

Research Article

From Engineering to Counseling: A Case Study of a Taiwanese Female Graduate Student's Change of Major

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Abstract

This case study examined the process through which a Taiwanese female master's student (pseudonym: Alice) transitioned from Materials Science and Engineering (MSE) to a graduate program in counseling. Alice, a 26-year-old woman, studied in an MSE program for one and a half years before deciding to change her academic direction. Following approximately one year of preparation, she was successfully admitted to a counseling psychology graduate program. Data were collected through a single two-hour semi-structured, in-depth interview exploring her experiences of academic and career transition. The data were analyzed using qualitative thematic analysis. The findings revealed several major themes: lack of interest in learning and experimental research, perceptions of becoming a "tool person," doubts regarding learning and research, the influence of developmental history on internal psychological states, critical turning points in leaving MSE and "resetting" career path, valuing the fit between academic major and personal characteristics, receiving support from significant others, and re-evaluating and career change decision. The overall transition process consisted of four stages: awareness, breakdown and redirection, exploration and weighing, and acceptance and reconstruction. Implications for counseling practice and directions for future research are discussed.

Keywords: Female graduate student, Engineering, Counseling, Change of major

Within Taiwan's higher education system, the proportion of female students has steadily increased, with women comprising 49.48% of undergraduate students and 47.63% of graduate students. However, women remain underrepresented in engineering-related disciplines; female graduate students in engineering, manufacturing, and construction account for only 24.15% of the total enrollment (Ministry of Education [MOE], 2026) [1]. In recent years, changing majors has become increasingly common among Taiwanese students. In 2020, approximately one in ten first-year students at top universities applied to transfer to a different department [2]. Although a limited number of studies have examined undergraduate students' experiences of changing majors [3-6], research focusing on graduate students remains scarce.

Scholars have observed that female students in science, technology, engineering, and mathematics (STEM) frequently experience the "leaky pipeline" phenomenon, in which women's representation declines progressively from undergraduate education to graduate training and eventually to the workforce [6-8]. This case study examines the experience of Alice, a Taiwanese female student who majored in Materials Science and Engineering (MSE), a STEM discipline, at both the undergraduate and graduate levels before ultimately transitioning to a graduate program in counseling. This study explores her emotional experiences, cognitive processes, and behavioral responses during this transition, with particular attention to the influence of personal interests, values, support systems, developmental history, and sociocultural context.

Female Graduate Students in STEM

Women remain underrepresented across many STEM disciplines and often study in environments historically shaped by masculine norms and values. As a result, female students may be required to adapt to academic cultures that privilege traditionally masculine traits, while also experiencing what has been termed the "femininity penalty" [9]. Women pursuing STEM degrees and careers encounter multiple structural and interpersonal barriers, including restrictive institutional policies [10,11] limited access to research opportunities [12], insufficient diversity and representation [13], rigid curricular structures [14], and classroom-related challenges such as large class sizes [15]. In addition, campus and departmental climates may impede women's academic development and sense of belonging [8].

The structure and demands of STEM education may further intensify gender disparities. Berwick (2019) [16] argued that the most significant barriers for women in STEM arise from environmental and social factors, including gender stereotypes, implicit bias, and the broader cultural climate of science and engineering departments. These conditions can continuously hinder women's persistence and advancement in STEM fields.

Casad et al. (2020) [17], in a survey of 579 female STEM majors, found that higher gender stigma consciousness predicted greater gender-based rejection sensitivity. Rejection sensitivity, in turn, contributed to more negative perceptions of campus climate. Negative

campus perceptions increased stereotype threat, which reduced students' perceived control. Lower perceived control subsequently heightened psychological disengagement from STEM and diminished self-esteem. These findings highlight the cumulative psychological impact of gendered academic environments.

Compared with men, women are also more likely to prefer broader liberal arts-oriented educational experiences and may perceive tension between their educational goals and the rigid requirements of certain STEM programs [14,18] identified several factors that negatively influence women's participation in STEM, including competitive and low-interaction teaching approaches, "chilly climates" in male-dominated settings, and societal expectations regarding women's family and career roles. Competitive environments that lack support may undermine women's confidence and motivation. When female students experience repeated frustration, reduced self-confidence, or insufficient support in classrooms or departments, they may become more likely to leave STEM or change majors [19]. Moreover, the psychosocial climate of classrooms significantly affects women's comfort and sense of inclusion within learning environments [20].

Female STEM Students in Taiwan

In Taiwan, STEM disciplines constitute a substantial proportion of graduate education, with STEM students representing a large segment of the graduate student population [1]. Gender differences in academic major selection remain pronounced, with men disproportionately represented in STEM fields and women more commonly enrolled in humanities and social science disciplines [21]. Although increasing numbers of women have entered traditionally male-dominated STEM fields, these disciplines continue to be largely male dominated in Taiwan. Because men remain the numerical majority in STEM, academic environments in these fields often reflect masculine norms characterized by competition, hierarchy, and authority. Such environments may create additional challenges for female students as they navigate academic and professional development.

