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RESEARCH ARTICLE

Narratives of Career Uncertainty: A Qualitative Study on Career Identity Formation Among Computer Science Students

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Abstract: Career uncertainty has become a defining characteristic of contemporary higher education, particularly in dynamic and rapidly evolving fields such as computer science. This study examines how computer science students construct and negotiate their career identities amid uncertainty using a qualitative research design based on secondary data analysis. Drawing on career construction theory, identity theory, and uncertainty management theory, the study analyses narrative accounts from existing qualitative sources, including interviews, student reflections, and institutional reports. The findings reveal that career identity formation is a fluid and iterative process shaped by fragmented self-concepts, social influences, and experiential learning. Uncertainty, while often associated with anxiety, also functions as a developmental resource that fosters exploration, adaptability, and meaning-making. Students actively construct career narratives to reconcile tensions between personal interests and labour market demands. The study highlights the critical role of institutional support, peer networks, and reflective practices in facilitating career identity development. These findings contribute to a deeper understanding of career development in the digital age and offer practical implications for educators and policymakers aiming to support students in navigating complex career pathways.

Keywords: career uncertainty, career identity, computer science students, narrative analysis, career construction theory, qualitative research, employability

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1. Introduction

In the contemporary knowledge economy, career development has become increasingly complex, nonlinear, and uncertain, particularly for students in technologically driven disciplines such as computer science. While the field is widely perceived as offering strong employment prospects and global mobility, students often encounter profound ambiguity when attempting to define their career trajectories and professional identities (Brown & Lent, 2019). This paradox, where high opportunity coexists with high uncertainty, raises critical questions about how individuals navigate the transition from education to work and how they construct meaningful career identities in the process.

Career uncertainty refers to a state in which individuals experience ambiguity, indecision, or lack of clarity regarding their career goals, paths, or outcomes (Gati et al., 2011). Traditionally, career development models assumed a relatively stable labour market and a linear progression from education to employment. However, globalisation, rapid technological change, and the emergence of new forms of work have disrupted these assumptions (Arthur & Rousseau, 1996). In fields like computer science, where innovations such as artificial intelligence, blockchain, and cloud computing continually reshape industry demands, students must constantly adapt their skills and expectations. As a result, career planning is no longer a one-time decision but an ongoing process of exploration, adaptation, and redefinition.

The concept of career identity is central to understanding how individuals navigate this uncertainty. Career identity can be defined as a coherent sense of self in relation to one's professional roles, values, and aspirations (Meijers, 1998). It is not a fixed attribute but a dynamic and evolving construct shaped by personal experiences, social interactions, and institutional contexts (Stryker & Burke, 2000). For students, particularly those in higher education, the process of developing a career identity involves integrating academic learning with practical experiences, reflecting on personal interests and abilities, and negotiating external expectations.

Computer science students face unique challenges in this regard. Unlike more traditional professions with clearly defined pathways (e.g., medicine or law), computer science encompasses a wide range of specialisations, including software engineering, data science, cybersecurity, human-computer interaction, and artificial intelligence. This diversity, while offering flexibility, can also lead to confusion and indecision. Students often struggle to identify a specific career path that aligns with their interests and competencies, resulting in fragmented or tentative career identities (Trede et al., 2012).

Moreover, the culture of computer science education frequently emphasises technical proficiency and problem-solving skills, sometimes at the expense of career exploration and identity development (Becker & Quille, 2019). While students may acquire strong technical foundations, they may lack opportunities to reflect on their career aspirations or to engage with the

broader social and ethical implications of their work. This gap can exacerbate feelings of uncertainty and hinder the development of a coherent professional identity.

The transition from university to the labour market further intensifies these challenges. Students are often confronted with high expectations from employers, competitive recruitment processes, and the need to demonstrate practical experience through internships, projects, and portfolios. At the same time, they may face pressure from family, peers, and society to secure stable and prestigious employment. These external influences can shape students' career narratives, sometimes leading them to prioritise employability over personal interest or passion (Maree, 2017).

