and Patrick Pineda asked 185 students if they were willing to be interviewed for the study and all but seven of them (96%) agreed. The 178 students who were interviewed represented about 52% of the 342 seniors in Economics who graduated during the 2012-2013 school year.[6]

Students were asked which degree option—BA or BS—they were completing for their undergraduate degrees. One interviewee did not specify a degree option, and of the remaining 177 interviewees, 115 (65%) said they were completing BA degrees, and 62 (35%) said they were completing BS degrees. When there were differences in the responses of BA and BS degree recipients, we note them in this report.

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[5] Merriam, 2001.

[6] The number of undergraduate degree completions is based on the 2012-13 UW Profiles reports published by the UW Office of Planning and Budgeting (https://uwprofiles.uw.edu/Viz/View/13-SummaryandTrendsDegreeAttributes)

Quarters to Graduation and Where Students Experienced Challenge

Most of the interviewees had three (39%) or two quarters (37%) left to complete before graduating. About 21% had only the quarter in which they were interviewed left before they graduated, and a few interviewees (3%) had four quarters left. As Table 1 shows, Economics majors earning BA degrees were somewhat closer to graduation than were students earning BS degrees at the time of their interviews. About 25% of the students earning BA degrees were in their final quarter at UW, compared with 13% of the BS degree interviewees, and 37% of students earning BA degrees had three or four quarters to complete before graduating, compared with 52% of the BS degree seekers.

Table 1. Time to graduation, BA and BS Interviewees

Degree type	1 quarter (%)	2 quarters (%)	3 quarters (%)	4 quarters (%)
BA N=115	29 (25%)	44 (38%)	40 (35%)	2 (2%)
BS N=62	8 (13%)	22 (35%)	29 (47%)	3 (5%)

When asked which courses in the major had presented them with the greatest challenges, 18 (10%) of the 178 interviewees mentioned more than one course—nine students in the BA track and nine in the BS track. Overall, the interviewees listed 29 classes in the Economics major as presenting them with significant challenges, shown in Table 2.

As the table shows, 90% of the courses in which students' most challenging work occurred were 400-level courses. Students in both the BA and BS tracks noted one course at the 200-level and two at the 300-level as the sites of their biggest academic challenges, with more than one in five (22%) of all interviewees identifying Economics 300 and/or 301 as presenting them with their greatest challenges. Overall, the most frequently mentioned courses in the major were:

- Economics 482, mentioned by 25 (14%) interviewees
- Economics 422, mentioned by 22 (12%) interviewees
- Economics 301, mentioned by 20 (11%) interviewees
- Economics 300, mentioned by 19 (11%) interviewees

In addition to noting courses in the major that had presented them with challenges, individual students also reported the following as presenting challenges:

- The whole major (10, with one adding "*But mostly in the 400-level coursework*")
- "*All exams, in general*"
- "*Projects, in general*"
- "*Two or three of them*"
- "*Macro classes*"
- "*I haven't taken a lot of 400-level courses yet*"

Table 2. Courses presenting the greatest challenge

BA	BS	Total number of students
ECON 201	ECON 201	2
ECON 300 (15)	ECON 300 (4)	19
ECON 301 (15)	ECON 301 (5)	20
ECON 400 (2)	ECON 400 (3, one mentioning Prof Knox)	5
	ECON 401 (3)	3
ECON 421	ECON 421 (2)	3
ECON 422 (11)	ECON 422 (11, one mentioning Prof Clower and one Prof Yang)	22
ECON 424 (3)	ECON 424 (4)	7
	ECON 425	1
ECON 435 (5)	ECON 435 (3)	8
ECON 436 (2)		2
ECON 437		1
ECON 442 (4)	ECON 442	5
ECON 443 (4)	ECON 443 (2)	6
ECON 448 (2)		2
ECON 451	ECON 451	2
ECON 454 (2)		2
ECON 455		1
ECON 464 (2)	ECON 464	3
ECON 471 (6)	ECON 471 (2)	8
ECON 472 (4)	ECON 472	5
ECON 475	ECON 475	2
ECON 482 (10)	ECON 482 (15)	25
ECON 483 (8[7])	ECON 483	9
ECON 485 (3)	ECON 485 (2)	5
ECON 490	ECON 490	2
ECON 495 (3)		3
ECON 496	ECON 496	2
ECON 497	ECON 497	2

Also, four students listed courses outside the major that had presented them with their most challenging experiences, including:

- ITAL 431 (Professor Gaylard)
- RUSS 322 and SLAV 351
- STAT 311
- INDUSTRIAL E 410 and 411

[7] Includes one student who did not indicate whether he was a BA or BS degree seeker.

Regarding differences in the courses listed by students in the BA and BS tracks, more BA than BS students identified ECON 300 and 301 as the sites of their greatest academic challenges, along with ECON 483. However, as Table 2 shows, the two lists of courses were remarkably similar.

1. Students' Greatest Challenges

Students were asked: "What do you consider to be the most challenging work that you had to complete in this major? And by "challenging" I mean doing the work that stretched your thinking the most. This can be anything—a project, a paper, an exam question, homework, something else you did related to the major." About 23% of the interviewees gave more than one response to this question.

Three strong themes and several minor themes emerged from students' responses.

A course. Forty-six percent of the interviewees said that a whole course or a course sequence had presented them with their most challenging work in the major, including the four students who identified courses outside the major as the sites of their most challenging experiences. In addition, more than one out of five (21%) of the interviewees who identified a whole course as their most challenging experience in the major specifically mentioned the mathematical aspects of the course(s) they had described as particularly challenging. (As noted later in this section, four students said the mathematical aspect of the whole major presented them with their greatest challenges.) The following quotations illustrate this category of response:

- *The intermediate micro course—Economics 300. It was actually one of my favorite Economics classes, but one of the hardest.*
- *Economics 472 in general. I do well in micro Economics, and this was macro Economics.*
- *Economics 435 and 436 were definitely intellectually stimulating. They're similar. One was heavily math- based, and one was concept based.*
- *I took Economics 422 last quarter. That material was a lot more mathematically rigorous.*
- *Economics 301 because it covered such a wide variety of topics. The whole course [was challenging].*
- *The material in Economics 483 was challenging. It required me to do a lot of outside things in order for me to understand the content. I was not prepared for the level of difficulty in the content.*
- *I think for me the hardest class in Economics is Economics 482. The reading of the book and the lectures. In this class is completely new for me. I cannot use old knowledge for it.*

A project. Twenty percent of the Economics seniors interviewed said that a project they had completed was their greatest challenge. More than a third of those projects (37%) were completed for Economics 422, which required a projects that involved deciding how to invest $1,000 in imaginary money and then tracking and explaining those investments over the quarter. Another 35% of the projects students identified as their greatest challenges in the major were completed for Economics 482 (Econometrics). Most of these projects appeared to focus on using data to analyze cases.

