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Effective Strategies for New Faculty from the Perspective of an Assistant Professor in the Early-Career Stage

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Effective Strategies for New Faculty: Insights from an Early-Career Assistant Professor

Abstract

This paper presents a comprehensive examination of effective strategies tailored for new faculty members, as seen through the lens of an assistant professor in the early stages of their academic career. Drawing from personal experiences and observations, this paper delves into crucial strategies for success in teaching, research, and service, offering essential principles to guide new faculty members toward a successful start in academia. The paper discusses strategies for teaching across various undergraduate levels, establishing and cultivating research groups within undergraduate-focused programs, and actively engaging in service roles within the academic community. Additionally, it emphasizes the importance of advising, mentorship, self-care, and achieving work-life balance, particularly with regard to the unique experiences and challenges faced by female faculty members. By providing practical tools, resources, and best practices, this paper aims to empower new faculty members to navigate the complexities of academia confidently, fostering personal and professional growth while enhancing the educational and research experiences of their students and colleagues.

1 Introduction

The transition into academia as a new faculty member marks the beginning of a challenging yet rewarding journey[1]. For many individuals, this period represents a significant shift from the role of a student or postdoctoral researcher to that of an educator, scholar, and contributor to the academic community. As new faculty members navigate the complexities of their roles, they encounter various responsibilities and expectations, ranging from teaching and research to service and mentorship. Effectively managing these demands while striving for excellence in each domain is essential for establishing a strong foundation for a successful academic career.

In recognition of the unique challenges faced by new faculty members, this paper aims to provide practical guidance and insights from the perspective of a female assistant professor in the early stages of their academic journey. Drawing upon personal experiences, observations, and scholarly literature, this paper offers a comprehensive examination of strategies for success across various aspects of academic life. Throughout this paper, we will explore essential strategies for success in teaching, research, and service in undergraduate-focused programs. From designing engaging and inclusive learning environments to building research groups and contributing meaningfully to

the academic community, new faculty members will find practical guidance and actionable insights to enhance their effectiveness and impact. Additionally, this paper will address the importance of mentorship, self-care, and work-life balance, recognizing the critical role these factors play in sustaining a fulfilling and sustainable career in academia.

2 Strategies for Effective Teaching

As a new faculty member steps on their teaching journey, they will inevitably encounter challenges that align with their passionate commitment to education. These challenges may arise from the inherent complexity of the teaching process and the diverse array of responsibilities that come with the role. Grounded in a deep commitment to education, the new faculty's teaching philosophy will foster a dynamic and interactive classroom environment, which will emphasize imparting theoretical knowledge, instilling critical thinking skills, creativity, and a lifelong love for learning.

2.1 Preparation of courses

Adequate preparation for faculty in undergraduate level courses is paramount as it directly impacts the quality of instruction, time management, and student engagement. Well-prepared courses can deliver clearer explanations, manage time efficiently, and create interactive learning experiences, catering to diverse student needs and encouraging critical thinking. There are several aspects that new faculty should pay attention during the preparation.

2.1.1 Designing effective syllabi

Syllabi serve as a contract between instructor and students. New faculty members should ensure that their syllabi communicate course objectives, learning outcomes, grading criteria, and policies in a transparent and accessible manner. Providing students with an alternative lecture schedule can also show an outlining key date for assignments, exams, and other important milestones. This clarity enables students to plan their study schedule effectively, manage their time efficiently, and stay on track with coursework.

2.1.2 Laboratory Design and real-world connection

Designing laboratories with stronger connections to real-world examples and theoretical knowledge involves several strategies, including selecting experiments and activities that reflect authentic scientific practices and applications relevant to industry or research fields. For example, using the commercial available software which students will use in their future career; integrating case studies, simulations, or hands-on projects that mirror real-world problems and scenarios, alongside incorporating modern technologies, equipment, and techniques used in industry settings.

2.1.3 Assessing student learning outcomes

Various indicators can be employed to assess and evaluate the learning outcomes, including students' performance in laboratories, completion of homework assignments, and examination results. Designing homework assignments and quizzes for new faculty involves careful consideration of their purpose, format, guidelines, and feedback mechanisms. Varied question types and complexity levels should be employed to accommodate diverse learning styles and abilities. Regular review and revision based on student feedback and assessment data are necessary to ensure continual improvement in supporting student learning and achievement. Grading rubrics may vary from professors and also different types of courses, here are some personal examples provided.

