Faculty Perception of the GRE as a Graduate Admission Requirement

Animesh Paul, University of Georgia

Animesh was born in Tripura, India, and raised in a liberal modern ”brown” military upbringing. He prefers the pronouns ”He/They” and considers himself a creative, sanguine, and outgoing individual. He graduated with a bachelor’s degree in Technology focusing on Electronics and Electrical Engineering from KIIT University. He is now a part of the Engineering Education Transformation Institute as a Ph.D. student under the advisement of Dr. Racheida Lewis. His research is in Engineering Education, focusing on equity, inclusion in the classroom, and easing student transition to the workforce catering to STEM graduates.

Deborah Moyaki, University of Georgia

Deborah Moyaki is a doctoral student in the Engineering Education and Transformative Practice program at the University of Georgia. She holds a bachelor’s degree in Educational Technology and is excited about the possibilities technology offers to the learning experience beyond the formal classroom setting. Her research focuses on improving the educational experience of engineering students using virtual reality labs and other emerging technologies.

Dr. John Ray Morelock, University of Georgia

Dr. Morelock is an Assistant Professor of Practice with an emphasis on engineering education research, and the Associate Director of Educational Innovation and Impact for UGA’s Engineering Education Transformations Institute (EETI). In addition to coordinating EETI’s faculty development programming, Dr. Morelock conducts research on institutional change via faculty development, with an emphasis on innovative ways to cultivate and evaluate supportive teaching and learning networks in engineering departments and colleges. He received his doctoral degree in Engineering Education at Virginia Tech, where he was a recipient of the NSF Graduate Research Fellowship. His dissertation studied the teaching practices of engineering instructors during game-based learning activities, and how these practices affected student motivation.

Dr. Racheida S. Lewis, University of Georgia

Dr. Racheida S. Lewis, Ph.D. is an Assistant Professor at the University of Georgia in the Engineering Education Transformations Institute (EETI) and the Department of Electrical and Computer Engineering.

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Introduction

The goal of this paper is to describe a study that assesses engineering faculty perceptions of the Graduate Record Examination (GRE) in terms of its usefulness as an application component for admission into engineering M.S. Thesis and Doctoral programs. The Graduate Record Examination (GRE), administered by the Educational Testing Service (ETS), is a widely used standardized test and is often required or requested for admission into graduate-level programs in the United States.

The research questions addressed in this study are:

1. How do faculty members perceive the importance of the GRE for admission to MS Thesis and Doctoral programs?
2. How do faculty members' perceptions of the GRE differ across faculty groups (Tenure, discipline, race, ethnicity, gender)?

The GRE aims to measure an individual's verbal reasoning, quantitative reasoning, and analytical writing abilities and comprises three sections offered in computer-based centers all year round at test centers worldwide. The Verbal Reasoning section evaluates an individual's ability to comprehend and analyze written materials and understand relationships among words and concepts. The Quantitative Reasoning section assesses an individual's capability to understand, interpret, and analyze numerical information and solve mathematical problems. The Analytical Writing section tests an individual's ability to express complex ideas effectively in written form [1]. The scores from the GRE are utilized by graduate schools to evaluate applicants during the admission process.

For this study, we specifically focus on the GRE as a standardized test and faculty members' perceptions of it as a graduate school application component. Engineering faculty members form an integral part of graduate school in higher institutions as they serve as mentors, advisors, and expert guides to graduate students during their academic journey. In many institutions, they also play an integral part in determining who gets accepted into engineering graduate programs. For these reasons, we consider the perception of faculties to be an influential factor to be studied for this research, as they are the central point of contact and decision-making for any graduate student. They are also a major support system to graduate students and play a pivotal role in steering their academic and professional journey. The role of faculty goes beyond providing academic guidance; they also assist with funding opportunities, mentor students, evaluate progress, advocate for their well-being, and connect them with relevant resources. They help graduate students navigate their programs and achieve their academic and career goals by offering support, encouragement, and constructive feedback. This is why it is essential to comprehend their opinion of the GRE as a graduate school application component for MS/Ph.D. programs.