Liu (2001) [22] investigated the career transition processes of women holding undergraduate STEM degrees and identified several factors influencing their initial major selection, including personal interest, departmental reputation, examination performance, parental expectations, social influence, and significant life events. Among women who later transitioned from STEM to non-STEM careers, career changes were influenced by frustration with academic study or work, career satisfaction, social support, emerging opportunities, and personal characteristics. Liu further noted that women's career development was often constrained by negative social expectations, which reduced self-efficacy. Gender role stereotypes, occupational gender stereotypes, and experiences of discrimination further reinforced internal career barriers. Compared with men, women also placed greater emphasis on marriage and family responsibilities, which often created additional tensions between work and life and negatively affected career development. Wang (1990) [23] examined factors associated with nontraditional career choices among 407 female university students and found that parental, sibling, and peer support played important roles in their career decisions. Similarly, Yang (2002) [24] explored the developmental contexts underlying career themes

among female undergraduates in nontraditional technology-related programs. Participants identified several motivations for choosing nontraditional fields, including pursuing personal interests, improving their family's financial well-being, and maintaining competitiveness with peers. These findings suggest that women's career decision-making in Taiwan is shaped not only by individual preferences but also by broader familial and sociocultural influences.

Taken together, prior studies suggest that Taiwanese women in STEM navigate career development within a complex interplay of personal aspirations, family expectations, gender norms, and structural barriers. However, existing research has primarily focused on undergraduate students or career transitions after graduation. Little is known about how female graduate students experience changing majors while still enrolled in graduate education. The present study addresses this gap by examining the case of a female graduate student who transitioned from engineering to counseling.

Changing Fields in Higher Education

Research on major changes among students in Taiwanese higher education remains limited, despite the relative commonality of this phenomenon. In 2020, approximately one in ten first-year students at Taiwan's top universities applied to transfer to a different department [2]. Within engineering colleges, many students sought to transfer into electrical engineering or computer science, whereas economics and law were among the most popular destinations within the social sciences [2].

Using graduation survey data from a university in northern Taiwan collected between 2012 and 2018, Lee (2021) [5] found that students with stronger economic motivations or interest-driven goals were more likely to successfully transfer. Pan (2017) [25] further argued that universities should adopt more flexible transfer standards, as students often seek major changes due to lack of interest in their original field, poor academic performance, or economic pressures. Excessively restrictive transfer policies may prevent students from pursuing fields aligned with their interests and may increase the risk of academic disengagement or withdrawal.

Internationally, changing majors is a common educational experience. More than one-third of students change their major at least once during their undergraduate studies [26-28]. Rather than viewing major change as a single event, scholars increasingly conceptualize it as a developmental process shaped by academic environments, departmental cultures, and students' evolving self-understanding [26,29]. Learning environments, in particular, play a critical role in shaping students' academic trajectories and outcomes [30]. Dissatisfaction with the learning context or discontent with aspects of one's original major often serves as a major impetus for transfer.

Denice (2021) [31], using U.S. university data, found that students primarily changed majors to pursue fields better aligned with their interests and abilities. Major-change decisions were influenced by characteristics of the original major, academic performance, and the degree of social and academic integration within departments. In addition, gender, socioeconomic background, and prior academic

preparation significantly predicted transfer behavior. Women, for example, were more likely to leave STEM fields, particularly when exposed to “chilly climates” characterized by gender discrimination and exclusion [32,33].

Qualitative studies similarly highlight the importance of psychological and contextual factors. de los Reyes (2021) [34] examined students who left STEM after their junior year and identified three major influences: poor academic and career fit, mental health concerns, and dissatisfaction with STEM learning environments. These factors contributed to students' decisions to leave STEM and redirect their career trajectories. Likewise, Meyer et al. (2022) [35] identified academic achievement, the degree of fit or mismatch between personal career interests and major content, and parental or peer evaluations of the initial major choice as key predictors of major change. Their findings suggest that academic performance, person-major fit, and social expectations jointly shape transfer decisions. In particular, misalignment between career interests and major content strongly predicts cross-disciplinary transfers.

The prevalence of major changes may also reflect the ongoing development of students' expectations, perceptions, and identities during higher education [36]. As students recognize discrepancies between their initial expectations and long-term career goals, they often experience confusion, uncertainty, and stress amid numerous academic and occupational possibilities [37]. Lower academic performance frequently signals a mismatch between students and their chosen major and is considered a strong predictor of transfer. Students with weaker academic performance are more likely to move into fields with substantially different curricular structures and learning demands [26].

Although changing majors may lead to more suitable academic and career pathways, the process also carries significant costs. Major changes may delay graduation, increase educational expenses, and elevate dropout risk due to additional coursework requirements. Such consequences include extended time to degree, reduced returns on prior educational investment, and greater risk of academic withdrawal [38]. At the same time, changing majors can yield positive outcomes by enabling students to correct unsuitable initial choices, improve academic performance, increase graduation likelihood, and achieve greater alignment between academic training and career goals [39].

Astorne-Figari and Speer (2019) [26] further demonstrated that lower academic performance often reflects academic mismatch and strongly predicts transfer decisions. They also found that students tend to select majors that “look like them,” meaning fields whose demographic characteristics resemble their own. For instance, women are more likely to transfer into majors with higher female representation and are significantly more likely than men to leave STEM fields. Women's departure from STEM may not necessarily reflect a lack of interest in science or mathematics, but rather a response to cultural environments characterized by intense competition, male dominance, gender stereotyping, and diminished belonging.