- For my entry-level circuits course, with the emphasize on both practicing and accuracy, the students will receive 100% for correct answer with work;70% for incorrect answer with work; percentage will vary from 70% to 0% based on the attempts; and 0% for not attempted.
- For the higher-level antenna course, I will provide the final answers to the students and some of the homework involves MatLab coding or designing, the rubrics will change and most focus on efforts but not the accuracy.
- For lab courses, lab reports focus on the data presentation, however all sections should be included for professionalism: the introduction (10%), procedures (10%), results and discussion (50%), conclusion (20%), and grammar/professionalism (10%).

2.2 Creating inclusive learning environments

Establishing and sustaining an environment dedicated to fostering diversity, equity, and inclusion is crucial for the well-being of all community members and is foundational to the success of students. At the beginning of each quarter, new faculty should make it a point to discuss the diversity and inclusion statement with students during the first lecture and incorporate it into all course syllabi. Students should be actively encouraged to voice their thoughts or reach out to faculty members individually if they encounter any discomfort or concerns. New faculty member can try to engage in their classes to create a more inclusive environment by utilizing the following methods:

- Generate a photo roster of all students, incorporating their preferred pronouns to respect individual identities.
- Distribute an introductory questionnaire during the initial lecture includes a query about students' preferred pronouns and backgrounds, promoting inclusivity.
- In courses with group work, use random group generator to change lab partners weekly, fostering a fair environment, encouraging communication, and facilitating mutual assistance among students.
- Provide some level of extension for homework assignments and exhibit adaptability in cases involving emergencies or medical issues.

- Proactive in identifying and implementing accommodations for students with disabilities to ensure equal access to education
- Ensure a diverse representation within the group of teaching assistant if exists, actively avoiding biases during tutoring and grading to maintain fairness.

2.3 Student Engagement and active learning methods

New faculty member should utilize evidence-based learning approaches to enrich the educational experience for students and aim to optimize learning outcomes and foster a more engaging and effective classroom environment[2][6]. There are several approaches can be used in classes:

- Multi-source teaching: Encompass a combination of slides, whiteboard illustrations, short videos, and dedicated Q&A sessions within the lecture. This varied presentation style aims to prevent students from experiencing a lack of concentration.
- In-class exerices: Each class can incorporate diverse in-class exercises, including multiple-choice questions, true or false statements, and direct or sequential problem-solving tasks.
- Flipped classroom: Post lecture videos sourced from online platforms and integrated additional materials from reference books to offer a range of perspectives.
- Peer-teaching: Upon addressing a question from a student, encourage that individual to share the explanation with peers who may have had a similar question.
- Collaborative Learning: During the in-class exercises and labs, students should be encouraged to collaborate in pairs, engaging in discussions or jointly solving problems.
- Research presentations and Q&A from peers: Student should be encouraged to ask questions and actively contribute feedback to their peers' project or research outcomes

2.4 Continuous improvement

Engineering education should provide a rigorous theoretical base uponwhich innovation is fashioned and promote active student involvement. New faculty members should be committed to a continuous process of refinement and enhancement guided by the feedbacks. Pedagogy is perceived as an art that involves lifelong learning for both students and educators. The essence of successful teaching lies in ongoing self-reflection and the proactive implementation of adjustments.[9] New faculty members should improve their teaching methods and other things related by frequent self-assessment and incorporating input from students, feedback from peers, and extracurricular observations.

Here are several examples of improvement provided from my own classes, which can explain the methodology and pathway.

2.4.1 Feed back from students

- After receiving an email from students during the middle of the quarter regarding to some vaguely defined grading rubrics, I made a more detailed grading rubrics together with the TAs for homework and lab reports and used the same standard for the continuing course.
- After first midterm exam of one course, I added two more exercises related to topics which the students showed some weakness, and posted some extra resources on Canvas.
- After receiving feedback from the students that they want more detailed feedback from the homework. I requested the TA to publish a summary addressing common issues, which I will discuss during lab sessions.