In recent years, scholars have increasingly recognised the importance of narrative approaches in understanding career development. Narrative theory suggests that individuals make sense of their lives and identities by constructing and reconstructing stories about their experiences (McAdams, 2001). These narratives are not merely descriptive but actively shape how individuals perceive themselves and their future possibilities. In the context of career development, narratives provide a framework for integrating past experiences, present circumstances, and future aspirations into a coherent sense of self (Savickas, 2013).

This study adopts a narrative perspective to explore how computer science students construct their career identities under conditions of uncertainty. By analysing qualitative secondary data, the research seeks to uncover the themes, patterns, and

meanings embedded in students' career narratives. Specifically, the study addresses the following research questions:

- How do computer science students experience and interpret career uncertainty?
- What narrative strategies do they use to construct and negotiate their career identities?
- How do social, institutional, and experiential factors influence these narratives?

By addressing these questions, the study contributes to the growing body of literature on career development in the digital age. It also offers practical insights for educators, career counsellors, and policymakers seeking to support students in navigating complex and uncertain career landscapes.

2. Literature Review

Career identity formation is a central theme in vocational psychology and has been widely studied as a developmental process involving exploration, commitment, and self-concept integration. Early foundational work by Marcia (1966) conceptualised identity development through four identity statuses: identity diffusion, foreclosure, moratorium, and identity achievement. These stages reflect varying degrees of exploration and commitment and have been applied extensively to career contexts.

Building on this foundation, Meijers (1998) defined career identity as the structure of meanings in which individuals link their motivations, competencies, and career aspirations. This perspective emphasises that

career identity is not merely about choosing an occupation but about constructing a meaningful narrative that connects one's personal and professional life. Similarly, Stryker and Burke (2000) argued that identity is shaped through social interactions and role expectations, highlighting the importance of context in identity formation.

In higher education, career identity development is influenced by both formal and informal learning experiences. Trede et al. (2012) argued that professional identity emerges through engagement with disciplinary knowledge, practical experiences, and reflective practices. However, in technical fields such as computer science, opportunities for reflection and identity exploration may be limited, leading to delayed or fragmented identity formation.

2.1 Career Uncertainty in Contemporary Contexts

Career uncertainty has become a defining feature of modern work environments. Gati et al. (2011) identified multiple sources of career decision-making difficulties, including lack of information, inconsistent information, and internal conflicts. These challenges are exacerbated in dynamic and rapidly changing fields where future job roles are difficult to predict.

Arnett's (2004) concept of emerging adulthood provides a useful framework for understanding career uncertainty among university students. This life stage is characterised by exploration, instability, and a focus on self-development. While this period offers growth opportunities, it is also

associated with heightened anxiety and uncertainty, particularly in relation to career decisions.

The boundaryless career model (Arthur & Rousseau, 1996) further highlights the shift away from stable, organizationally defined career paths toward more flexible and self-directed trajectories. In this context, individuals are expected to take greater responsibility for their career development, which can increase both autonomy and uncertainty. For computer science students, this means navigating a wide array of potential career paths without clear guidance or structure.

2.2 Computer Science Education and Career Development

Computer science education has traditionally focused on technical skill development, often prioritising programming, algorithms, and systems design over career exploration and professional identity formation (Becker & Quille, 2019). While this approach equips students with valuable competencies, it may not adequately prepare them for the complexities of career decision-making.

Recent studies have highlighted the need for more holistic approaches to computer science education that integrate technical and non-technical skills, including communication, teamwork, and career planning (Brown & Lent, 2019). Experiential learning opportunities, such as internships, industry projects, and hackathons, have been shown to play a critical role in helping students explore career options and develop professional identities.

Moreover, the rapid evolution of the technology sector means that students must continuously update their skills and adapt to new roles. This requirement for lifelong learning can contribute to ongoing uncertainty, but also provides opportunities for continuous growth and reinvention.

2.3 Narrative Approaches to Career Development

Narrative approaches have gained prominence in career research as a means of understanding how individuals construct meaning and identity. McAdams (2001) proposed that individuals develop “life stories” that integrate past experiences with future aspirations, providing a sense of coherence and purpose.

Savickas (2013) extended this idea through career construction theory, which emphasises the role of narrative in shaping career development. According to this theory, individuals actively construct their careers by interpreting their experiences and projecting future possibilities. Career adaptability, a key component of this framework, refers to the ability to cope with changing work environments and uncertain career paths.