Major change can therefore be understood as a significant educational transition involving identity reconstruction and adaptation.

Silver (2024) [40], in interviews with 38 U.S. undergraduates who had changed majors, conceptualized this experience using Bridges' (2004) transition framework, which includes three stages: endings, neutral zones, and new beginnings. During the endings stage, students reflected on their self-perceptions, including whether they possessed the abilities required by their original major, and recognized the limitations of their initial choices. In the neutral zone, students engaged in tentative exploration of alternative fields while navigating uncertainty, pressure, and insufficient support. Finally, during new beginnings, students adapted to their new majors, reconstructed their identities, and developed clearer career directions. This framework suggests that changing majors involves not only academic adjustment but also substantial psychological transformation.

Rationale of the Study

This study is grounded in Holland's (1997) [41] typological theory and the five models of Social Cognitive Career Theory (SCCT). Together, these frameworks provide a useful foundation for understanding the psychological and contextual factors involved in academic and career transitions, particularly decisions to change majors.

Holland's (1997) [41] typological theory proposes that individuals seek environments that best match their vocational interests, personalities, and values. In higher education, such environments include the curricular content, learning experiences, and interpersonal climate associated with a student's academic major. Individuals continually attempt to achieve congruence between personal characteristics and environmental conditions. When students perceive a strong fit between their vocational interests and their major, this congruence increases motivation, engagement, and persistence. Conversely, when students perceive a mismatch between their interests and learning environment, they may become dissatisfied and consider changing majors [35]. Learning contexts therefore play a critical role in academic decision-making, as students often seek educational environments that foster a sense of belonging and align with their personal values and aspirations.

SCCT further explains how career interests, choices, persistence, and adaptation develop through dynamic interactions between personal and contextual factors. Lent and Brown (2019) [42] noted that SCCT originally consisted of three interrelated models and was later expanded to five.

The first model, interest development, explains how individuals develop interests in particular academic or career domains. Individuals who possess stronger self-efficacy beliefs and anticipate positive outcomes from engaging in a given activity are more likely to develop sustained interest in that domain.

The second model, choice-making, explains how individuals make educational and career decisions based on their interests, abilities, and environmental conditions. After interests are formed, individuals establish goals and take actions to pursue them. Career decisions are shaped not only by internal characteristics but also by contextual influences, including family support, economic resources, educational opportunities, and sociocultural expectations.

The third model, performance and persistence [43], focuses on performance outcomes and persistence in educational or vocational settings. Self-efficacy, outcome expectations, ability, and environmental supports jointly influence whether individuals can maintain engagement when facing academic or occupational challenges.

The fourth model, satisfaction and well-being [44], emphasizes individuals' subjective experiences of satisfaction, psychological well-being, and adjustment in academic or work settings. When educational experiences align with personal interests, values, and goals, individuals tend to experience greater satisfaction and well-being. In contrast, incongruence between personal needs and environmental demands may reduce satisfaction and negatively affect psychological functioning.

The fifth model, career self-management [45], focuses on how individuals regulate and manage career-related tasks across the lifespan, including career decision-making, job search, adaptation, and work-life balance. Self-efficacy, goal setting, outcome expectations, and environmental supports influence the effectiveness of career planning and adaptation.

Taken together, the five SCCT models provide a comprehensive framework for understanding students' decisions to change majors. Students may lose interest in their original field or develop stronger self-efficacy and more positive outcome expectations in a new domain, leading to intentions to transfer. Major-change decisions are shaped by multiple factors, including personal abilities, values, family expectations, institutional structures, and available resources. Persistent academic difficulties, poor performance, or insufficient support in the original major may weaken commitment and prompt consideration of alternatives. Similarly, low satisfaction, psychological distress, or poor fit between learning experiences and personal needs may motivate students to seek more suitable environments. From this perspective, changing majors can be understood as an active process of career adjustment, identity reconstruction, and self-management.

Drawing on Holland's theory and SCCT, the present study reveals how a Taiwanese female graduate student navigated the transition from engineering to counseling. These above theoretical frameworks provide a lens for understanding how person-environment fit, self-efficacy, outcome expectations, support systems, and psychological adjustment shaped her decision-making process and academic transition.

Method

This study adopts a qualitative case study approach, primarily because this method enables an in-depth exploration of individual cases to better understand social phenomena. It allows researchers to grasp the complexity of social realities and uncover the underlying causes behind them. Through detailed examination of specific cases, the study seeks to gain insight into participants' subjective experiences and perspectives, as well as to analyze the diverse and intricate relationships between individuals and their social environments. The method of case study is suitable for revealing the contextual details and subjective experiences of Alice's major switching from MSE to counseling program.

Participant

The participant (Alice) is a 26-year-old master's student majoring in counseling psychology at a research-oriented university in Taiwan. She was enrolled in MSE bachelor's program for four years, and then in MSE master's program for one and a half year. She is one of the few female students in the programs of MSE. After she quitted from MSE master's program, she spent one year for preparation and then switched her major to counseling master's program. She is willingly shared her experiences regarding her journey of studying in MSE, and switching from MSE to counseling field.

