2026 ASEE ANNUAL CONFERENCE June 21–24, 2026 | Charlotte Convention Center, NC
Host Sponsor UNC Charlotte
Paper ID #50453

Hobbies as Catalysts: Investigating Informal Skill Development Among Engineering Technology Students

Dr. Anne M Lucietto, Purdue Polytechnic Institute, Purdue University – West Lafayette

Dr. Anne M. Lucietto focuses her research on engineering technology education, particularly on understanding engineering technology students' experiences, learning styles, and career pathways. Her teaching approach emphasizes active learning, engaging students in hands-on activities that build practical, real-world skills. In addition to her core research, she is expanding her work to explore emerging areas within engineering technology, including interdisciplinary collaboration and informal learning influences.

Dr. Diane L Peters P.E., Kettering University

Dr. Peters is a Professor of Mechanical Engineering at Kettering University.

Hobbies as Catalysts: Investigating Informal Skill Development Among Engineering Technology Students

Abstract

Engineering Technology (ET) students often enter their academic programs with diverse informal learning experiences, deeply influenced by their hobbies and familial backgrounds. Previous research by Peters and Lucietto [1, 2] has underscored the significance of these hobbies in guiding students' career decisions and cultivating practical skill sets crucial for their persistence and success in STEM majors.

Building on this foundation, the present study aims to delve deeper into the relationship between hobby-driven skill acquisition, the curriculum of Engineering Technology programs, and industry expectations. Given the constraints of a condensed research timeline, a survey-based approach was employed to identify prevalent hobbies among ET students and investigate the technical and interpersonal skills these activities help develop.

Preliminary anecdotal findings indicate that hobbies such as mechanical tinkering, electronics, gaming, and crafting play a significant role in nurturing essential skills. For instance, mechanical tinkering encourages hands-on problem-solving and critical thinking, while electronics pursuits enhance technical knowledge and proficiency in circuit design. Gaming, particularly strategy-based or simulation games, cultivates spatial reasoning and decision-making skills, while crafting activities promote creativity and attention to detail, both of which are valuable in engineering contexts.

These activities often involve collaboration, fostering teamwork and communication skills, which are vital in academic settings and the professional engineering environment.
This paper presents these preliminary insights and offers practical recommendations for educators and program designers. By strategically integrating informal learning experiences into recruitment strategies, curriculum development, and student engagement initiatives, academic programs can better align with prospective students' skills and interests. Such integration better prepares students for the challenges of the workforce, ensuring they are equipped with both technical competencies and soft skills required in the rapidly evolving field of engineering technology.

Introduction

Students entering Engineering and Engineering Technology (ET) programs often bring with them a wide range of informal learning experiences shaped by personal hobbies, family influences, and hands-on experimentation. These early experiences frequently serve as the first point of contact with engineering thinking, nurturing both curiosity and foundational skills long before students encounter formal coursework. Prior research by Peters and Lucietto [1, 2] emphasizes that such hobby-driven learning not only informs students’ decisions to pursue engineering-related majors but also strengthens the practical competencies that support persistence across both Engineering and Engineering Technology pathways.

Despite this growing recognition, limited research has explored how these informal learning experiences align with the expectations of engineering and ET curricula or with the skill demands of the modern engineering workforce. To address this gap, the present study examines the relationship between hobby-based skill development and the competencies emphasized in Engineering and Engineering Technology programs. A survey-based approach was selected due to the compressed research timeline, enabling the rapid collection of perspectives in a workshop on their hobbies and the technical and interpersonal skills they believe these activities foster.

Data were collected at the SWE Conference in October 2025, where organizers initially anticipated fewer than 100 participants. Instead, the study received nearly 500 responses, an unexpectedly high level of engagement that underscores the relevance of the topic and the enthusiasm of engineering and ET students to share their experiences. This unexpected, robust dataset provides a unique snapshot of students' informal learning backgrounds across both areas.

Preliminary findings suggest that hobbies such as mechanical tinkering, electronics, gaming, and crafting play a substantial role in cultivating skills that mirror those required in engineering and ET fields. Mechanical tinkering encourages iterative problem-solving and spatial reasoning; electronics projects build foundational technical knowledge; gaming—especially strategy and simulation genres enhances decision-making and systems thinking; and crafting activities strengthen creativity, precision, and attention to detail. Many of these hobbies also involve collaborative communities, reinforcing teamwork and communication skills essential to both academic success and professional engineering practice.