In the words of some of the students identifying projects as their greatest challenges in the major:

- *In Economics 422, we had a mock/practice investment project. There was $10000 fake money to invest. We would look up various assets—stocks, bonds, money markets, etc.— and we would list the reasons why we would invest in those things and how we would divide our money. We tracked it throughout the quarter.*
- *Econometrics. We did a project in EViews where we had to analyze correlations between two variables. We used the ordinary least squares method.*
- *A project in Economics 482, estimating if a program is effective for reducing the juvenile criminal rate. It was a program that other people did, and we had to find out if it was effective. We used real data and had to figure it out. The data was raw data, and everything was messy, and we had to clean it up from the first step until the end.*
- *I had a project in one of the econometrics classes. I found it challenging to apply what I researched in class to the real world. I had a lot of calculations, based on theory. The process of researching data thru the internet and other resources was a challenge as well.*
- *A project in Economics 454 [was my most challenging experience]. We were given 150 pages of documents with sources and had to analyze them and write a paper on it and present it. The documents were about a project that the government was doing. You needed to analyze it to see if it was worth the cost to do it.*
- *In natural resources econ (435), there was a model talking about when you cut trees after they have grown and knowing the timing on when you should cut down trees to maximize the benefits. It uses math. You build a model, and you fit in the data, and you can calculate the time.*

Exams. Ten percent of the interviewees said that their most significant challenge in the major was an exam or exams in general, often identifying particular exams in specific courses. For example:

- *In game theory (Economics 485), the final exam. You had to break down the problems into games, which was not your normal thinking.*
- *The final for Economics 421—end of the quarter.*
- *Khalil's midterm in 485. I remember that vividly.*
- *International trade, the midterm.*

A paper/writing in the major. Fourteen (8%) of the interviewees said that a paper or, more generally, writing in the major, presented them with their most significant challenges. As four of those students put it:

- *It would definitely be the writing course that I took through the university. It was with Professor Thornton about the Economic Transformation of Europe. Having to write an academic paper with economic terms, organizing math in the paper, organizing thoughts, etc. [were challenging].*
- *As an international student from China, writing papers was challenging. In Economics 436 there was a short paper about the environment and economics.*

- *For me it was the paper writing for Economics. It's different than the APA style for Psychology [my other major]. I wasn't quite sure about the research type papers I wrote for my other courses in Psychology. I wasn't even quite sure what format to use [for my Economics papers]. I used MLA thinking that was okay, and that seemed to work out fine, but it wasn't explicit. In Psychology we had a writing center. It would have been nice to have one specific to Economics as well.*
- *For me, for the 464 class, the writing class, the reading through all the materials and connecting them to what the professor taught, along with my own opinion and forming a term paper [was the challenge]. There's so much information there. I was flushed with information, and it was hard to find a single topic for a paper.*

Homework. Six percent of the interviewees said that homework presented them with their greatest challenges. For example:

- *Weekly homework [for most of the classes].*
- *Homework assignments in Economics 400. There were book problems assigned.*
- *I feel like usually the homework sets that I do from econ classes is the most difficult.*

Computer-related work. Ten students (6%) said that working with specific computer programs and doing coding was the source of their greatest challenges. In the words of three of these students:

- *In Economics 483, econometrics, I had never had that before. Analyzing the data in the class and processing the data in STATA—it was really hard. It was in the research area and you have to really be serious about what you're doing.*
- *In Economics 424, we had to code in R. I felt like everyone knew what they were doing, but it was frustrating—jumping into a coding class. I was familiar with it because I was on an engineering track, but without that, it would have been hard. There was a huge paper.*
- *Economics 482 contains a lot of knowledge of statistics, which I'm not good at. We did a lot of data analysis, using the software EViews, and it was hard for me to do that because I'm not good at software. We did it in groups. After my group members did the data, I did the analysis.*

Connecting economics/economic theory to the real-world issues. Seven (4%) of the interviewees said that their greatest challenge in the major was connecting course material to real issues and problems. Four of the seven were speaking of work they had done in econometrics courses. The following examples illustrate this category of response:

- *With economics, there are many formulas, and [it's challenging to know] how to connect it to the real world. When I try to think of how that occurs, that understanding is pretty hard.*
- *My labor market analysis project. It was a study about how gender affects income—how men make more than women. I had to take what I learned in class and apply it to real issues in society today. It was fun and challenging at the same time.*
- *I had a project in one of the econometrics classes. I found it challenging to apply what I researched in class to the real world. I had a lot of calculations, based on theory.*

A presentation. Five (3%) of the interviewees said that their most challenging experiences were presentations. For example:

- *I am not comfortable with speaking in front of people and this course required a group presentation. It was about global economic issues. My group was responsible for information on the 2008 financial crisis. The research was ok and the individual paper was ok, but the presentation part was scary.*
- *For me, doing the presentations. I'm an international student. Sometimes I feel weird speaking in public in front of the whole class.*

The reading. Four (2%) students mentioned challenges in completing the reading assigned for the major. As one of them noted:

> *Sometimes the professor asks us to read scans and articles outside the textbook. The text provides definitions, etc. but with articles, it's hard to get the main idea and the definitions [without the background]. Plus, many articles were low-quality print and not easy to read.*

English language problems. Four (2%) students also mentioned English language challenges. For example:

> *Language is the problem for me. I'm an international student.*

Unclear/poor instruction. Four (2%) of the interviewees said that the greatest challenge they faced in the major was unclear or poor instruction in one or more courses. As one of these students noted:

> *Some of the classes were not presenting information clearly. I had to study really hard for them. The major is one where you take common sense and put it into a science, but if it's not portrayed clearly, it doesn't make a lot of sense.*

The math in the major. Two percent of the interviewees reported that the mathematical aspect of the whole major had presented them with their most significant challenges in the major. As one said:

> *The hardest part is the math. Translating the economic theory into math problems is hard [for all courses in the major].*

Other. Two or three students identified the following as their greatest challenges in the major:

- ***Group work*** *(3 students). "So, rather than memorizing all the formulas, the stuff that challenged me the most, group work was the most challenging. When I get a job, I'll probably have to work with people. Some of the teachers asked us to read articles. This was challenging as well, but [the challenge of] group work will probably help me most beyond UW."*
- ***Nothing*** *(2). "Nothing much has been challenging. I'm comfortable with Economics."*
- ***Economic modeling*** *(2). "Economic modeling. I think it's really interesting, however, in this subject. Approaching economics problems through modeling—it took time and effort to master that."*
- ***Finding classes or a direction I'm interested in*** *(2). "Confusion about economics as a major and which part of this large subject to focus in on."*

In addition, six students gave the following individual responses:

- How much more advanced the 300-level courses were than the 200-level
- Understanding the field
- Problem-solving assignments
- Seminar type courses
- The need to learn the course material independently
- Thinking through conflicting arguments presented in different courses

Differences in BA and BS responses. As Table 3 shows, there were some interesting differences in the responses to this question from students seeking BA degrees and those seeking BS degrees in Economics. Although a similar percentage of both groups identified a course or courses as presenting them with their greatest challenge in the major, 33% of the BA-degree seekers who identified a course as a significant challenge also mentioned the mathematical aspect of the class, compared with only 7% of the BS-degree seekers. In addition, projects and computer-related work were challenges mentioned by a smaller percentage of BA than BS students, and exams were noted as challenges by a greater percentage of BA than BS students. These differences suggest that the students seeking BS degrees have stronger mathematical and perhaps technical backgrounds than those seeking BA degrees.