Researcher

The author serves as a full-time faculty member and part-time counseling psychologist in higher education. She has provided guidance and counseling services to undergraduate and graduate students for many years. As an experienced counseling psychologist and educator, the researcher has supported students and clients in understanding issues related to major selection, person-major fit, and decisions regarding academic major changes.

Interviewer

A research assistant (RA) with a master's degree in counseling conducted one interview. Prior to the study, the RA completed courses in interviewing skills, qualitative research, and research methodology. She received training and completed pilot studies to refine her interviewing skills. She built a trusting relationship with the participant, Alice, and maintained an open, nonjudgmental manner during the interviews.

Data Collection

Data collection was conducted through one in-depth interview, lasting 120 minutes. Also, the interviewer completed personal reflections to reveal her observations, thoughts and reactions during and after the interview. Alice was fully informed about the study's purpose and procedures and provided informed consent before participating. The interview aimed to elicit detailed accounts of her experiences, with sample queries such as: "Please describe your experiences in the field of MSE." "Please describe any significant or memorable perceptions and reactions you have encountered over your academic career in MSE at the higher education level." "What motivated you to quit the MSE graduate program?" "How did you go through the process of quitting the MSE program, searching for a new career direction, and finally enrolling in "counseling" master's program?" "If applicable, how would you advise prospective graduate students consider their major choice and career development?"

Data Analysis

The researcher serves as the analyst. The data comprised interview transcripts and the interviewer's reflective notes. This care report utilized thematic analysis [46] to analyze the data related to experiences of a female graduate student switching from MSE to counseling master's program. Thematic analysis proceeded through several steps. Audio recordings were transcribed verbatim. The researcher adopted an open and inquisitive stance, repeatedly reading transcripts and

noting thoughts, feelings, and potential meanings or themes. Initial codes were generated based on both surface-level semantics and deeper meanings. Themes and subthemes were then extracted from the codes, organized into coherent descriptions, and conceptualized to capture underlying significance. The analyst reviewed and refined themes to ensure they accurately and comprehensively reflected the data, verifying internal consistency within themes and clear distinctions between themes. Each theme's essence and content were clarified, and theme names were aligned with their meanings. Finally, the researcher provided detailed descriptions of the analysis and prepared the report.

To enhance validity and reliability, steps were arranged into a detailed protocol and database [47]. Transcripts were examined for accuracy during transcription, with careful comparison of data with codes and forming notations. Validation strategies proposed by Creswell and Miller (2000) [48] were employed, including extended engagement and continuous observation. Multiple sources and methods were integrated to clarify themes or perspectives. Rich, thick narratives were formulated to elaborate the participant and settings encountered in the interview. Member checking was adopted, inviting the participant to review rough drafts and offer feedback. A peer of the researchers served as an external auditor, scrutinizing the research process and evaluating the results.

Results

Lack of Interest in Learning and Experimental Research

Alice recalled that her daily life in the MSE graduate program revolved almost entirely around laboratory operations, instruments, reagents, data analysis, report writing, and reading journal articles. She described her experience in the MSE program as tedious, imbalanced, and emotionally exhausting, accompanied by little intrinsic motivation for experimental research. Reflecting on her lack of engagement, she stated, "I really had no interest in those experiments. They felt boring, and I was too lazy to read the journal papers."

Repeated experimental failures further intensified her discouragement. Despite investing substantial time and effort, her experiments often failed to produce acceptable results, leaving her with little sense of achievement or progress. She described the repetitive nature of graduate research as especially draining: "During my first year of graduate school, the experiments basically kept failing... I kept repeating the same procedures and tasks without clear feedback... the frustration was really heavy."

Over time, this persistent frustration extended beyond her academic work and affected her overall daily functioning. Her graduate life became characterized by low energy, emotional exhaustion, and a growing imbalance between academic demands and personal well-being. She often felt stuck and unmotivated to read, attend classes, or conduct experiments. She also reported depressive feelings and a profound sense of depletion. As she explained: "The next day I had a lab meeting, but I really didn't want to do anything. I just lay in bed, not wanting to get up... waking up in the morning, I really didn't want to get out of bed... my whole life felt completely without energy." Her narrative suggests that the loss of interest in learning and research

was not merely academic disengagement but a broader psychological experience involving emotional fatigue, diminished motivation, and reduced vitality.

Perception of Becoming a "Tool Person"

As Alice became increasingly disengaged from her academic work, she also began reflecting on the values embedded within the MSE environment. She perceived the graduate training culture as highly performance-oriented, where productivity and measurable research output served as the primary indicators of value. Within this context, she felt that individuals were appreciated mainly for what they could produce rather than for who they were as human beings.

Alice described feeling as though she had become a "production machine," valued only for her output. She used the phrase "tool person" to capture her sense of dehumanization within the MSE environment. In her view, the field prioritized results, publications, and efficiency while leaving little room for emotional expression, individuality, or human warmth. She explained: "In MSE, the standard of value is whether you produce enough output... I felt like a tool, not valued as a person... the whole training environment made me uncomfortable." This perception of being reduced to a functional instrument deepened her dissatisfaction with the field. Rather than experiencing research as meaningful intellectual inquiry, she increasingly experienced it as a system of production governed by external standards of achievement.