This paper presents these early insights gathered at the workshop and discusses their implications for engineering and ET education. By recognizing and intentionally integrating students' informal learning experiences into recruitment, curriculum design, and engagement strategies, programs can better align with the strengths and interests of incoming cohorts. Such alignment not only enriches student learning but also supports the development of graduates equipped with the technical expertise and soft skills demanded by an evolving engineering and engineering technology landscape.

Purpose of the Study

The purpose of this study is to explore how participants' hobbies and informal learning experiences at the Society of Women Engineers (SWE) Conference in October 2025 have influenced their interest in engineering and engineering technology fields, as well as their broader career pathways. Many individuals develop foundational technical and problem-solving skills long before entering formal STEM programs, often through creative and hands-on hobbies. Activities such as knitting, crochet, quilting, and other textile arts require precision, pattern recognition, iterative thinking, and spatial reasoning. Similarly, baking, woodworking, and related craft-based pursuits cultivate planning, measurement, experimentation, and attention to detail—skills that closely parallel engineering mindsets.

This study employed a survey-based research design informed by previous literature and the authors' earlier largely anecdotal exploratory work on the role of hobbies and informal learning in shaping engineering and engineering technology career pathways. Prior studies have

demonstrated that hands-on, craft-based, and self-directed activities contribute to the development of technical competencies, problem-solving skills, and the formation of an engineering identity [1, 3, 4]. These insights guided the development of the survey instrument, ensuring that the questions captured both the nature of participants' hobbies such as knitting, crochet, quilting, textile arts, baking, woodworking, and similar activities and the perceived influence of these hobbies on their educational and professional trajectories.

Methods

The survey consisted of a combination of multiple-choice and open-ended questions designed to gather information about participants' backgrounds, hobby engagement, skill development, and reflections on how these experiences shaped their interest in engineering and engineering technology. To facilitate rapid, accessible data collection, the survey was distributed via a QR code provided to attendees during a workshop at the Society of Women Engineers (SWE) Conference in October 2025. Participants were invited to scan the QR code using their mobile devices and complete the survey during the workshop.

The workshop format allowed for real-time engagement with the data. As responses were submitted, the workshop organizers reviewed the emerging results and incorporated them into an interactive discussion with attendees. This approach enabled participants to see immediate patterns in the dataset, compare their experiences with peers', and engage in dialogue about the role of informal learning in engineering pathways. The facilitators used this time to highlight preliminary trends, answer questions, and encourage participants to reflect on how their own hobbies contributed to their skill development and career decisions

This real-time, participatory method not only enriched the data collection process but also fostered a collaborative environment in which attendees could contextualize the findings and contribute additional insights. The combination of survey-based data and live discussion provided a multifaceted understanding of how informal learning experiences influence engineering and engineering technology career pathways, and interpersonal skills associated with these activities.

Findings

Across the core survey items in the SWE Conference workshop (October 2025), ~379–391 responses per question were recorded (due to item-level variation in non-response and multi-select questions). This provides a robust dataset for examining informal learning, hobby engagement, and perceived career influences among engineering students and professionals.