Table 3. Greatest challenges of BA and BS interviewees

Greatest challenge	BA	BS
Course(s)	43% (33% of them mentioning math)	48% (7% of them mentioning math)
A project	17%	26%
Exams	12%	2%
Writing	8%	8%
Homework	7%	7%
Computer-related	4%	8%

2. What Made Those Activities/Classes Challenging?

When asked what had made those activities challenging, about 22% of the 178 interviewees identified more than one challenge. One very strong theme and several themes with a moderate or small amount of agreement across interviewees emerged from students' responses to this question.

The kinds of thinking required in the major. Fifty-one (29%) of the interviewees spoke of the challenge in the kinds of thinking that the Economics major required, with one out of every two students in that group speaking about mathematical or quantitative thinking, one in five speaking about conceptual or theoretical thinking, and several students specifically mentioning creative thinking. In addition, about 8% of this group noted that the level of thinking they were required to do in the courses they described as their most challenging was beyond what they were asked to do in other courses. The following quotations illustrate this category of response:

- *I think in my particular case, because I transferred, I felt a little behind on the concepts, and a lot of the algebra/calculus, that they assumed I should have known. Maybe I*

should have taken an extra stats class, so that I could get that sense of comfortability before.

- *It was basically about concepts, instead of equation answers (in comparison to 200 and 300). There's a lot less actual answers, and more about theory.*
- *The creativity part. You are expected to be creative in other subjects, but not usually in Economics. I wasn't expecting to have to think so much outside the box.*
- *The math was more advanced; applying the math was more advanced--not at all like 200. Wanting to be an Economics major, it was fine for me, but I know a lot of people in the class were shocked (holy crap!).*
- *Just the whole concept of game theory is challenging. It's complicated. It does not just require a lot of memorization but also a lot of new ways of thinking.*
- *You have to think in different ways, depending on different assumptions. It's confusing.*
- *I just felt like the topics were new, and, really, I had to learn all of these economic concepts for the first time. Since it's a different way of thinking, it's more difficult to adjust to, compared to other classes.*
- *I like math, but I suppose I just never was used to seeing math being applied to economics.*
- *The logic is very new to me.*
- *In Economics 471 and 472, I put a lot of time and effort into concepts related to the graphs and relating the graphs to the text. I had to really go to class and do the homework.*

I had to figure things out on my own. About 14% of the interviewees said that what made the courses and activities they had described challenging was that they had to figure out how to do what was required on their own. Several students noted that they had to figure out how to do problems or computer programming on their own, and about one out of five of the students in this group said they needed to learn course content on their own, particularly in order to take exams. Although students did not always describe this kind of self-teaching as negative, one-third of the students in this category of response noted that learning on one's own was necessary because the instructor and/or the course did not provide help. The following quotations serve as examples of this type of response:

- *It was a book problem, so the professor didn't go into detail in class. You had to read the book for the answers and the professor didn't really go over it. I had to read the book over and over to understand the question.*
- *I had never taken a computer programming class before, and we didn't spend a lot of class time working on the computers. We had to do it really on our own.*
- *Especially this quarter for the Economics 301 class. I haven't understood the PowerPoints that well, so I have to do some of the learning on my own.*
- *Understanding the material in lecture. I had to do a lot of work on my own—preparing for exams. For some professors, there are not a lot of practice exams. I had to do a lot of work in the textbook, and study for myself, particularly in Economics 471.*

- *Having to learn on my own, outside of the classroom. Having to research.*
- *[It was challenging] to collect data from the stock prices, because I never used the website before, and the teacher hadn't gone over it much, so I had to investigate it.*
- *I had a lack of study materials, a lack of materials from the instructor, a lack of practice problems, etc. It was an interesting class, and I learned a lot, but I could have used more helpful material.*
- *We had to do linear regression. It was kind of confusing. The instructor didn't focus too much on the programming, so we had to figure out the programming by ourselves.*

The material or task was unfamiliar. About 12% of the interviewees said that the courses and activities they had described were challenging because the topics studied or the work assigned was unfamiliar to them. For example:

- *I had not done any of that before. I didn't use the program, R, before.*
- *We are required to find new perspectives, so we were not familiar with them. We spent a lot of time trying to find them.*
- *[It was challenging] because I'm not familiar with the EU. In that course, we were trying to analyze countries I was not familiar with, then apply that to economics internationally.*
- *It was a new topic to me. It was dealing with real world finance stuff. I had no experience; it was my first finance class.*
- *I had never done research following investments. It was my first time to really look at stocks and bonds. I didn't know what they were.*

Problems in teaching. Fourteen (8%) of the 178 interviewees said that poor or unclear teaching caused the course or work they described to be their most challenging. In the words of five of them:

- *The notes were messy and she was not organized in the course. I think two of my friends dropped the course, too. I dropped the course and retook it.*
- *It covered such a breadth of topics. I had a graduate student teaching, which was more challenging because there wasn't much class involvement. He would just go through things without pausing to see if students understood.*
- *Because the professor at times goes on about his calculations without connecting it to the textbook. So it's basically very hard to understand what he wanted us to do.*
- *I didn't get anything at all from the lectures. I felt that wasn't specific to me—there were only 50 people to attended lectures regularly. I don't think anyone really liked the lectures.*
- *The professor was very intelligent, but he may have expected a little too much from the students to understand the models a little more intuitively than he taught them.*

English language problems. About 7% of the interviewees said that English language problems caused the challenges they had described. For example:

- *There is a lot of terminology for Economics, and those terms are not familiar to me. If you were born here or learned here, you likely heard those words growing up.*

- *The language. Some econometrics terminology, even when I translated it into Chinese, I couldn't understand it. It's not like Economics 300, 400, or 401, where, after I read the textbook I can understand that knowledge. But not this class. It had lot of language and terminology I never had before.*
- *For me, doing the presentations. I'm an international student. Sometimes I feel weird speaking in public in front of the whole class.*
- *English is my third language. Sometimes I have to reread the questions/problems to understand, because of the way it's translated in my head.*