Her discomfort was further reinforced by her repeated experimental setbacks. Because her experiments often produced flawed or inconsistent data, she became more aware of the tension between the idealized image of scientific rigor and the messy reality of research practice. This gap intensified her frustration and strengthened her perception that the academic environment valued productivity over personhood.

Doubts regarding Learning and Research

Beyond dissatisfaction with the MSE environment, Alice gradually developed deeper doubts regarding the nature of scientific learning and research itself. During graduate school, she began reflecting on what it meant to learn, conduct research, and pursue knowledge. In this process, she recognized a fundamental contrast between her earlier educational experiences and the epistemological demands of graduate research.

Her previous learning experiences in STEM had largely been structured around clear procedures and correct answers. Success was often defined by accuracy, mastery, and the ability to arrive at predetermined solutions. In contrast, MSE research required tolerance for ambiguity, exploration of the unknown, interpretation of uncertain data, and acceptance that outcomes were often provisional rather than absolute. This epistemological shift proved deeply unsettling for her.

Alice described the prolonged trial-and-error process of research as emotionally difficult. She struggled with the absence of immediate feedback and the unpredictability of outcomes, especially because she lacked intrinsic interest in the research itself. She reflected: "In the past, learning always had correct answers. My tolerance for uncertainty is really low. Having to explore unknown things without knowing if my

effort will be rewarded... that was very frustrating, especially when it was something I wasn't interested in."

Her low tolerance for uncertainty, combined with limited intrinsic motivation, made sustained engagement in research increasingly difficult. As a result, she began questioning not only her willingness to remain in MSE but also her broader academic direction. This period marked an important turning point in her self-understanding, as she became increasingly aware of the growing gap between her personal values, interests, and the demands of scientific research.

Her experience reflects a deeper struggle involving the reconstruction of both her knowledge perspective and academic identity. Rather than merely questioning whether she could succeed in MSE, Alice was confronting a more fundamental question: whether the scientific domain itself aligned with who she was and how she wished to engage with learning and work.

Awareness of the Impact of Developmental History on Psychological States

As Alice's distress in the MSE program intensified, she gradually began reflecting on the deeper psychological roots of her struggles. She recognized that her poor psychological state, lack of motivation, and persistent sense of being trapped were not solely caused by the immediate demands of graduate school, but were also closely connected to her developmental history. She described repeatedly "hitting walls" without finding a way forward or an outlet for relief.

Through reflection, Alice came to realize that her upbringing and educational experiences had profoundly shaped how she approached learning, achievement, and self-worth. She felt that Taiwan's education system had trained her to pursue "only correct answers" and to continuously prove herself as a "good student." This developmental context fostered a strong performance-based sense of self-esteem, accompanied by fear of failure, compulsive striving, and constant pressure to excel. She explained: "Throughout my schooling, I became very afraid of failure because I always had to find the correct answer... I pressured myself to perform well, and my self-worth became tied to being a good student with good grades."

Alice recognized that this long-standing pattern shaped how she responded to the uncertainty and repeated failures of graduate research. Having internalized the belief that achievement and correctness determined her worth, she found it especially difficult to tolerate situations without clear answers or guaranteed success.

She also became aware that her entry into MSE reflected not only personal choice but broader social values. She had followed a mainstream educational pathway widely associated with success, stability, and prestige. However, her actual experience in the field was marked by repeated setbacks, anxiety, and emotional discomfort. Through this contrast, she realized that her developmental trajectory had provided little support for self-exploration or encouragement to identify environments aligned with her personal characteristics and needs. She reflected: "In this industry, people pursue high salaries and social status... it's the mainstream. But I felt very uncomfortable. My feelings weren't valued, and throughout my upbringing there were

very few voices encouraging me to explore or find an environment that suited me."

Alice further noted the influence of her family's economic circumstances on her psychological state and career decision-making. Limited financial resources heightened her anxiety regarding future career choices and reduced her confidence in trusting her own decisions. She internalized a persistent sense of scarcity and uncertainty, which constrained her perceived freedom when making life choices. The broader social emphasis on STEM careers as financially secure further intensified this pressure.

Reflecting more deeply, Alice admitted that her motivation to study STEM had largely been driven by external expectations rather than genuine personal interest. Her academic persistence had long been sustained by obligation, pressure, and performance-based validation rather than intrinsic motivation. She explained: "My past learning in STEM was always about forcing myself forward... my self-worth was tied to grades and performance. Only then did I feel valuable."

Upon entering graduate school, however, the psychological costs of this pattern became increasingly difficult to ignore. The intense uncertainty of experimental research, combined with repeated failure and low interest, gradually became a chronic emotional burden. For the first time, she began seriously confronting her unhappiness and questioning whether this path was sustainable. She recalled: "I really wasn't happy. I was suffering... I started thinking, should my life continue like this?"

This period marked a significant shift in Alice's self-awareness. She recognized that her past experiences had shaped her into what she described as a "high self-esteem but failure-intolerant" student—someone who could perform well under structured systems of achievement but struggled deeply in environments characterized by ambiguity and repeated setbacks. She ultimately concluded: "Studying MSE made me feel very uncomfortable. Forcing myself into the STEM field was really painful." Her growing awareness of these developmental influences helped her understand that her distress was not simply a matter of inadequate ability, but reflected a deeper mismatch between her psychological needs, personal values, and academic environment.