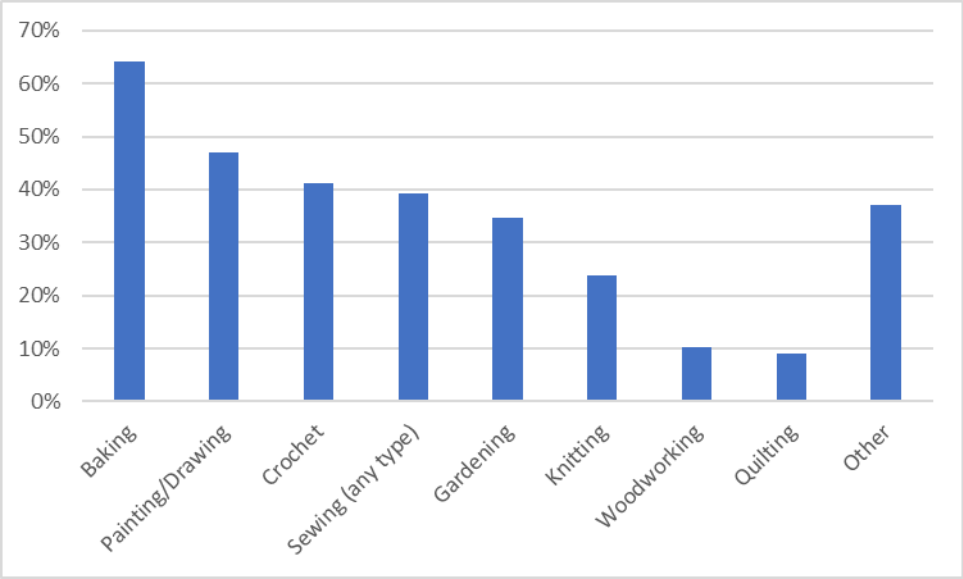

Figure 1: Prevalence of Craft-Based and Hands-On Hobbies (n = 379)

Participants reported broad engagement in craft and hands-on activities, with strong representation across textile arts and other creative pursuits. The most frequent response was Baking, at 64% (n = 243), with Quilting being the least frequent response at 9% (n = 34). The responses are shown in Figure 1.

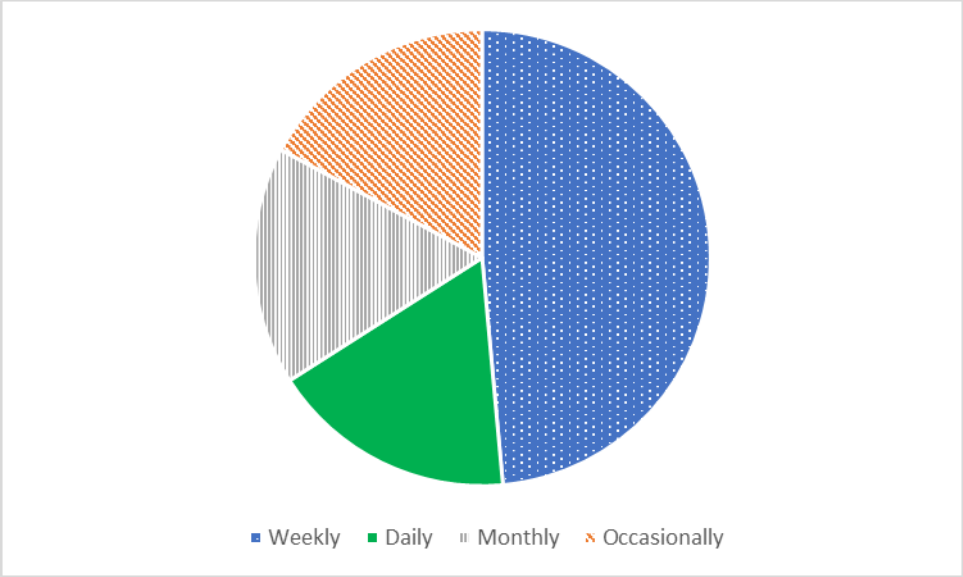

Figure 2: Frequency of Engagement in Hobbies (n = 379)

Almost half of participants reported that they engaged in their hobby weekly, at 49%. Approximately equal proportions, 17%, indicated that they engaged in their hobby daily or monthly, with the remaining 17% indicating that it was an occasional pursuit.