Background

Nearly all studies on the GRE as an admissions component have focused on its predictive validity for graduate students' success in terms of grades, time to degree completion, advisor rating, and peer-review publication ratings, among other graduate student success metrics. Kileger et al. [3] adopted a multivariate approach to measuring the predictive validity of the GRE and observed a notable value of the GRE for predicting grades in graduate school. More specifically, Wang [4] carried out a study to assess the predictive power of the GRE for graduate engineering programs and discovered similar results observing higher variance in the predictive power of quantitative and verbal reasoning scores for domestic students. Similarly, Howell, Sorenson, and Jones [5] evaluated the predictive validity of the GRE for mechanical engineering students' performance in graduate school. They measured student performance in terms of grades, time to graduation, advisor, and peer review publication rating and reported the quantitative score of the GRE to be a valid predictor of graduate school success. However, they recommended the use of other subjective measures like letters of recommendation and interviews for the admission process as the GRE quantitative score only measures a student's ability which accounts for a fraction of graduate school success determinants. Rockinson-Szapkiw, Bray Jr, and Spaulding [6] in their study on the GRE score predictive validity in doctoral education also discovered the GRE writing score to be a strong predictor for graduate students' dissertation completion time.

While these studies focused on various components of the GRE, evaluating their validity in predicting factors postulated to reflect graduate school success, a more recent study by Newman et al. [7] assessed issues with the GRE considering fairness for all demographic of applicants. They discussed trade-offs in graduate admissions application requirement and recommended the use of the GRE as an optional admission requirement. While these studies have attempted to indicate the effectiveness of the GRE using well-defined metrics that could be considered objective, we argue that the most impactful factor in how the GRE is used in graduate programs (including engineering programs) is the perceptions of engineering faculty, who play a significant role in admitting and sponsoring students. There has been little research (if any) assessing faculty perceptions of the GRE despite their role and impact in graduate studies. Our research thus aims to investigate the views of faculty members on the usefulness and effectiveness of the GRE as a tool for evaluating the qualifications of graduate school applicants. The research examines the degree to which faculty members believe that the GRE accurately measures the skills and abilities that are important for success in graduate-level studies and evaluates their perceptions of the test as a fair and unbiased assessment of applicants. Additionally, we explore concerns or criticisms faculty members have about using the GRE as a graduate school application component.

Methodology

Our research employed a two-phase, sequential, explanatory mixed methods approach [2] for collecting data to address the research questions at hand. The first method involved an online, primarily quantitative survey distributed to College of Engineering faculty members at the (anonymized). The survey aimed to gather information about the demographic characteristics of the participants, as well as their general beliefs about the GRE. In addition to providing a broad

overview into the range of faculty opinions on the GRE, the online survey served primarily as a recruitment tool for purposive sampling for participation in focus group interviews during the second phase of the research. The survey covered a range of topics to gather comprehensive data and faculty were instructed to fill out the survey only if they were willing to participate in a follow-up focus group. Table 1 exhibits the survey questions.

Table 1: Survey Questions

DEMOGRAPHIC QUESTIONS	
1	What is your gender/gender identity?
2	Do you identify as a member of the LGBTQ+ community?
3	Please indicate the racial or ethnic groups with which you identify
4	Which best describes where you were born and raised?
5	Do you identify as a person with a disability?
6	Which of the following best describes your primary role in the College of Engineering?
7	Are you a full-time or part-time faculty member?
8	How many current and former graduate students have you advised (Ph.D. + Thesis M.S.)
PERCEPTIONS OF THE GRE	
1	Are you familiar with the GRE structure?
2	Which Engineering Degree-Granting Program are you affiliated with?
3	In my opinion, the higher the GRE score, the higher the student's ability to succeed in their graduate program of study.
4	In my opinion, the higher the GRE Score, the higher the student's aptitude.
5	In my opinion, the higher the GRE Score, the higher the student's GPA will be in their graduate program of study.
6	In my opinion., I believe the GRE is a useful requirement for admission to MS Thesis and Doctoral programs?
7	Briefly describe why you believe the GRE is (or is not) a useful requirement for admission to MS Thesis and Doctoral programs?
8	Which of the following GRE scores do you believe are useful for the admissions process? (Please select all that apply)
9	I believe GRE is a barrier to graduate program accessibility concerning Diversity, Equity, and Inclusion.