Writing a paper appropriate for the discipline. Six percent of the interviewees noted challenges in writing for Economics courses. In the words of four of those students:

- *Having to write an academic paper with Economic terms. Organizing the math in the paper, organizing thoughts, etc.*
- *[The paper was challenging] because we need to put what we learned in class into a very specific format. We used models from class and applied it to real life.*
- *It was long, and different than most other papers. The format required was very different.*
- *The paper for Economics 437—I had to research a lot and the requirements for the number of pages was a lot—17 pages.*

Learning the computer program that was needed to complete a project/course. About 6% of the interviewees said that learning a computer program or software needed to complete activities was what made them challenging. As four of them put it:

- *I'm not good with computer-based coding things and STATA involved that. It was the first time I was involved with using a database program.*
- *Had to use EViews (computer program). EViews is the software used to build economics models. I had never used it before. It was completely new for me.*
- *The learning use of the programming in ECON 424. Takes a while to learn.*
- *How to use the data analysis program [is what made it challenging]. It was R, which is like Java. I had just basic experience with it before in a statistics class, and this jumped above that a lot. The professor didn't mention a lot about it in class, but he posted instructions on how to use R online.*

Conducting research. Ten (6%) interviewees noted that the projects or papers that they had described were challenging because of the research that was necessary to complete them. These students described a range of research activities as challenging. In the words of three of them:

- *It was really complicated, because we had to research the EU, and many things were going on. I had to read many articles.*
- *It was hard to get the data—like how much money men earn, etc. It was age dependent and quite hard to get the right data.*

- *I had a project in one of the econometrics classes. I found it challenging to apply what I researched in class to the real world. I had a lot of calculations, based on theory. The process of researching data thru the internet and other resources was a challenge as well.*

Pace was too fast/too much information in too short a time. About 5% of the interviewees said that there was too much information presented too quickly or without enough time to learn it. Students giving this type of response sometimes spoke about a whole course, but they also spoke of exams as covering too much material in too little time. For example:

- *A lot of the stuff I learned in the class was pretty abstract, and not quantified, unlike the 400-levels. I liked that a lot more than the 400-level classes, but it was definitely hard to pick up because it moved pretty quickly.*
- *Not enough time to learn what we needed to learn.*
- *The amount of questions in the little amount of time [was what made the midterm challenging].*

The gap between the exams, lecture and homework. Nine (5%) of the interviewees spoke of the challenge of what felt like a mismatch between course materials and homework and the exams. As four of them put it:

- *It was because we had a grad student teaching it. And he was not very good teaching it. I felt like the exams covered material not covered in the class.*
- *The professor made the homework hard. He made the test harder. I expected him to make the test like the homework. Everyone complained.*
- *The homework problems, papers, and tests are not related to one another. The lecture is basic. The homework requires outside research. Then the expectation of the test is that it will relate to either lecture or the homework. Whenever I went to the class to take the test, I felt like I was in a different classroom. I have a feeling that the material for this course, in general, was not consistent.*
- *The instructor was not very good. She made slides and didn't talk about things. The material she talked about was not related to the exams and homework.*

Bringing theory, models, and real-world problems together. Five percent of the interviewees spoke of the challenge of linking theory, models, and "real life" issues, usually through projects or homework assignments. As three of them said:

- *It was a unique way of solving problems and making real-life problems into a theoretical framework.*
- *It was tough to relate the coursework to real life problems. I had a hard time connecting the dots—the coursework with something relevant in life.*
- *I think because my other majors are math, numbers, and quantitative stuff, it's more difficult to link these to the concepts--how the numbers relate to real-life scenarios.*

The broad scope of/amount of material in the class. About 4% of the interviewees said that the scope of the course was what made a particular class more challenging than others. In the words of three of those students:

- *Just simply of how wide it spans. The timing, the material of the class. We often went over time. There were lots of data that had to be correlated together.*
- *It covered such a breadth of topics.*
- *I used that material in all other classes. There was just a lot of material. And I guess it's kind of a weed out class, so it's pretty competitive.*

Understanding, analyzing, and using Economics articles. Five (3%) students spoke of the challenges posed by the reading required in a course or courses. For example:

- *Sometimes the professor asks us to read scans and articles outside the textbook. The text provides definitions, but with articles, it's hard to get the main idea and definitions [without having the background].*
- *Especially for some of my classes, I have a lot of readings. I have to read again and again to think about the economics, and have to correlate that with the current economical trends. That is challenging.*

Other. Two or three interviewees gave the following responses in answer to the question of what was challenging about the courses or activities they described as their most challenging in the major:

- I'm not interested in the course/field. (3) "*I personally don't care about the global economy*."
- Bringing together knowledge from several courses/fields. (3) "*The use of all of my previous micro courses and tying it all together.*"
- My shyness. (3) "*I'm a shy person. I don't enjoy talking in front of people. During those classes, I have to engage in discussion and have to convey my thoughts clearly. I'm afraid of making mistakes while speaking out loud, making the wrong usage of the words*."
- Hard exams. (2) "*The teacher gives really hard exams. Average for the class was 20/100. Highest was 49/100. He did not give us prepared material for the exams*."
- A lot of memorization. (2) "*A lot of equations. A lot of memorization*."
- Keeping track of requirements. (2) "*There are a lot of Economics classes. I'm getting a certificate in the major, too. Keeping track of the requirements [is a challenge]*."
- Working with real data. (2) "*The raw data—cleaning it was challenging. We had to ask questions about why there was missing data, 0s, peaks, etc.*"
- Presentations. (2) "*We had to get the data…and make an organized PowerPoint presentation*."

Finally, individual students gave the following responses:

- The whole field of Economics
- The depth of questions asked on exams
- The international focus of the class
- Multiple choice questions posed a challenge
- Because much of class was online, students felt disconnected from each other

- Data analysis
- Scheduling problems when working with other students
- Differences between 400-level courses and those at 200-/300-levels

Differences in BA and BS responses. Table 4 shows the differences in what students seeking BA degrees and those seeking BS degrees found challenging about the activities and courses they had described. Both groups noted that the kinds of thinking required by those courses and activities were especially challenging, and both groups noted that the mathematical thinking required was a particularly challenging aspect of those kinds of thinking. In fact, one might expect BS students to find the mathematical aspects of the Economics major less challenging than BA degree seekers, but the two groups were almost identical in their responses. In addition, BS degree seekers found greater challenges in the unfamiliarity of the activities they described; greater challenges in learning the computer programs necessary to complete their work; and greater English language problems than did BA degree seekers. As the table also shows, BA degree seekers noted greater challenges in writing; in bringing theory, models, and real-world examples together; and in pace than did BS degree seekers.