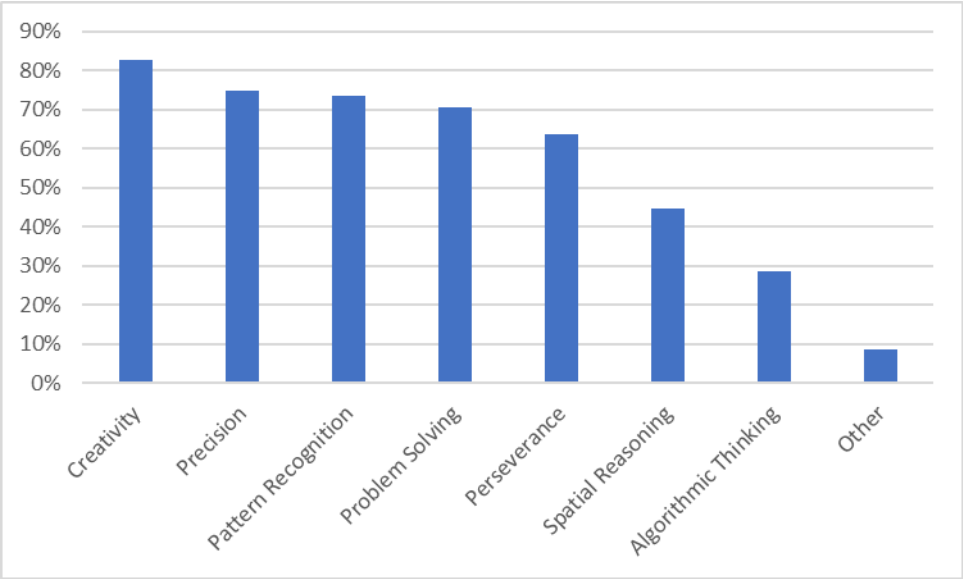

Figure 3: Skill Development Through Hobbies (n = 378)

Participants identified a wide set of STEM-relevant skills gained through their hobbies, with many participants indicating that they gained multiple skills. The most common choice was Creativity, at 83%. The least frequent choice was algorithmic thinking, although that was still chosen by a significant proportion of participants at 29%.

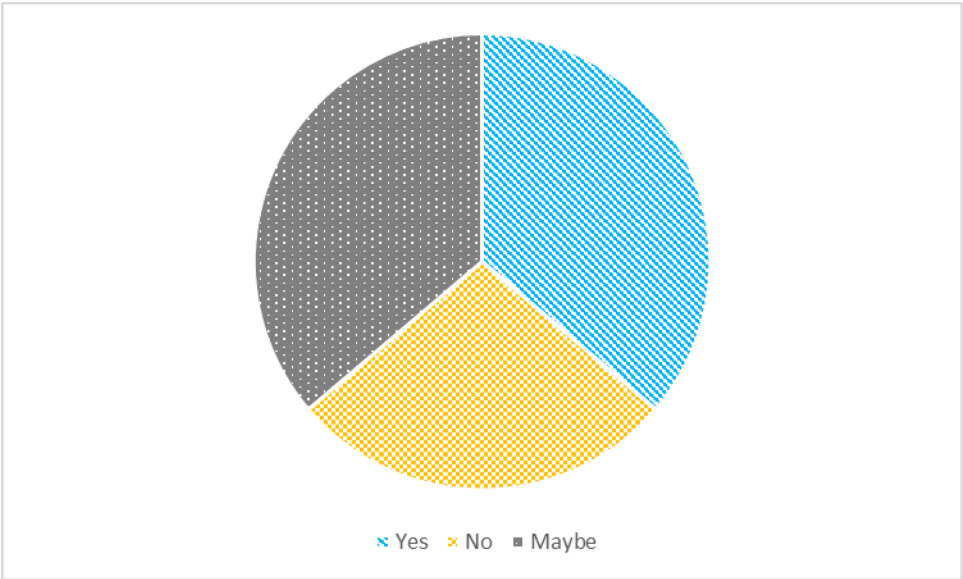

Figure 4: Influence on Career Interest and Identity (n = 381)

Many participants (36%) reported that their hobbies have had an influence on their career interest and identity, with an additional 36% indicating that hobbies may have had that influence; only 28% reported that their hobbies did not have any influence on their academic and career choices.