The focus group interviews were designed to delve deeper into the topic of graduate admissions, with a particular emphasis on why faculty members held their reported beliefs about the GRE. Focus groups consisted of 3 or 4 engineering faculty and were assembled based on similar responses to the survey. We ended up with three groups with the following shared beliefs within each group: (1) the GRE is useful but also a significant barrier to DEI; (2) the GRE is sometimes narrowly useful and is a barrier to DEI; and (3) the GRE is of no value and a barrier to DEI. The interviews were openly structured, beginning the conversation with a background information, asking faculty to describe the admissions process and their perceptions about the role of the GRE in that process, and using an interview guide to ensure each conversation addressed a list of specific topics. The guide, shown in Table 2, used in these focus groups was crafted to elicit information about faculty perceptions of the role of the GRE as an application component for graduate admissions. The guide also aims to understand the current status quo and faculty perception regarding using the GRE in the admission process.

Table 2: Interview Guide for Focus Groups

Background information

- Can you start by telling me about the program you belong to? (Probes: How long have you been in the program? What does it entail?)
- How involved are you with the admission process? (Probes: talk about role in the admission process)

The Graduate Admission Processes (topics to cover during conversation)

- Describe the process as you know it
- Importance of the GRE in the process – status quo, your perception
- Pros of the GRE
- Cons of the GRE
- Inclusivity of the GRE

Concluding Script

- Is there anything else you wanted to discuss or say that we didn't cover during our conversation today?

The data collected from the focus group interviews were then coded using an open coding scheme, following a thematic analysis process to group codes and identify patterns among focus group responses [8, 9]. This analysis aimed to provide a more nuanced understanding of the research questions being examined and to identify any key factors that may influence faculty perceptions of the GRE.

This paper covers the results from all three focus groups: One whose participants perceived the GRE as having no value in the admissions process, another that perceived the GRE was narrowly useful in some circumstances (e.g., as a quantitative filter for an untenable number of applications to review), and the last group whose participants had a positive perception of the GRE while acknowledging the significant barrier it poses to DEI. Overall, all of the focus group participants believed the GRE to be a significant barrier to diversity, equity, and inclusion. We believe these results stand on their own.

Results

Each theme from results will be headed by a short quote from the focus groups that summarizes the theme in participants' own words. We will then elaborate on each finding and provide a longer supporting quote as evidence from our data.

"The GRE is Missing the Research Component"

Faculty in first two focus groups believed that the GRE does not directly measure research experience or aptitude, an essential factor for success in engineering MS Thesis and Ph.D. programs. While the skills measured by the GRE—verbal reasoning, quantitative reasoning, and analytical writing—could be indicative of a potential for success in graduate school, they do not necessarily directly translate to research skills. This is a disadvantage to engineering program

applicants with solid research experience who may not perform as well on the GRE test. In these cases, it may be frustrating for applicants to feel like their research experience needs to be given more weight in the admissions process than the quantitative GRE score. As one participant expressed:

> *I don't know if this falls in pro or con, it probably depends on how you're looking at it. And I think I see it more as a con. […] When I look at the GRE score, and that idea of, "they're a good test taker," I'm like, "okay, they'll probably do well in courses." But if I'm trying to hire somebody, and it's on that research component, I don't think the GRE is actually reflected on that research component. It's reflective on their ability to do well in courses. So maybe that's viewed as a good thing for courses. But when I'm hiring a student, the focus is on research.*

"The GRE is Just Another Data Point"

Faculty from the focus groups that felt the GRE could be narrowly useful stressed that the quantitative score of the GRE cannot be used to know what the students bring as holistic qualities to be successful in graduate school. For example, some professors may place too much emphasis on the quantitative score without considering the other aspects of the exam and admission requirements. This can result in overlooking qualified applicants who may have lower quantitative scores but excel in other areas. In addition, some professors may need to familiarize themselves with the structure of the GRE and what it is testing. This can lead to a better understanding of how to interpret the scores and use them to make informed decisions about admissions. One participant summed this sentiment up well:

> *My point of view is just that it's another metric to use for assessment. It's just another data point. I don't think it's the be-all, end-all of the application. But it's just another thing to reference. For me, the way I look at standardized testing is they have the ability to understand how standardized testing happens, like you learn how to study for an exam is how I see standardized testing, which is still a skill set. But […] I don't think that's the only skill set you need to get into grad school.*

One Faculty group agreed that the GRE is an important requirement in the admissions process, like any other prerequisite. However, another faculty group thought of the GRE as just another data point in a prospective student's application, and they suggested that administrators in charge of engineering and the admissions committee should evaluate each application requirement holistically. Collectively all the faculty members' opinion of the GRE is a helpful benchmark for comparing one applicant's performance against others.