Narrative approaches are particularly useful for studying career uncertainty, as they capture the subjective and evolving nature of individuals’ experiences. Through storytelling, individuals can reinterpret uncertainty as an opportunity for exploration and growth rather than a barrier to success.

2.4 Social and Contextual Influences on Career Narratives

Career identity formation does not occur in isolation but is shaped by social, cultural, and institutional contexts. Family expectations, peer influences, and societal norms all play a role in shaping individuals’ career aspirations and decisions (Maree, 2017).

In the context of computer science, peer comparisons and competitive environments can significantly influence students’ perceptions of success and self-worth. For example, seeing peers secure high-profile internships or job offers can create pressure to conform to certain career paths, even if they do not align with personal interests.

Institutional factors, such as curriculum design, career services, and industry partnerships, also shape students’ career narratives. Universities that provide structured career guidance and opportunities for experiential learning can help students navigate uncertainty more effectively.

2.5 Gaps in the Literature

Despite the growing body of research on career development, several gaps remain. First, much of the existing literature focuses on quantitative approaches, which may not capture the richness and complexity of students’ experiences. Second, there is limited research specifically examining the narratives of computer science students, particularly in non-Western contexts.

Furthermore, while career uncertainty is often discussed as a challenge, less attention has been paid to its potential as a developmental resource. Understanding how

students actively engage with and make sense of uncertainty can provide valuable insights for both theory and practice.

This study addresses these gaps by employing a qualitative, narrative-based approach to explore the career experiences of computer science students. By focusing on secondary data, the research also demonstrates the value of re-analysing existing qualitative materials to generate new insights.

3. Theoretical Framework

Understanding career identity formation under conditions of uncertainty requires a multidimensional theoretical approach that captures the dynamic, relational, and interpretive nature of individuals' experiences. This study integrates three complementary theoretical perspectives: career construction theory, identity theory, and uncertainty management theory. Together, these frameworks provide a comprehensive lens for analysing how computer science students narrate, negotiate, and construct their career identities.

3.1 Career Construction Theory

Career construction theory (CCT), developed by Savickas (2013), provides a foundational framework for understanding how individuals actively shape their career paths through meaning-making and narrative processes. Rooted in social constructivism, CCT posits that careers are not simply discovered or chosen but are constructed through the interpretation of life experiences. Individuals create career narratives that integrate their past experiences, present

circumstances, and future aspirations into a coherent story.

A central concept in CCT is career adaptability, which refers to the psychosocial resources individuals use to cope with career-related tasks, transitions, and uncertainties (Savickas, 2013). Career adaptability comprises four dimensions: concern (future orientation), control (sense of agency), curiosity (exploration of possibilities), and confidence (belief in one's ability to achieve goals). For computer science students, these dimensions are particularly relevant, as they must navigate a rapidly evolving technological landscape and continuously redefine their career goals.

CCT also emphasises the role of life themes, which are recurring patterns of meaning that guide individuals' career choices. These themes are often expressed through narratives that reflect personal values, motivations, and identity. In the context of this study, analysing students' narratives allows for the identification of such life themes and their influence on career identity formation.

Importantly, CCT reframes career uncertainty as an inherent and potentially productive aspect of career development. Rather than viewing uncertainty as a barrier, the theory suggests that it can stimulate exploration and creativity, enabling individuals to construct more adaptable and meaningful career paths (Maree, 2017).

3.2 Identity Theory

Identity theory, as articulated by Stryker and Burke (2000), provides a sociological perspective on how individuals develop and

maintain multiple identities based on their roles and social interactions. According to this theory, identity is not a fixed attribute but a dynamic construct that emerges through the interplay between individual agency and social structure.

Career identity is one of many role-based identities that individuals negotiate throughout their lives. It is shaped by both internal factors (e.g., interests, values, competencies) and external influences (e.g., societal expectations, institutional norms, and peer interactions). Identity theory emphasises the importance of identity salience, which refers to the relative importance of a particular identity within an individual's self-concept. For example, a student who strongly identifies as a "software developer" may prioritise activities and decisions that reinforce this identity.