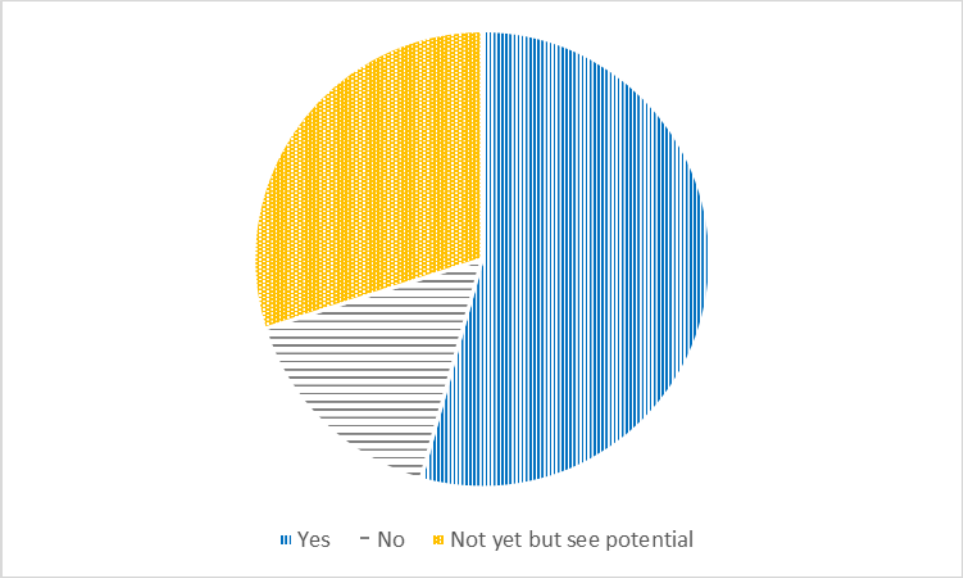

Figure 5: Use of Hobby Skills in Professional or Academic Settings (n = 381)

Over half of the participants (54%) indicated that they used skills from their hobbies in professional or academic settings, while an additional 30% saw the potential for them to do so in the future. The remaining 16% indicated that they had not used these skills in professional or academic settings.

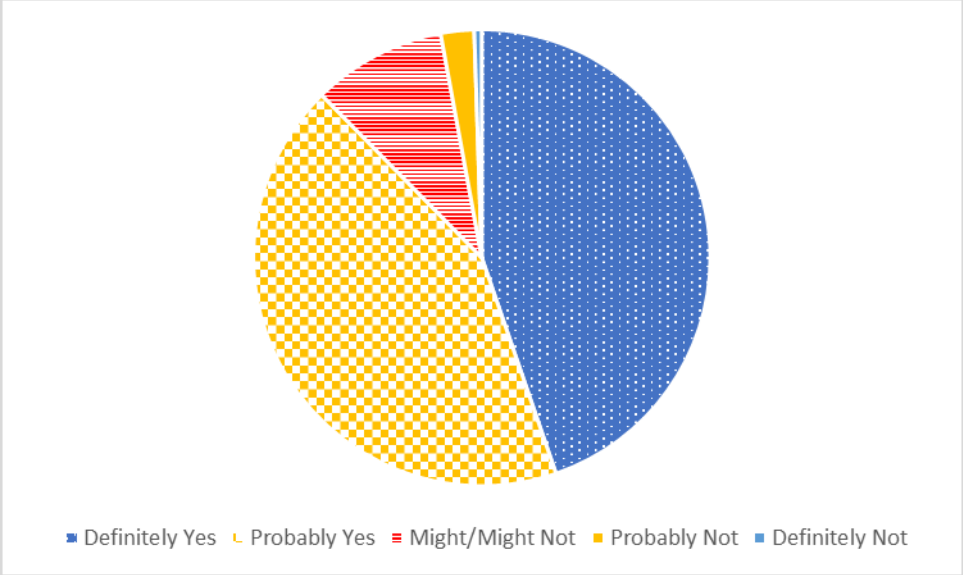

Figure 6: Recognition of Hobbies in STEM Education (n = 381)

When asked if they felt that hobby-based learning should be included in STEM fields, with recognition of the importance of hobbies, participants were supportive. Over 80% were favorable, with 45% saying “definitely yes” and an additional 43% saying “probably yes”, as shown in Figure 6. Of the remaining participants, 9% were ambivalent, choosing “might or might not”, 2% said “probably not”, and only 1% were strongly opposed, choosing “definitely not”.