2.4.2 Suggestions from peers

One of my colleagues suggested me to clearly state the intended learning goals for the day after observation my lecture. Upon receiving the recommendation, I incorporated the first objective page and the last summary page onto every lecture slide. Additionally, I commenced each class by informing the students about "the goals for today".

Several my colleagues recommended incorporating group problem-solving and think-in-pair activities to enhance comprehension, as well as establishing connections between theoretical concepts and real-world applications for practical relevance. In response to this feedback, I have integrated group discussions into the in-class exercises to foster collaborative learning.[8] Additionally, I intend to introduce Jigsaw questions, wherein students will be divided into small groups, each tasked with mastering a specific segment of the material. Subsequently, members from diverse groups will convene to discuss and share their knowledge, facilitating a comprehensive understanding of the topic.

2.4.3 Extracurricular development

In the pursuit of continuous improvement, reviewing more several ASEE conference papers can help new faculty to explore novel teaching techniques aimed at creating a more interactive learning environment for students. New faculty members should be encouraged to observe senior faculty's classrooms to glean insights and learn from their teaching approaches. Through these observations and subsequent discussions, new faculty can integrate some of their effective techniques into their own courses to enhance overall quality.

2.5 Self-assessment

Engaging in self-assessment after receiving course evaluations offers numerous benefits for new faculty. Through this process, new faculty can boost confidence by acknowledging their strengths and accomplishments while also acknowledging areas for growth, fostering a deeper understanding

of their teaching practices. The conduction of self-assessment from one course evaluation can follow these three steps:

1. Demonstrate all the contributions: this should include remodeled or new designed teaching materials, novel teaching methods, and the fulfillment of learning outcomes
2. Summarize student feedback: strength, weakness and other comments should are be considered. Here is an example:

Please identify what you consider to be the strengths of the course/section	**Please identify area(s) where you think the course/section could be improved**
well organized and put solution and assignments on Canvas in a timely fashion	lab expectation was not clear
The balance between homework, lectures and labs are really nice and worked with the topics covered by each	leave more time for students to take note
Professor was good at presenting strategies/methods used to solve the many different types of problems. Steps to take were clear.	Homework was a little bit difficult compared to the in-class practice
lots of practice and tests are effective Critical thinks, problem solving and teamwork skills were developed	grading rubrics was not clear at the beginning sometimes go fast and a little bit rush on topics
Other Comments: • The professor was very interactive and make sure to get feedback as she went. It never felt like she was just teaching at us, we were a part of the process • The lab time is useful as a physical demonstration of the course principles • The professor was highly knowledge in the subject and were always willing to answer any question in a way that was easily understandable	

Table 1: Student feedback summary

3. Future improvements should be enumerated as reflections on the weaknesses. The response to the previous table was shown as follows:
   - I plan to establish more explicit expectations and grading rubrics for homework assignments and labs, providing students a clearer understanding of the evaluation criteria.
   - I will implement pre-reading assignments, ensuring a smoother comprehension of lecture materials and facilitating more active engagement during class discussions.
   - I will adjusting some of the in-class exercises to present a slightly higher level of difficulty will strategically aid students in tackling homework challenges.
   - I will allocate more time for the students taking note and thinking

3 Research Development

For faculty members, staying actively involved in research is essential to remain at the forefront of engineering advancements. Keeping abreast of the latest developments in engineering enables new faculty to enhance the relevance of lectures, thereby becoming a more effective educator for students. To navigate this process effectively, new faculty members can engage in various strategies for research development.

3.1 Identifying Research Topics

New faculty members should focus on defining their research interests and goals. As a starting point, most of the new faculty members may choose to continue their graduate studies and explore novel topics by conducting a thorough review of existing literature, identifying gaps, trends, and emerging areas of interest within their field. By staying informed about current research developments and debates, faculty members can identify opportunities for innovative research and scholarly contributions.

3.2 Building Research Groups

Building research groups in undergraduate-focused programs presents unique opportunities and challenges. New faculty member can attract interested participants by attending departmental events, host information sessions, and reach out to student organization as well as point out your reseach interest during lectures and find connections. They can promote research by offering independent study courses to the students and highlighting the opportunity to gain hands-on experience, develop critical thinking skills.