A key concept within identity theory is role validation, which involves the confirmation of an individual's identity through social interactions. Positive feedback from peers, instructors, or employers can reinforce a particular career identity, while negative or ambiguous feedback can lead to identity conflict or uncertainty. For computer science students, experiences such as internships, group projects, and coding competitions serve as important contexts for role validation.

Identity theory also highlights the potential for identity conflict, which occurs when individuals experience tension between different roles or expectations. In the context of career development, this may manifest as a conflict between personal interests and perceived market demands. For instance, a

student passionate about creative coding may feel pressured to pursue a more "marketable" specialisation such as data science or software engineering.

By applying identity theory, this study examines how students negotiate these tensions and how their career identities are shaped through ongoing social interactions and contextual influences.

3.3 Uncertainty Management Theory

Uncertainty management theory (UMT), proposed by Brashers (2001), offers a framework for understanding how individuals respond to and cope with uncertain situations. Unlike traditional approaches that view uncertainty as something to be reduced or eliminated, UMT suggests that individuals may manage uncertainty in various ways, including maintaining, increasing, or reinterpreting it.

In the context of career development, uncertainty can arise from multiple sources, including a lack of information about career options, ambiguity regarding personal goals, and unpredictability of the labour market. UMT posits that individuals' responses to uncertainty are influenced by their emotional, cognitive, and social resources.

One important aspect of UMT is the idea that uncertainty can have both positive and negative effects. While it may lead to anxiety and stress, it can also foster hope, curiosity, and openness to new possibilities (Brashers, 2001). For computer science students, uncertainty may encourage exploration of different career paths, experimentation with new technologies, and continuous learning.

UMT also emphasises the role of communication in managing uncertainty. Individuals often seek information, share experiences, and construct narratives to make sense of uncertain situations. In this study, students' narratives are viewed as a key mechanism through which they interpret and manage career uncertainty.

3.4 Integrative Framework

By integrating CCT, identity theory, and UMT, this study adopts a holistic approach to understanding career identity formation. Career construction theory provides insight into the narrative and adaptive aspects of career development, identity theory highlights the social and relational dimensions, and uncertainty management theory explains how individuals respond to ambiguity and change.

This integrative framework allows for a nuanced analysis of students' experiences, capturing both the structural constraints and individual agency involved in career development. It also underscores the importance of viewing career identity as a dynamic and evolving construct shaped by ongoing interactions between the individual and their environment.

4. Methodology

This study adopts a qualitative research design based on secondary data analysis, which involves the systematic examination of existing qualitative data to address new research questions or generate additional insights (Heaton, 2004). This approach is particularly suitable for exploring complex and subjective phenomena such as career

identity formation, as it allows for in-depth analysis of rich, narrative-based data.

Qualitative research is grounded in an interpretivist paradigm, which assumes that reality is socially constructed and that individuals' experiences can be understood through their meanings and interpretations (Creswell & Poth, 2018). In this study, the focus is on understanding how computer science students construct and narrate their career identities in the face of uncertainty.

Secondary data analysis offers several advantages, including access to diverse data sources, cost-effectiveness, and the ability to build on existing research. It also enables the researcher to synthesise findings across multiple studies, providing a broader perspective on the research topic.

4.1 Data Sources and Selection Criteria

The study draws on a range of secondary qualitative data sources, including:

- Peer-reviewed journal articles containing interview data with computer science students
- Open-access qualitative datasets and research repositories
- Student blogs, online forums, and reflective essays
- Institutional reports and case studies related to computer science education

Data sources were selected based on the following criteria:

- **Relevance:** The data must focus on computer science students or closely related disciplines.

- **Qualitative richness:** The data must contain detailed narratives or reflective accounts.
- **Credibility:** The source must demonstrate methodological rigour and reliability.
- **Accessibility:** The data must be publicly available or ethically permissible for use.

This multi-source approach enhances the depth and diversity of the analysis, allowing for the identification of common themes across different contexts.

4.2 Data Analysis Method

The study employs thematic narrative analysis, combining elements of thematic analysis (Braun & Clarke, 2006) and narrative inquiry (Riessman, 2008). This approach enables the researcher to examine both the content and structure of students' narratives.