"GRE Favors Strong Test-Takers and Wealthier Individuals"

Faculty from all groups expressed a belief that GRE is more accessible for some individuals to take than others, as some individuals may be better at taking tests or be socioeconomically advantaged. One criticism of the GRE is that it primarily benefits "good test takers" who can score well using their knowledge of test-taking strategies more than their knowledge or understanding of the subject matter of the test. Faculty members critiqued the GRE because it is

expensive, making it difficult for individuals from lower-income backgrounds to take the test. The cost to take the GRE can vary depending on the region, but it typically ranges from $205 to $255. For students already facing financial challenges, faculty acknowledged this cost can be prohibitive and limit students' ability to apply to graduate programs requiring the GRE. The costs of study materials and preparation courses were also cited as barriers. As one faculty member said:

> *From my point of view, [a] con is the cost to take the GRE. I know there's different programs to help get around that. I know for myself at the time when I was a senior, I was like, "okay, I'm either taking the GRE or I'm taking the FE." I took the GRE. [I] still never got around to taking the FE, but I was [still] finding myself at that point. And I wasn't going to drop a couple hundred [dollars] on both tests to take them at the same time. So I see that as being a con. Also people who aren't good test takers. There's a flip side of that coin of people who are good test takers so just recognizing that goes both ways as a pro and con here. I personally fall in that "bad test taker" category, so I can at least sympathize.*

"The GRE Creates Barriers"

Faculty from the focus group who saw little value in the GRE also expressed that GRE can by inaccessible for students in ways beyond its cost and preparation requirements. First, the cost of taking the GRE is a barrier for many students, particularly those from lower-income backgrounds. In addition to the cost, traveling to a testing center can be challenging, especially for those in rural or remote areas. Depending on their location, students may need to travel long distances to find a testing center, which can be costly and time-consuming. The COVID-19 pandemic has led to the introduction of the GRE General Test at-home option, allowing students to take the test from their homes. While this may seem like a solution to the travel and cost barriers, this option also requires a stable internet connection and a quiet testing environment, which may only be feasible for some students. For example, students from rural or low-income areas may need access to reliable internet, while students in shared housing may need a quiet space to take the test. The faculty members held the opinion that the GRE poses challenges related to inclusivity and accessibility factors. Therefore, they emphasized the importance of incorporating a holistic rubric within the system to alleviate some of the disparities that may arise w*hen the GRE is a requirement for admission.*

> *The GRE presents hurdles to the student economically and logistically; to get to the location of the testing center you know, how many days you (the student) have to travel just to get there (testing location), he (the student) probably does not have a good internet connection [.....] We have to be empathic with them.....*

In addition to the above themes, we observed a consensus about the GRE's quantitative, standardized, and objective nature and the drawbacks it presents from most of the faculty interviewed. While these variables could serve as helpful performance indicators across varied candidates and institutions, thus speeding up the decision process by eliminating lower-scoring candidates, it only benefits the admission committee in terms of time and effort. The faculty members, however, commented that the benefits and drawbacks of the GRE should be

considered in its usage for graduate admissions to ensure a diverse pool of graduate students. In illuminating faculty members' perceptions of the GRE, our study offers a helpful starting point for further analysis, creation, and implementation of a comprehensive graduate admission rubric.

With interviewed faculty ranging from teaching to research to administrative faculty, we were able to garner similar perspectives expressed in separate ways. As one faculty group emphasized the importance of the GRE as only another additional data point in the graduate admission process, another faculty group reiterated this perspective by highlighting the importance of one-on-one interactions via interviews with prospective students beyond quantitative measures. The knowledge of faculty on the testing objective and structure of the GRE was further stressed.