Table 4. What made activities challenging, BA and BS interviewees

Challenge	All N=178	BA N=116[8]	BS N=62
The kinds of thinking required	29% (50% noting mathematical/ quantitative thinking)	27% (58% noting mathematical/ quantitative thinking)	26% (56% noting mathematical/ quantitative thinking)
I had to figure things out on my own	14%	14%	11%
The material or task was unfamiliar	12%	10%	15%
Problems in teaching	8%	7%	8%
English language problems	7%	5%	10%
Writing a paper appropriate for the discipline	6%	7%	3%
Learning the computer program that was needed	6%	3%	11%
Bringing theory, models, and real-world problems together	6%	7%	3%
Pace was too fast/too much information in too short a time	5%	7%	0%

Course differences. Because so many of the majors identified the same four courses (Economics 300, 301, 422, and 482) as the sites of their most challenging learning experiences in the major, we tracked the most frequently-noted specific challenges mentioned in each of those courses. Table 5 shows the results. As the table indicates mathematical and quantitative thinking was challenging for students in all four courses. Students who identified Economics 300 as the site of their most challenging learning experiences were more likely than students mentioning other courses to identify the kinds of thinking required and problems in teaching as the most challenging aspects of that course. Majors who noted that Economics 422 was a particularly challenging course were more likely to identify the unfamiliarity

[8] The responses of the student who did not designate a degree path were analyzed with the BA group.

of the material or tasks required as the aspects of the course that were the most challenging. Interviewees who identified Economics 482 as the site of their most challenging work were more likely to note that figuring things out on their own, working with the computer programs needed to complete requirements, and conducting research were more challenging than students in the other three courses. In addition, only students identifying Economics 482 among the four as their most challenging course felt that writing was the aspect of the course that made it challenging.

Table 5. What made activities challenging in frequently mentioned courses

Challenge	All N=178	Econ 300 N=19	Econ 301 N=20	Econ 422 N=22	Econ 482 N=25
The kinds of thinking required	29% (50% math thinking)	47% (78% math thinking)	35% (43% math thinking)	23% (80% math thinking)	20% (100% math thinking)
I had to figure things out on my own	14%	11%	11%	9%	20%
The material or task was unfamiliar	12%	5%	5%	41%	8%
Problems in teaching	8%	16%	9%	9%	4%
English language problems	7%	5%	5%	0%	4%
Writing a paper appropriate for the discipline	6%	0%	0%	0%	4%
Learning the computer program that was needed	6%	5%	5%	0%	16%
Conducting research	6%	0%	0%	5%	16%

3. What enabled students to meet those challenges?

About 36% of the interviewees identified more than one source of help for meeting the challenges they described. For example, this student speaks of help received from her own efforts, the professor, and peers—combining the three most frequently given responses to this question in one answer:

> *I read the books. I Google everything that I don't know. I go to office hours. I communicate with the professor about things I don't know. I also check with others in the class to make sure.*

Regarding what enabled them to meet their challenges, students' responses yielded three very strong themes, along with several minor themes.

My own efforts. More than half (51%) of the interviewees said that their own efforts had helped them meet the challenges they had described. The kinds of efforts students described varied a great deal. For example, about 37% of this group noted that they had done reading, research, or online searches beyond what was required in their courses in order to improve their understanding of course concepts, clarify ideas, or learn more about a topic. Many students said that they worked especially hard, practicing problems again and again or seeking additional problems to ensure their understanding, and many also noted that they had changed the way they studied in order to learn challenging material. The following examples illustrate this category of response and suggest the variations in it:

- *I actually dropped the class the first time that I took it. When I retook it, I got a 3.4. [That time] I took a lot of time to go over the problem sets and practice problems –the most time I've spent on any Economics class. It paid off.*

- *Researched it on my own. I had to find info on my own because there was no text provided. I had to find other ways to learn the information.*
- *Lots of practice problems.*
- *For example, when we're going through the theory. I would have to research the history of that equation. It ties back to this/that theory. The exceptions are very useful.*
- *I read a lot of other texts (online and in textbooks), which helped me to write in the right format.*
- *I just went to Korean websites, so that I could look up Economics stuff that was written in Korean. It felt like I had to work double.*
- *I made a big chart of the banking system to help me study.*
- *I first searched for an alternative text at the UW library. I tried to find someplace else that would describe the concept--Wikipedia, YouTube, the internet, etc. It helped a lot, actually.*
- *[This challenging exam] changed the way I studied for the final. I thought about how does this work and how would it still work if we changed the parameters, the constraints. I made new games and played with them.*
- *I took more time and effort, compared with the more theoretical courses in Economics. I tried different ways to memorize, trying to match the concepts to the quantitative stuff to understand what's going on.*
- *I spent more time studying and really looked over the midterm and learned from my mistakes. My study habits have gotten so much better.*
- *I opened my eyes to studying a lot harder, reading ahead. I realized that I should be doing that.*
- *Hard work. I read the lectures over and over. They were videotaped, so there were a couple of lectures I watched over and over. Having the video was much better.*
- *You have to read the textbook first to find the parts you don't understand, then go online and find related articles. Also, when the textbook uses statistics to analyze data and you don't understand it, you learn it.*

Professors/TAs/Office hours. About 34% of the interviewees reported that their professors and TAs—or going to office hours—had helped them meet the challenges they had described. In the words of several of these students:

- *The professor gave me a lot of help with the project. I went to office hours.*
- *Professor Thornton was really available for help. In office hours, she help me nail down a topic. Her being available was the most helpful, and her willingness and knowledge to help.*
- *Basically just asked the TA about suggestions.*
- *I went to office hours. That was really helpful because sometimes in class, we'd talk about a few concepts, and it was difficult to ask in class.*

- *I discussed it with the professor and did a lot of readings on other papers. The main thing was talking to the professor because he gave good feedback and let us know if we were on the right track.*
- *I asked a lot of questions of the professor. The professor was willing to understand the level of difficulty of the course and also the level that the students were at.*
- *Go to professor twice a week. Get to know the instructor. When math was so far beyond what I've done, sitting down with the professor step-by step was the most helpful. It gave me insight on how economists think.*
- *The professor created a Facebook page on catalyst to allow the students in the class to interact and meet up.*
- *Meeting with professors one-on one for office hours was ridiculously helpful.*
- *The professor brought up many examples, which was helpful.*

Peers/study groups. Thirty-one percent of the interviewees said that their peers or working in study groups with their peers had helped them meet the challenges they described. The following seven quotations illustrate this category of response.