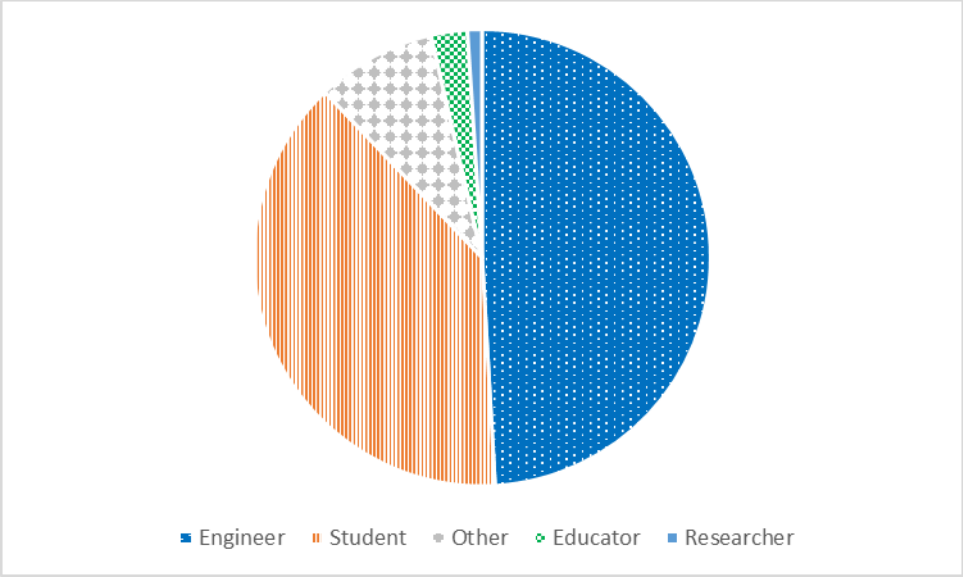

Figure 7: Current Role (n = 389)

The largest proportion of the participants (49%) described their role as “Engineer”, with a substantial number also indicating that they were students (39%). The next largest category was “Other” at 8%, followed by educators and researchers at 3% and 1%, respectively, as shown in Figure 7.

The overwhelming majority of participants identified as female, as shown in Figure 8. A small number identified as male, non-binary, or other, with a few participants preferring not to provide that information.

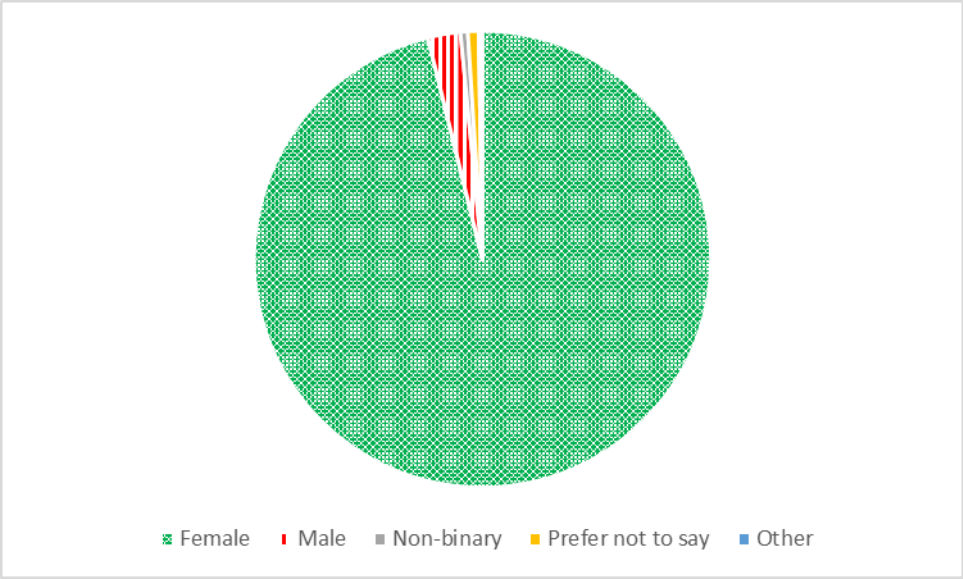

Figure 8: Gender Identity of Participants (n = 390)