3.3 Collaborative Opportunities

Building collaborations and networking within their academic community is essential for research development. New faculty members can attend conferences, seminars, and workshops to connect with other researchers in their field and explore opportunities for collaboration. Additionally, new faculty members can seek collaboration, internal scholarship, funding or grants with their colleagues within their institution. Collaborating within the institution facilitates easier communication and coordination, as colleagues are typically accessible on campus and familiar with the institutional resources, such as specialized laboratories, equipment, and support services.

3.4 External Funding

Securing external funding is essential for supporting research projects and advancing one's academic career. New faculty members can explore various funding sources, including government agencies

such as National Science Foundation (NSF) and Office of Naval Research(ONR), private foundations, and industry partnerships. NSF also provides specific funding opportunities called Faculty Early Career Development Program (CAREER) for new faculty only. New faculty members can attend workshops and short courses provided during conferences and IEEE society, which will provide quantities of information on how to write a high-quality proposal and grant. Seeking guidance and feedbacks from experienced colleagues, mentors, or grant writing professionals to a rapid start and refine your research proposal can identify areas for improvement, ensure clarity and coherence, and strengthen your funding application.

3.5 Capstone Projects and Publications

Engaging students in capstone projects and facilitating publication opportunities are integral components of undergraduate-focused research programs. New faculty members involve into the capstone projects that integrate theoretical knowledge with practical applications, allowing students to solve real-world problems and challenges. By providing mentorship, guidance, and support throughout the research process, faculty members can empower students to develop critical thinking, research, and communication skills. Additionally, new faculty members may facilitate opportunities for students to disseminate their research findings through conferences, presentations, and publications, which can promote academic visibility, recognition, and professional development.

4 Engaging in Academic Service

Faculty responsibility encompasses a vital pillar – service to both the university and the broader profession. Academic service encompasses a wide range of activities contributing to the advancement of the institution, the discipline, and the broader academic community. By actively participating in departmental and programmatic service, serving as reviewers for instructional journals and meetings, and engaging in committee work, new faculty can make significant contributions to their educational unit and discipline at the same time as furthering their own professional improvement and scholarly recognition. Additionally, instructional service presents possibilities for networking, collaboration, and leadership development, enhancing the overall enjoy and impact of faculty individuals within the group.

4.1 Department and Program Service

Department and program service involves contributing to the functioning and enhancement of academic units within the institution. New faculty members can engage in departmental service by participating in program and department meetings, serving on committees, and contributing to curriculum development and assessment efforts. By actively engaging in departmental committees and decision-making processes, faculty members can contribute their expertise and perspectives

to the direction of the department. Moreover, new faculty members can also serve as academic advisors and mentors to undergraduate students, providing guidance, encouragement, and support throughout their academic journey. Additionally, participating in program or department-level service, such as advising student organizations and coordinating events, fosters a sense of community and belonging among students and colleagues. By taking departmental and programmatic service roles, new faculty members can contribute to the vitality and success of their academic unit.

4.2 Committee Participation

Committee participation involves serving on institutional committees tasked with addressing various issues and concerns related to academic affairs, governance, and policy development. New faculty members can volunteer to serve on committees such as curriculum committees, faculty search committees, and diversity and inclusion committees, among others. Participating in committee work allows faculty members to contribute expertise and perspectives to institutional initiatives and decision-making. By actively engaging in committee work, new faculty members can play a meaningful role in shaping the future direction and priorities of the institution while gaining valuable leadership experience and professional development opportunities.

4.3 Professional Service

Serving as a reviewer for academic journals, conferences, and funding agencies is a valuable service contribution that enhances the quality of scholarly work within the discipline. New faculty members can volunteer to serve as reviewers for journals and conferences related to their area of expertise, providing constructive feedback and evaluations of submitted manuscripts and proposals. By participating in the peer review process, faculty members contribute to the advancement of knowledge and scholarship within their field while gaining insight into emerging trends and research directions. Additionally, serving as a reviewer enhances faculty members' visibility and credibility within the academic community, establishing them as trusted experts and thought leaders in their respective areas of specialization.

4.4 Community Service

Beyond the classroom and professional activities, participating in service activities allows new faculty to establish meaningful connections with diverse communities, therefore broadening their perspectives and contributing to a more inclusive educational environment. Engaging in community service also provides real-world examples and case studies that can enrich teaching and research activities. Faculty members can incorporate their experiences from community service into classroom discussions, research projects, and service-learning courses, enhancing the educational experience for students.