Based on our initial interview session, we incorporated an additional question into our interview protocol on whether the GRE should remain optional or be made mandatory in the graduate admission process. All the interviewed faculty thought the GRE being an optional requirement was the worst-case scenario for admissions. They also mentioned it as a confusing factor for both students and faculty. Students could either get deterred from applying for admissions or expend unavailable resources to take the test with the assumption that it would increase their chances against other students who do not submit the test, thus posing a negative impact on the diversity of the applicants' pool. At the same time, faculty could view students who took the test as having more significant potential. It was suggested that a definite decision be made on using the GRE for a more equitable graduate admission process. One interviewee expressed this opinion well:

> *In my mind, if you have a system that does not require it [the GRE], and it's optional, then we're human beings; if someone submits a GRE, and it's a really good score, we're going to be influenced by whether it's required or not. I think that, if you get a really bad score, you're not going to submit it. […] So, we're only get to see really good scores. […] I think what we have now [the GRE being an optional admissions component] is the worst possible world where it's up to the student to decide.*

Discussion

It's important to consider these differing opinions and perspectives when evaluating the role of the GRE in admissions processes. While some may view it as a valuable tool for assessing a student's readiness for graduate-level coursework, others may see it as a barrier that unfairly disadvantages certain groups of students. The focus group was conducted with participants familiar with GRE, either through their roles in recruiting and advising graduate students or as recent graduate students. The focus group participants shared their opinions on GRE. They noted that it could be a barrier to inclusivity and does not test research skills. This suggests that the participants believe that GRE may not accurately assess the skills and knowledge required for success in graduate school. Additionally, they noted that GRE could be a barrier to inclusivity, which may suggest that they believe the test could be biased or disadvantage certain groups of students. It is important to note that these opinions are based on the perspectives of a specific group of people and may not reflect the views of the entire faculty population or the broader community of graduate students.

Nonetheless, the feedback from the focus group can be valuable in identifying potential issues with GRE and informing discussions about how to address them. Overall, the GRE scores can be a helpful tool for assessing applicants and saving time during admissions. However, committees must comprehensively understand the test and its purpose to make fair and informed decisions. A shift towards a more holistic approach to admissions can help to create a more equitable and accessible graduate school application process, but engineering program leaders must consider how such a shift will affect other aspects of the admissions process, such as the resources required. An institution cannot suddenly shift to a holistic evaluation approach and expect the same number of faculty or staff to handle the higher workload effectively.

We plan to use the results of this study to design a more comprehensive survey that can capture the perspectives of a wider breadth of faculty at our institution and other institutions. As more institutions adapt to a post-pandemic education environment, more colleges of engineering will need to consider if they will continue the COVID-inspired waiver of GRE scores permanently, stop requiring it altogether, or find a solution between the two extremes. Understanding how the GRE is used by faculty is an important first step for making that decision in an informed matter, as understanding any current system is key first step to changing it for the better [10].

Conclusion

This study examined engineering faculty perceptions of the GRE as an admission requirement for graduate school admissions. These faculties expressed that the GRE failed to capture the skillsets most valuable to graduate-level research. Therefore, it should be considered one narrowly practical data point among many in admissions-related decisions. They also discussed the GRE as a significant barrier to diversity, equity, and inclusion, especially for students who are socioeconomically disadvantaged or located far from testing centers. The benefits of the GRE were discussed at the focus group interviews with faculties, notably the time savings for bulk applications.

Nevertheless, it was also acknowledged that relying solely on the GRE as a data point in admission metrics has limitations. These results highlight the barriers of the GRE in recruiting a diverse range of capable students but also highlight a need to understand the affordances of the GRE that would be missed if it were entirely removed as an admissions requirement. They will also allow us to design a survey that will allow us to capture a wider breadth of opinions in future work. The study also highlighted the importance of effective communication and knowledge transfer to ensure a comprehensive understanding of the GRE among faculty members. Finally, whether the GRE should be optional or mandatory in the admission process was discussed. Most faculty members expressed dissatisfaction with the GRE being an optional application component and called for a definitive decision to be made regarding its requirement or abolishment as a requirement.

According to Barker et al. in "Work in Progress: A Holistic Ph.D. Admissions Rubric--Design & Implementation," it is essential to use evidence-based best practices and a holistic graduate admissions rubric to broaden applicant pools and guarantee that all students have an equal chance to succeed, regardless of their background--the Holistic Ph.D. Admissions Rubric, which examines applications using better predictors of success like research potential, motivation, and

leadership, is introduced by the authors after they point out the drawbacks of traditional quantitative admissions criteria like the GRE and GPA [11]. Prospective students should be informed of such a rubric's existence and program-specific evaluation procedures to increase their chances of being accepted and succeeding.

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