Overall Trends

Across items, the dataset shows that informal, hobby-based learning experiences are common and consequential in this SWE workshop cohort. Participants reported wide engagement in craft and hands-on activities, as shown in Figure 1. Many of those hobbies are traditionally associated with women, though this varies across cultures; also, the traditionally male hobby of woodworking was selected by 10% of participants. Within the category of "Other", a number of different hobbies were mentioned, including embroidery, pottery, photography, jewelry-making, music, and others. Many of these were family traditions, as participants reported learning them in childhood or from older family members. The most frequently cited skills, in order of popularity, are creativity (83%), precision (75%), pattern recognition (74%), and problem solving (70%), as shown in Figure 2. All of these map directly to engineering success [1]. In fact, participants often recognized the link to their success, with comments about spatial reasoning linked to sewing and quilting, process control in baking, and tool use and safety in woodworking. Open-ended suggestions (nearly 15 pages of comments) highlight active reflection and discussion during the workshop. Participants s connected quilting to geometry, crochet/knitting to algorithms, baking to chemistry and process control, and woodworking to design and safety. These entries illustrate emergent themes observed in real time as data were reviewed with attendees.

A majority either have used or anticipate using hobby-derived skills in academic/professional settings, as shown in Figure 5. The strong presence of textile arts, baking, gardening, painting/drawing, and woodworking underscores diverse pathways into engineering, fostering technical competence, confidence, perseverance, and identity within the engineering community[5, 6].

Discussion/Conclusion

The results of this study highlight the significant role of informal, hobby-based learning in shaping engineering identity and skill development. The strong prevalence of craft-oriented hobbies such as baking, sewing, quilting, crocheting, and woodworking, among engineering students and professionals, challenges traditional assumptions about STEM pathways. These activities, often learned through family traditions or community engagement, foster technical and cognitive skills closely aligned with engineering competencies, including precision, pattern recognition, problem-solving, and spatial reasoning.

Survey responses indicate that these hobbies are not merely recreational; they serve as informal laboratories for developing transferable skills. More than half of participants reported applying hobby-derived skills in academic or professional settings, and an additional 30% anticipate doing so in the future. This finding underscores the practical relevance of informal learning experiences and their potential to support success in engineering coursework and careers.

The strong endorsement for recognizing hobbies as valuable skill-building experiences in STEM education (88% responding “Definitely yes” or “Probably yes”) suggests an opportunity for educators and program designers to integrate hobby-based learning into curricula and outreach initiatives. Open-ended responses offered creative strategies for bridging hobbies and STEM concepts, such as using quilting to teach geometry or crochet to illustrate algorithmic thinking. These suggestions reflect a broader desire to validate diverse learning experiences and leverage them to enhance engagement and persistence in engineering fields.

In conclusion, this study contributes to a growing body of evidence that informal learning through hobbies is a powerful, yet underutilized, mechanism for fostering technical competence, creativity, and confidence. By acknowledging and integrating these experiences into STEM education and recruitment, educators and employers can broaden participation, enrich skill development, and create more inclusive pathways into engineering. Future research should examine the longitudinal effects of hobby engagement on career progression and investigate how structured programs can effectively leverage these informal learning experiences to strengthen engineering identity and persistence.

References

[1] D. Peters and A. Lucietto, "Traditionally feminine hobbies and engineering aptitudes," (in English), *Frontiers in Education,* Perspective vol. 9, 2024-August-23 2024, doi: 10.3389/feduc.2024.1377534.

[2] A. M. Lucietto and D. Peters, "Editorial: Engineering technology and engineering: incorporating the humanities into the classroom," (in English), *Frontiers in Education,* Editorial vol. 9, 2024-December-20 2024, doi: 10.3389/feduc.2024.1534407.

[3] S. Kaczynski and G. Marvez, "Crafty Engineers: Undergraduate Engineering Students' Perspectives on the Relationship Between their Crafting And Engineering Practices," in *2025 ASEE Annual Conference & Exposition*, 2025.
[4] L. England, "Crafting professionals: Logics of professional development in craft higher education," *Arts and Humanities in Higher Education,* vol. 22, no. 2, pp. 128-147, 2023.
[5] A. M. Lucietto, M. R. Taleyarkhan, T. M. Azevedo, and N. Hobson, L.F., "Math Anxiety in Female and Underrepresented Minority Students: A Literature Review," presented at the ASEE Annual Conference, Montreal, Quebec, Canada, 2020.
[6] R. Everts, E. Hitters, and P. Berkers, "The working life of musicians: Mapping the work activities and values of early-career pop musicians in the Dutch music industry," *Creative Industries Journal,* vol. 15, no. 1, pp. 97-117, 2022.