- *I took it in conjunction with Economics 436. There were a few overlapping students between the two courses, so it was easy to make study groups and get some help from other students.*
- *Teamwork really helped me.*
- *I found that studying with a partner was helpful--being able to talk through the situations and brainstorm ideas.*
- *The homework was very hard. You can't really find anything that closely relates to the text. I had to make a study group. We tried to figure it out together and asked for the answers to the problem sets afterward.*
- *I went to class and worked with a group of people. I learned with peers rather than by myself. Lecture was dry, so we had to work it out after class.*
- *I formed study groups. I got a lot of help from other students.*
- *Working in groups. My group members helped me a lot with the software and the problem sets. We discussed together to solve the problems.*

The textbook. A minor theme that emerged from interviewees' responses to the question of what had helped them meet the challenges they described was the textbook. Eight (4%) of the students gave this response. For example:

- *Luckily the textbook was well-written—the best I've had in Economics—and I was able to rely on that.*
- *All the textbooks have a fairly good review chapter at the beginning. So that, and mostly repetition.*

- *You have to read the textbook first to find the parts you don't understand, then go online and find related articles. Also, when the textbook uses statistics to analyze data and you don't understand it, you learn it—read and listen to lectures.*

Related courses taken previously. Four percent of the interviewees also mentioned the help of courses they had taken earlier. In the words of three of those students:

- *Having math 124, 125, 126 was a good background.*
- *I used what I had learned in the finance courses I had taken.*
- *I used something from Economics 471, international economics. They have similar models. In 475, the instructor didn't really talk about models to use, so I used models that I learned in 471.*

Tutoring from the Economics Undergraduate Board or CLUE. Four (2%) students said that they had received help with the challenge they had described from the Economics Undergraduate Board or the CLUE tutoring centers. As two of them noted:

- *The EUB tutoring helped.*
- *I went to the EUB. I even went to CLUE, and some of the tutors were able to help.*

Other. In addition to these major and minor themes, two or three students mentioned the following as helpful:

- Websites that faculty members referred them to (3)
- Time management (3)
- Dropping the class and retaking it (2)
- Nothing helped (2)

Individual students noted the following as helpful:

- Nothing was needed for help because nothing was challenging
- Spending time in the computer lab
- The Oedegaard writing center
- A natural progression—building knowledge
- The student's own interest in the subject
- Following the instructions (for using the computer program)
- Going to many classes on first day and observing before choosing a class
- Getting a whiteboard for the house

Differences in BA and BS responses. Table 6 shows differences in the responses to this question of students seeking BA and BS degrees in Economics. As the table indicates, BS degree seekers reported getting more help from all three sources—their own efforts, Faculty and TAs, and peers. This result is likely caused by the fact that there was more agreement among BS degree seekers about what gave them help in meeting challenges than among BA degree seekers, whose responses generated more minor categories than did those of BS seekers.

Table 6. What helped students meet challenges, BA and BS interviewees

Source of help	All N=178	BA N=116[9]	BS N=62
Own efforts	51%	47%	55%
Faculty/TAs	34%	33%	45%
Peers	31%	29%	34%

Course differences. As we did with responses to the previous questions, we tracked the help students said they had received in meeting the challenges they mentioned in the four courses that were mentioned most often by students—Economics 300, 301, 422, and 482. Table 7 shows those results. As the table shows, interviewees noting Economics 300 and 482 as the sites of their most challenging work credited their own efforts as helping them meet challenges more often than did students mentioning Economics 300 and 422. Peers were found to be most helpful for challenges students met in Economics 300 and 482, and peers were most helpful in Economics 422 and 482. This latter result suggests a growing reliance on peer and group work as students move through the major.

Table 7. What helped students meet challenges in frequently mentioned courses

Source of help	All N=178	Econ 300 N=19	Econ 301 N=20	Econ 422 N=22	Econ 482 N=25
Own efforts	51%	42%	55%	32%	56%
Faculty/TAs	34%	42%	25%	41%	48%
Peers	31%	26%	25%	41%	52%

4. What did students learn by completing this project/class/activity?

We asked students what they felt they had learned by meeting the challenges they had described, and about 17% of the 178 interviewees mentioned more than one lesson learned. Two strong themes emerged from their responses, along with a number of minor themes.

Content knowledge. One in five (20%) of the interviewees said that they learned new information as a result of the challenges they met. The kinds of information they learned varied, and included seven students who said that they had learned about finance, five students who said that they had learned about investing, three students who said they had learned about human resources, and others who noted gaining knowledge in the EU, economic theory, the 2008 financial crisis, international trade, and other areas. The following quotations illustrate this category of response:

- *I learned a lot about dynamic efficiency and net benefits. I learned about non-market goods, public goods. There's no market for a public good, so you have to evaluate them in certain ways.*
- *How to invest my money! This project was really challenging, but it made me know the theories and concepts more deeply.*
- *I have comprehensive understanding of the financial crisis….*

[9] The responses of the student who did not designate a degree path were analyzed with the BA group.

- *About the EU! Understanding the economic crises in Europe. I took the course at a good time to be learning about the crises.*
- *[I learned that] gender and marital status has a definite impact on income.*
- *I definitely learned a wide range of macroeconomic subjects. It directed me to what I found to be the most interesting within the field—the effect of monetary policy and federal reserve decisions. It led me to take Economics 421.*
- *I learned more about our monetary system and the financial crisis.*
- *I learned about signaling, how to distinguish between a good worker and a bad worker, how the insurance companies make their claims. A lot of material.*
  It gives me a pretty solid knowledge of how international trade works. Circumstances and why countries want to trade with each other. How you calculate the benefits.
  I learned a little bit more about the nature of investments and how they perform. My dad helped me frame it.

A new way of learning/studying. A second strong theme in response to this question was that students had learned different or new ways of studying. About 16% of the interviewees described new ways of learning material, including how much time they needed to invest in order to learn something deeply, and time management. The following examples show the variety in this category of response:

- *When I do the reading, I was able to come up with questions beforehand. It helped to be able to get more out of the class and made it more engaging. I once thought that I would hate this type of class, but it turned out to be beneficial.*
- *What I learned is not only doing what professors asked me to do; I have to find some more stuff to think critically, to learn more about the course. I have to find stuff outside the textbook.*
- *It changed the way I studied for the final. I thought about—how does this work and how would it still work if we changed the parameters, the constraints. I made new games and played with them.*
- *I need to learn more in depth to understand more about the subject.*
- *I learned to be a good student.*
- *Organizing my time, so I can finish early. To be prepared so that I'm not confused.*
- *It taught me how to teach myself better. Better study habits. Independent learning.*
- *[There is] a different way of learning in the upper-level ECON classes.*
- *I learned different study styles for different instructors. I had to change my study habits, there wasn't a lot of material, so I couldn't just go off the notes. And had to go to professor office hours.*
- *How to make a plan. How to manage my time. How to me more efficient with work.*

The application of Economics concepts and ideas to real life. A minor theme that emerged in students' responses to the question of what they had learned by meeting the challenges they described was that

they could apply course ideas to real life. About 10% of the interviewees identified this, as the following examples illustrate:

- *It gave me a sense of when you really encounter something, you can apply what you've learned. When you learn something, you want to show how you've learned it, to prove what you've learned. When you read some news, you can see what you've learned in your economics courses.*
- *It helped me better understand the political sphere we were in at the time.*
- *I can apply it to playing video games, trying to sell stuff. I can apply game theory to my whole life.*
- *I think I can use a lot of economics knowledge to think about real life.*

The importance of and better skills for working with a team. Ten percent of the interviewees noted that they had learned the value of teamwork or had learned more about team skills in meeting the challenges they had described. In the words of four of those students:

- *I think most importantly, teamwork and communicating between teammates.*
- *Communication with each other. Since we are in a group, everyone has their own advantages [to offer], and thus, we can work together to get a better result.*
- *I think I learned how to work with a group.*
- *I learned how to work together with other students.*

How to think critically and analytically in Economics. Ten percent of the respondents said that they had learned a new way of thinking or had improved their critical/analytical skills in the discipline. Note that in this case, we did not include quantitative reasoning in this "thinking" category as we did in our analysis of Question 2. Instead we counted students who spoke of using math to understand Economics in the category that follows, which focuses on math and statistics, in order to get a better picture of all the gains in learning about math and statistics that students felt they had made. Had we combined the subgroup of students in the following category who spoke primarily about learning the relationship between Economics and math with this category of responses, the percent of students in the "how to think critically and analytically" would be 13% instead of 10%. Four examples of students who spoke of learning how to think critically and analytically follow:

> *New ways of thinking [such as] cost-benefit analysis. You can use it to make decisions. It's been a pretty useful way of thinking.*
>
> *Most importantly—the idea, the way of thinking. Studying with friends made me think in different ways about economics.*
>
> *It gave me a whole new aspect of thinking academically. We had to do it on our own, an entire project, and it contained our own thoughts.*
>
> *The way of thinking—thinking in more comprehensive ways*
>
> *I learned how to work with people. More importantly, I learned how to take a testable hypothesis and apply an econometric model to it.*

More about math and statistics and their application in Economics. As previously noted, we included the responses of students who said that they had learned more about math and statistics, as well as the responses of students who said that they had learned more about the relationship of Economics to statistics in this category of responses. Altogether, this category represented 9% of the interviewee responses. As four of the students in this group put it:

- *I learned how to guess and check, try the problem, see if it works. If not, do it again.*
- *I learned about statistics, when doing the project.*
- *I understand where graphs come from, not just analysis, and how to code and derive them.*
- *[I learned about] combining the Economic knowledge with some quantitative/math work.*

Learned something about themselves. About 7% said that they had learned confidence, independence, or the value of persistence. In the words of three of those students:

- *I learned that if I spent enough time studying I could learn anything I wanted. At first I felt that it was way over my head and was never going to be clear.*
- *I learned that in order to fully grasp something you have to work really hard at it. If you're struggling, it doesn't mean you're bad, but you need to keep working on it. If I were to probably go back and take the class now, I think I'd do much better in it.*
- *Developing a sense of self-independence. Working on that stuff on your own, when you haven't seen it in a long time. How to play catch-up.*

How to write papers for Economics. Ten (6%) interviewees said that meeting the challenges they had described taught them how to write academic papers in their major. In the words of three of these students:

- *I learned how to do an analysis paper and then later on I learned how to read charts and analyze them—*
- *how to present it in a simplistic way so that people can understand.*
- *I learned to do independent research and write papers from a very different perspective—[that of] finance and Economics.*
- *I learned about how to write a paper for labor market analysis. I'm doing a thesis now and it's about labor market analysis.*

How to do economic research; how to collect data. Five percent of the interviewees said that they had learned to conduct economic research or collect data from the challenges they had described. As two of them put it:

- *I kind of learned how to research in the realm of economics. Being able to do research outside of the classroom. How to do research, etc.*
- *If I hadn't met this challenge, I would have never checked out a book at the UW library. It forced me to do something more, consider more, think more, and find more resources.*

Nothing/don't know what I learned. Nine interviewees (5%) said that they had learned nothing or they didn't know what they had learned. For example:

- *I didn't learn much, to be honest. I just tried to keep up and get by, but I didn't feel I grasped the material.*
- *Nothing much. Not much I can remember or apply in any way, mostly because of my lack of interest.*

How to use R, STATA, and/or EViews. Eight (4%) students spoke about learning to use and value the help of computer programs, specifically mentioning R, STATA, or eViews. As two of those students said:

- *The program [STATA] helps you to analyze data. It teaches you how to put everything in a formula. All the meaningful data that analysts use was introduced in this program.*
- *I learned how to use EViews. This is not about the theory. It's about the application. Because we do the projects, we have to think of different examples, and had to use the software to test different hypotheses.*

The foundation or context for other courses. Three percent of the interviewees said that they had learned something about the contexts or foundations of other courses from the challenges they had described. For example:

- *Nothing in particular, but it was helpful [for] other courses anyway. It's a foundation for other micro classes.*
- *The basis for the rest of my Economics classes. Whether or not they were math-involved, at least I understood the basis of it all.*

Presentation skills. Four (2%) students said that they learned about how to give presentations. As two of them put it:

- *I think I learned how to work with people and also, how to deliver my speech to others in a way that people could understand.*
- *[Giving a presentation] made me more confident in front of people. Presentation skills are very important to future careers, so this was useful.*

Other. Two or three students said that they had learned the following:

- The area or field they were or were not interested in (3)
- Reading comprehension (3)
- Resources to help students with learning on campus (3)
- That they were not prepared (2)
- What to expect in upper division or graduate school courses (2)
- To apply concepts learned previously to more advanced work (2)
- Some professors are not helpful (2)
- How to choose better classes/instructors (2)

In addition, single individuals said that they had learned the following by completing the challenges they had described:

- To use the project they had completed in interviews
- That education "is a personal goal for me"
- That "I have the skills to find a job after graduation"
- That communication with the professor is important

Differences in BA and BS responses. Table 8 shows the differences in the responses of students earning BA and BS degrees in Economics. As the table shows, BA degree seekers were more likely to have learned about content, about a new way of learning/studying, and about their own abilities to persist and work independently than did students earning BS degrees. The latter group learned more about the application of Economics to life events than did BA degree seekers.

Table 8. What students learned from challenges, BA and BS interviewees

What learned?	All N=178	BA N=116[10]	BS N=62
Content	20%	22%	16%
New way of learning	16%	17%	13%
Application of Economics to life	10%	6%	18%
Team skills	10%	10%	10%
How to think critically/analytically	10%	9%	11%
More math/stats	9%	10%	8%
About themselves	7%	10%	0%

Course differences. We tracked students' comments about what they had learned in meeting the challenges they mentioned in the four courses that were mentioned most often by students—Economics 300, 301, 422, and 482. Table 9 shows those results. As the table shows, what students learned from each of these courses varied a great deal. Economics 301 and 422 seemed to present students with the most content learning, compared with Economics 300 and 482. In those two courses, students learned more about math and statistics and their relationship with Economics than they did in 301 and 422. Also, it seems clear that Economics 300 presented students with new ways of learning and studying, as did 301. By the time students took 422 and 482, however, new ways of learning were less important. In those courses—and especially in 482—learning seemed to be focused on skills. Both courses appeared to emphasize application skills, and students reported learning about team skills in both as well. In addition in Economics 482, students reported learning more about critical and analytical thinking (which some might argue are cognitively the same as application skills, particularly in the social sciences), more about math and statistics and their use in Economics, and more about research and software than they had in the other three courses.