5 Female Faculty Identification and self-care

Female faculty members in STEM play pivotal roles as both role models and mentors for aspiring female and minority students, showcasing exceptional achievement and leadership within their fields[3][7]. Their presence in critical positions within academic institutions underscores the value of diversity and female perspectives in STEM. Despite the challenges they may face, particularly in academia, female STEM faculty can employ various strategies to navigate these obstacles effectively. These strategies may include seeking out mentorship, fostering supportive networks, advocating for institutional change, prioritizing self-care and work-life balance, and leveraging their unique perspectives and experiences to empower and inspire the next generation of women in STEM. By implementing these strategies, female faculty members can not only enhance their own success but also contribute to a more inclusive and diverse STEM community.

5.1 Creating Supportive Networks and seeking mentorship

One strategy for female faculty in STEM is to establish and maintain supportive networks. Building connections with peers, mentors, and senior colleagues can provide valuable guidance, advice, and opportunities for collaboration and professional development. Mentors can provide valuable insights, share their experiences, and offer guidance on career advancement strategies. Additionally, mentorship can help female faculty expand their professional networks and access opportunities for research funding, leadership roles, and career advancement.

5.2 Developing Leadership Skills

Developing leadership skills is essential for female faculty members aiming to succeed in STEM fields. By actively seeking leadership roles within academic institutions, professional organizations, and research projects, such as IEEE Women in Engineering Society, female faculty can demonstrate their expertise, influence decision-making processes, and enhance their visibility within their respective fields. Leadership positions also provide opportunities to advocate for gender equity and promote diversity and inclusion in STEM.

5.3 Balancing Work and Self-care

Achieving a balance between work and life responsibilities is importance for the success and well-being of female faculty in STEM, especially for new faculty members navigating numerous demands and pressures. Female faculty often navigate complex schedules, managing multiple roles both within and outside of academia. It is crucial for faculty to implement strategies that support their physical, emotional, and mental health. This includes setting boundaries, effectively managing workloads, and seeking support from colleagues and mentors. Engaging in activities like exercise, mindfulness, and hobbies can also help recharge and alleviate stress. Establishing routines and

rituals, fostering social connections, and prioritizing healthy habits are essential components of effective self-care practices. By integrating self-care into their daily lives, new faculty members can enhance resilience, productivity, and overall quality of life, ensuring they can successfully navigate their academic careers while prioritizing their personal well-being.

5.4 Gender Equity

Female faculty members can contribute to fostering gender equity in STEM by actively advocating for policies and initiatives that promote diversity and inclusion. Examples include volunteering on internal committees examining gender disparities in hiring, promotions or resource allocation and recommending improvements; collaborating with professional associations spearheading development of policies and codes of conduct discouraging subtle biases; speaking at conferences to illuminate challenges and invisible obstacles confronted by women in underrepresented roles.

Additional high-impact avenues include mentoring female students through obstacles, vocally questioning assumptions limiting opportunities for women scholars during decision-making discussions and supporting initiatives at departmental or university levels aimed at actively recruiting, retaining and elevating exceptional female talent. By raising awareness of gender biases, advocating for equal opportunities, and supporting initiatives aimed at recruiting and retaining women in STEM fields, female faculty can help create a more inclusive and equitable environment for future generations of scholars.

Success in STEM fields requires female faculty to navigate various challenges, including gender biases, work-life balance issues, and limited opportunities for advancement. However, by implementing these strategies, female faculty can overcome these obstacles and success in their careers.

6 Conclusion

This paper provides a comprehensive demonstration of effective strategies for new faculty members, including teaching, research, service, mentorship, and self-care. By embracing the strategies proposed in this paper, new faculty members can become effective and rapidly adopt to their new teaching and service roles. They can navigate the challenges of academia with confidence, fostering personal and professional growth while enriching the educational and research experiences of their students and colleagues. it's crucial for new faculty members to build up their confidence and patience, giving themselves the space to learn and grow over time. Embracing mistakes as part of the learning process and actively listening and practicing are key points for paving the path to success. With dedication and perseverance, there's no doubt that new faculty members can achieve success in the future.

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