Critical Turning Points in Leaving MSE and Resetting Career Path

As Alice's emotional and psychological burden accumulated, she eventually reached what she described as a decisive turning point—an experience of abandonment, release, and resetting. One day, she realized that she could no longer force herself to continue. She no longer wanted to attend classes, enter the laboratory, or face lab meetings. In that moment of exhaustion and resistance, a simple but transformative thought suddenly emerged: "I don't have to do this." Recalling this moment, she said: "At that time... I didn't want to prepare journal reports, I just wanted to escape from everything in the lab. Then I suddenly thought, hey, actually I don't have to do it."

This realization marked a critical psychological shift. For the first time, Alice allowed herself to consider the possibility that she did not have to remain bound to the life trajectory she had previously

constructed. Rather than viewing the MSE pathway as inevitable, she began to see it as a choice that could be reconsidered.

Before this turning point, Alice had envisioned a fixed career plan: complete graduate school in MSE, work in the technology industry for several years, accumulate sufficient financial resources by age thirty, and only then pursue what she truly loved. However, this moment of clarity disrupted that rigid timeline. She realized that postponing her authentic interests was itself a choice—one she no longer wished to maintain. She reflected: “After graduating from MSE, I’ll work in the tech industry for a few years, earn enough money by thirty, and then do what I really love. But then I realized—actually, I can do it now. I can quit MSE, reset, and rethink my career path.” This cognitive shift enabled Alice to move from passive endurance toward active decision-making. Instead of waiting for a distant future to pursue a meaningful life, she began reclaiming agency in the present.

After discussing the possibility of taking a leave of absence with her peers and advisor, Alice spent two months reflecting before ultimately deciding to withdraw from the program. She described the decision as profoundly liberating, both emotionally and physically. She recalled: “After making that decision, I felt so happy. Walking out of the MSE building, I felt light and free, like the world was full of vitality... I no longer had to use those boring lab machines... it felt like finally letting myself go.” This turning point represented more than simply leaving a graduate program. It marked a process of psychological liberation from performance pressure, external expectations, and a long-standing identity built around achievement. By stepping away from MSE, Alice released herself from a life characterized by monotony, emotional depletion, and chronic struggle. The act of leaving became a symbolic reset—an opening for self-redefinition and the possibility of constructing a new career path more aligned with her interests, values, and psychological well-being.

Valuing the Fit between Academic Major and Personal Characteristics

Alice’s prolonged struggles in MSE led her to begin counseling sessions during her first year of graduate school, which helped her realize she was not suited to the field. Over time, she developed interest in counseling. She reflected: “I felt staying in the MSE environment was a waste of my talents, because I clearly sensed that my characteristics didn’t fit there.”

Through counseling sessions, she experienced the embodied and emotional aspects of counseling practice. She also participated in group counseling and psychodrama courses, discovering that experiential and interactive learning resonated deeply with her. She explained: “I really like classes that aren’t traditional lectures... in experiential, communicative courses I can feel myself, I have a sense of presence.” In group dynamics courses, she enjoyed writing reflections and insights: “That was interesting for me.”

Gradually, Alice found joy in observing emotional processes and exploring the motivations behind human behavior. She recognized a strong fit between her personal traits and the counseling profession, cherishing the sense of meaning and accomplishment it provided. In contrast, her MSE experience was marked by disinterest in

note-taking, journal reading, assignments, and lab work, leaving her feeling like a “bad student.” She admitted: “In MSE courses, I felt like I wasn’t really learning... I wasn’t interested, I wasn’t serious, and it didn’t even feel like a big loss.” By comparison, counseling courses offered interpersonal interaction, emotional engagement, and self-understanding, which gave her a sense of growth and living fully in the present: “In counseling, I need to interact with people... I feel strong emotional tension, and I love it. In class, I feel alive in the moment.”

Receiving Support from Significant Others

Alice’s advisor recognized her lack of interest in MSE and her resistance to experimental research. When she tearfully expressed feeling like a “screw” or “tool,” he empathized: “This is probably the result of the industrial revolution... everyone becomes a small screw, alienated. Even if productivity is high, the human experience is very uncomfortable.” His understanding and encouragement provided comfort and support.

When Alice was still struggling with whether to quit and reset, her advisor urged her: “You’re smart—don’t waste your brain.” His support helped her reconsider her career direction, reinforcing her sense that staying in MSE was a waste of time and talent. He adopted an open mentoring style, affirming her courage to pursue a new path. Upon her decision to leave, he told her: “I admire your courage. At 24, you’re already brave enough to think about your best career development and pursue the life you want. That’s rare.” Alice regarded him as a respected figure in mainstream society, so his words carried weight and strengthened her resolve.

During counseling sessions, her counselor also affirmed her self-exploration, recognizing her determination and perseverance: “You’re very interested in exploring yourself. Using counseling resources during your student years for self-exploration is a great thing.” In group counseling and psychodrama courses, peers acknowledged her engagement and provided positive feedback. One peer remarked: “The fact that you can write these reflections shows you really feel something in these counseling courses.” The encouragement from her advisor, counselor, and peers became a crucial source of support, empowering Alice to abandon MSE, reset, and reimagine her career path. These affirmations played a pivotal role in her transition.