[10] The responses of the student who did not designate a degree path were analyzed with the BA group.

Table 9. What students learned from challenges in frequently mentioned courses

Source of help	All N=178	Econ 300 N=19	Econ 301 N=20	Econ 422 N=22	Econ 482 N=25
Content	20%	0%	20%	41%	4%
New way of learning	16%	21%	15%	9%	8%
Application of Economics to life	10%	0%	10%	18%	16%
Team skills	10%	11%	0%	14%	12%
How to think critically/analytically	10%	11%	0%	0%	16%
More math/stats	9%	16%	10%	0%	24%
About themselves	7%	11%	5%	5%	8%
Other:					Research 12% Software 12%

SUMMARY

The most significant challenges that Economics majors noted were courses or course sequences and projects in the major, followed by exams. However, when talking about those courses that they found the most challenging, about one in five students also mentioned the math/statistics aspects of those courses, particularly students earning BA degrees in Economics.

Students identified whole courses, projects, and exams as their most challenging experiences in the major. When asked why those activities were challenging, the most frequently-given response was that they required students to think analytically, critically, and quantitatively. Quantitative reasoning challenges and math-related thinking were particular challenges for both BA and BS degree seeking students. Students also reported that the activities they described were challenging because they had to figure things out on their own, and they had to work with materials, concepts, and tasks that were new to them and,hence, unfamiliar.

Less frequently-mentioned themes in students' responses to the question of why the activity they had described was challenging included needing to work around problems with teaching, manage English language problems, write a paper appropriate for the discipline, learn and use an unfamiliar computer program, and conduct research/find data.

More than half the students credited their own efforts as helping them meet the challenges they had described, and these efforts included reading beyond what was required, conducting research and online searches to learn more about course topics, and doing extra practice problems. About a third of them also spoke of receiving help from faculty and TAs and from peers and study groups. More BS than BA degree seeking students identified faculty/TAs and peers as providing them with help in meeting the challenges they had described.

In terms of what they learned by completing the challenging work they had discussed, students said that they had learned specific content knowledge (such as finance, investing, international trade) and new ways of learning and studying. They also noted that they had gained skill in applying Economics to "real-life" problems and issues, in working as members of teams, in thinking critically and analytically, and in math and statistics. Students also noted that they had learned to be persistent, to work independently, and to have greater confidence in themselves and their abilities. As the two students' full responses to the interview questions included at the end of this report show, BA students tended to emphasize

learning content, new ways of learning and studying, and how to be persistent, while BS students emphasized learning how to apply Economics concepts and methods to problems and events.

Although the two paths through the Economics major—the BA and the BS—are different in some key ways, understanding and applying quantitative methods and reasoning to Economic issues and events were challenges for both groups. Indeed, understanding how to do the math and statistics required in their courses and learning how to use math and statistics in the major were strong themes throughout students' responses to all questions.

In addition, students' responses suggest that the discipline—its concepts, topics, applications, and methods—is new territory for most students entering the field. This is not surprising, as most high schools do not offer Economics courses, so students come here with little prior exposure to the field, as is true of most of the social sciences. This reality puts particular instructional pressure on social sciences fields, which are beginning at the very beginning with students. About 90% of the interviewees identified courses in the 400-level as the sites of their most challenging work, which suggests that Economics presents students with unfamiliar problems and approaches throughout their time in the major and that students will need careful instruction and skill-building throughout the major.

Although these interviews on challenge in the major were not designed to assess whether students were meeting the department's learning goals (https://econ.washington.edu/learning-goals), there was evidence in students' responses that they were grappling with those goals in the courses and work they described as their most challenging in the major.

Finally, students' responses to the UW ACES interview questions suggest that Economics majors felt that the challenges they described were rewarding, as long as they felt they had instruction and help in meeting those challenges. Indeed, many students spoke of how much they enjoyed the course or the challenging activity they described. This response is consistent with research on student learning, which shows that when an assignment is challenging for students and when instructors help students meet those challenges, students are engaged in their courses and, therefore, learn more than they do when coursework is easy. The words of four of the interviewees serve as examples of the rewards of meeting significant challenges in the major:

- *The intermediate microeconomics course, Econ 300, [was the most challenging]. It was actually one of my favorite Economics classes but one of the hardest.*
- *You learn more and it makes you remember more. When something challenges you, you remember that.*
- *The labor market analysis project [was the most challenging for me]. It was a study about how gender affects income—how men make more than women. I had to take what I learned in class and apply it to real issues in society today. It was fun and challenging at the same time.*
- *Economics 400 stretched my thinking the most. The material covered was really the heart of the major and tied all of my intro courses together. I walked away with a greater understanding.*

Two Students' Responses to All Four Questions

BA degree seeker

Course where greatest challenges occurred: Economics 422

Q1. What was the most challenging work you did? *A project in Economics 422. We have "money" and need to invest it. You need to keep checking the stocks throughout the quarter, calculate gains and losses, and write a paper that discusses it.*

Q2. Why was it challenging? *It takes time. You need to think about it and keep checking throughout the quarter. The most challenging part is that I was not familiar with the stocks.*

Q3. What helped you meet that challenge? *Teamwork really helped me. The professor gave me a lot of help with the project. I went to office hours.*

Q4. What did you learn by meeting that challenge? *How to invest my money! This project was really challenging, but it made me know the theories and concepts more deeply.*

BS degree seeker

Course where greatest challenges occurred: Economics 482

Q1. What was the most challenging work you did? *A project. From Economics 482, Econometrics*

Q2. Why was it challenging? *We were assigned a project to make a model and collect data to estimate what influences the population. [It was challenging] because we collected data for 50+ countries and aspects from those countries for around 10 years. It's hard to collect data, and hard to think about the model. At first we were working with the wrong model and could not get the correct regression result. It took three or four times for us to correct our model. After that, we had to write a 5-page paper to analyze our results*.

Q3. What helped you meet that challenge? *I found a partner to work together. We went to the professor to ask for advice and we discussed the project with other classmates*.

Q4. What did you learn by meeting that challenge? *I think I learned how to work with a group. And also the skills on collecting and dealing with the data. Sometimes we had to apply a logarithm to the data to get the result*.

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