Re-evaluation and Career Change Decision

Alice initially chose MSE because she valued the security, salary, and social status associated with careers in the technology industry. Her original plan was to graduate, work in the tech sector to save money, and later pursue her true interests. However, repeated setbacks in graduate school prompted her to reconsider her career trajectory. She realized that personal interest and meaningful work were more important than financial security or social prestige. She reflected: “At first I thought I’d work in tech for a few years, save money, and at thirty finally do what I love. But then I realized—wait, I can actually do it now!”

During this re-evaluation, Alice became aware of her lack of confidence and anxiety about her family’s financial situation: “One of

the sticking points was this deep anxiety... I felt a lack of confidence and trust in myself, which I think is related to my family background. Our financial situation wasn't very good." This made her hesitant to leave a field with strong job prospects and high salaries. Yet, after careful consideration, she recognized that forcing herself into a career she disliked would be exhausting and unfulfilling. She explained: "In the lab, I kept doing things I didn't like. If I worked in tech, it would be the same tasks. For me, the most important thing isn't job security or money."

Ultimately, Alice abandoned her earlier plan of prioritizing financial stability and instead emphasized the fit between her career and personal characteristics. She stated: "I want to do something that makes me happy. So I gave up the money and chose what I really want to do—counseling. That gives my life meaning." Although counseling may not provide the same salary or status as engineering, she valued its alignment with her interests and identity. She emphasized: "Counseling focuses on human feelings... it doesn't force you to become a certain type of person. It's not utilitarian. That's what I like. Being in this field makes me more comfortable."

The Process of Changing Majors

Awareness Stage

Alice followed mainstream social expectations by majoring in MSE in college and continuing into graduate school, planning to enter the tech industry afterward. Over time, she realized that MSE did not align with her interests. Repeated experimental failures drained her confidence and energy, leaving her exhausted and unmotivated. She described: "My life was in a serious state of imbalance. I felt stuck, like stagnant water, with no vitality at all." She began reflecting on the utilitarian and "tool-oriented" nature of the MSE system, which emphasized productivity and outcomes over human subjectivity. She recognized that her pursuit of high grades and correct answers had trapped her in a cycle of fatigue and frustration. Her mindset shifted from "I should endure and overcome difficulties" to "Why should I keep suffering and draining myself? Should I continue at all?"

Breakdown and Redirection Stage

One day, Alice broke down crying in the laboratory, which became a turning point. She suddenly realized: "I don't have to do this." Years of accumulated frustration erupted, and she acknowledged her unhappiness: "I really wasn't happy." Her longing for freedom sparked an awakening, giving her the strength to let go. This moment of realization marked her first step toward abandoning MSE and reclaiming agency.

Exploration and Weighing Stage

After this awakening, Alice experienced relief and joy at the thought of leaving MSE. Yet she also struggled with anxiety about her family's financial situation. She recognized that becoming an engineer could improve her family's economic stability: "In this industry, people pursue high salaries and social status. It's the mainstream." Through counseling, she gradually shifted her focus from external expectations to internal values. Counselors affirmed her courage to explore

herself and pursue her interests. She discovered genuine enthusiasm for counseling courses, which gave her energy and presence. She explained: "Tech jobs have higher social status. But I don't value money that much, and my material desires aren't high. Weighing both sides, I chose counseling because it fits my interests and values."

Acceptance and Reconstruction Stage

Alice eventually learned to accept imperfection and uncertainty, adopting a holistic perspective on career development. She recognized that her family and society had long validated her through grades and academic prestige. Moving beyond the pursuit of mainstream "best choices," she began affirming her own interests and needs, even while facing tension with societal expectations. She demonstrated resilience, insisting on her decision to change majors. She explained: "With resilience, I can withstand the mainstream tide... allowing new methods, trying new careers, and building confidence is also resilience." Alice redefined her career as "doing what I care about and what makes me happy," embodying both resilience and vitality.

Discussion

This study identified several important factors contributing to women's departure from STEM fields in higher education. Previous studies have highlighted hostile or exclusionary departmental climates [50], frustration and loss of confidence in competitive STEM environments [19], and feelings of isolation or low belonging associated with "chilly climates" [51]. Although Alice did not explicitly report gender discrimination or overt exclusion, she perceived the MSE environment as highly performance-oriented, where academic productivity—such as grades, research output, and measurable achievement—served as the dominant indicator of personal value. This perception contributed to feelings of dehumanization, as if her worth were reduced to that of a functional tool rather than a whole person. Repeated failures in laboratory work gradually eroded Alice's confidence and self-esteem, leading to reduced perceived control, diminished motivation, and psychological disengagement from the MSE graduate program. This finding supports prior research suggesting that academic climate and institutional culture significantly influence women's persistence in STEM [16,17,26,29]. It also aligns with Casad et al. (2020) [17], who found that lower perceived control among female STEM students contributes to disengagement and reduced self-worth.

Alice's narrative further suggests that academic struggles cannot be fully understood without considering developmental history. She described growing up in an environment strongly shaped by mainstream social values emphasizing achievement, performance, and external success. Although this upbringing fostered confidence in achievement-oriented settings, it also limited opportunities for self-exploration and reduced her tolerance for failure. Consequently, the repeated setbacks inherent in graduate-level experimental research became psychologically overwhelming. This finding supports previous research indicating that frustration, loss of confidence, and insufficient support often contribute to women's decisions to leave STEM [19].

Social support emerged as a critical protective factor during Alice's transition. Existing literature emphasizes the importance of support

networks for sustaining women's engagement in STEM and facilitating career transitions [52]. In Alice's case, her advisor, counselor, and peers did not pressure her to remain in engineering; instead, they supported her exploration of whether MSE genuinely aligned with her interests and values. Their acceptance and encouragement allowed her to loosen attachment to her original career plan and consider alternative possibilities.

A particularly salient finding concerns the contrast between learning environments. Alice described MSE as emphasizing productivity, technical competence, and emotional detachment, whereas counseling offered experiential, relational, and reflective learning. Her strong preference for communicative and interpersonal learning supports Hartman and Hartman's (2009) argument that collaborative and relational learning environments may better support many female students than highly competitive, low-interaction STEM contexts. Her transition therefore involved not only a change in discipline but also movement toward an educational culture more congruent with her relational orientation.

Alice's experience of poor fit, low satisfaction, reduced motivation, and psychological distress closely aligns with findings from major-change research. de los Reyes (2021) [34] found that students often leave STEM because of poor academic or career fit, mental health concerns, and dissatisfaction with the learning environment. Likewise, Denice (2021) [31] argued that major-change decisions reflect students' responses to major characteristics, academic performance, and social integration. Alice's case further supports Astorine-Figari and Speer's (2019) [26] view that low performance often signals academic mismatch and predicts cross-disciplinary transfer.

Her transition also reflects the STEM "leaky pipeline" phenomenon [6,7], in which women's representation decreases at advanced educational and career stages. Importantly, Alice's departure from STEM did not reflect rejection of science or inability to succeed academically. Rather, it reflected disengagement from an environment she experienced as misaligned with her values and identity. This distinction suggests that women's attrition from STEM should not be understood solely in terms of competence deficits, but also in terms of person-environment incongruence.

Alice's experience strongly supports Holland's (1997) [41] theory of vocational choice, which emphasizes person-environment fit. Her disengagement from MSE reflected poor alignment between her interests and the demands of the field, whereas counseling provided stronger congruence with her values of human connection, subjectivity, and interpersonal engagement. This finding is consistent with Meyer et al. (2022) [35], who demonstrated that misalignment between career interests and major content predicts cross-disciplinary transfers.

Alice's journey also illustrates all five models of SCCT. Her declining interest in MSE and growing engagement in counseling reflected the interest development model. Her decision to leave engineering and pursue counseling reflected the choice-making model, shaped by personal values, abilities, and contextual resources. Her struggles in research reflected the performance and persistence

model, as repeated setbacks reduced persistence. Her emotional exhaustion and later psychological recovery illustrated the satisfaction and well-being model. Finally, her active exploration, reassessment, and career redirection reflected the career self-management model, highlighting the dynamic nature of lifelong career development.

Alice's transition further resonates with Silver's (2024) [40] application of Bridges' (2004) [53] transition theory. Her awareness and breakdown/letting go stages parallel the endings phase, during which students recognize unmet needs or lack of fit in their original major. Her exploration and weighing stage corresponds to the neutral zone, characterized by uncertainty and experimentation. Finally, acceptance and reconstruction mirrors the new beginnings stage, in which students reconstruct identity and commit to a new direction. Thus, changing majors can be understood not merely as an academic decision but as a profound psychological and identity transition.

Implications and Limitations

This study highlights the importance of attending to graduate students' emotional, academic, and career development, particularly when students experience misalignment between personal characteristics and academic environments. Counselors, faculty members, and student affairs professionals should remain attentive to signs of disengagement, loss of motivation, or psychological distress. Holland's person-environment fit framework and SCCT may serve as useful tools for helping students assess fit, clarify interests and values, and explore alternative pathways.

Practitioners should also recognize the influence of broader sociocultural values on career decision-making. In contexts such as Taiwan, leaving prestigious or high-income fields such as engineering may generate substantial internal conflict and external pressure. Students may struggle with guilt, self-doubt, or fear of social disapproval when considering less conventional paths. Institutions may therefore benefit from providing more flexible transfer policies and transition support systems to facilitate movement into better-fitting disciplines.

This study focused on a single participant and therefore cannot be generalized to all female graduate students in STEM. Future studies should include participants from diverse backgrounds and institutional contexts to better understand variation in major-change experiences. Additional research is needed to examine how female graduate students navigate cross-disciplinary transitions, particularly the psychological and contextual mechanisms underlying movement from STEM into fields with greater female representation, such as counseling.

Conclusion

Alice's transition from engineering to counseling illustrates how changing majors can represent far more than an academic adjustment. Her journey reflects a process of self-exploration, identity reconstruction, and redefinition of success. Rather than evaluating success solely through external standards such as prestige, salary, or social approval, Alice came to prioritize alignment between her career path and her personal interests, values, and relational needs.

Her experience underscores the importance of person–environment fit, psychological well-being, and social support in shaping graduate students' educational trajectories. Ultimately, this case highlights how changing majors can become a transformative developmental process through which individuals pursue greater authenticity, meaning, and fulfillment.

Disclosure Statement

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The author used ChatGPT to assist with language editing and manuscript revision.

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