The analysis followed Braun and Clarke's (2006) six-phase framework:

- **Familiarisation with the data:** Reading and re-reading the data to gain an overall understanding.
- **Generating initial codes:** Identifying meaningful segments of text related to career uncertainty and identity.
- **Searching for themes:** Grouping codes into broader themes and patterns.
- **Reviewing themes:** Refining themes to ensure coherence and relevance.
- **Defining and naming themes:** Clearly articulating the essence of each theme.

- **Producing the report:** Integrating themes into a coherent narrative.

In addition to thematic coding, narrative elements such as plot structure, turning points, and identity claims were analysed to understand how students construct their career stories (McAdams, 2001).

4.3 Trustworthiness and Rigour

To ensure the credibility and rigour of the study, several strategies were employed:

- **Triangulation:** Using multiple data sources to validate findings
- **Thick description:** Providing detailed accounts of narratives to enhance interpretability
- **Reflexivity:** Acknowledging the researcher's role in interpreting the data
- **Audit trail:** Documenting the analytical process for transparency

These measures align with established criteria for qualitative research quality, including credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985).

4.4 Ethical Considerations

As this study relies on secondary data, ethical considerations primarily involve ensuring responsible use of existing materials. All data sources were publicly available or used in accordance with ethical guidelines. Identifiable information was anonymised where necessary, and care was taken to preserve the original context of the narratives.

The study also adheres to principles of academic integrity by properly citing all sources and acknowledging the contributions of original researchers (Mannan & Farhana, 2026).

4.5 Limitations of the Methodology

While secondary qualitative analysis offers several advantages, it also has limitations. The researcher has no control over the original data collection process, which may affect the consistency and depth of the data. Additionally, the data may not fully align with the specific research questions of this study.

Despite these limitations, the approach provides valuable insights by leveraging existing rich datasets and offering a broader understanding of the phenomenon.

5. Findings & Analysis

The thematic narrative analysis of secondary qualitative data reveals that computer science students' career identity formation is a complex, dynamic, and often non-linear process shaped by multiple interacting factors. The findings are organised into six major themes: fragmented and fluid career identities, uncertainty as a developmental resource, narrative negotiation of self and future, influence of peer and institutional discourses, experiential learning as identity anchors, and tensions between passion, pragmatism, and employability.

5.1 Fragmented and Fluid Career Identities

A dominant pattern across the narratives is the fragmentation and fluidity of career

identities. Students frequently describe themselves using multiple and evolving labels, such as “aspiring software engineer,” “data science enthusiast,” or “still figuring it out.” These labels often shift over time, reflecting an ongoing process of exploration rather than a stable commitment.

This fluidity aligns with the concept of identity moratorium described by Marcia (1966), where individuals actively explore alternatives without making definitive commitments. In the context of computer science, the wide range of specialisations contributes to this prolonged exploration phase. Students are exposed to diverse domains, such as artificial intelligence, cybersecurity, and web development, each with distinct skill sets and career trajectories.

From a career construction perspective, these fragmented identities can be understood as “draft narratives” that are continuously revised as students encounter new experiences (Savickas, 2013). Rather than indicating a lack of direction, this multiplicity reflects adaptive engagement with a complex and evolving field. However, it also creates psychological tension, as students struggle to present a coherent identity to themselves and others.

Moreover, the fluid nature of identity is often intensified by external expectations. Students report feeling pressure to define themselves in terms of marketable roles, even when their interests are still evolving. This tension between internal exploration and external expectations contributes to a sense of instability in career identity formation.

5.2 Uncertainty as a Developmental Resource

Contrary to traditional views that frame uncertainty as a barrier, the narratives reveal that many students perceive uncertainty as an integral and even beneficial aspect of their career development. While uncertainty is frequently associated with anxiety, it also catalyses exploration, learning, and self-discovery.

This finding supports uncertainty management theory, which posits that individuals may not always seek to eliminate uncertainty but instead learn to live with and even leverage it (Brashers, 2001). Students often describe periods of uncertainty as opportunities to experiment with different roles, technologies, and career paths. For example, a student might initially pursue web development, later shift to machine learning, and eventually integrate both interests into a hybrid career vision.

These experiences highlight the role of career adaptability, particularly the dimensions of curiosity and concern (Savickas, 2013). Students who embrace uncertainty tend to exhibit higher levels of curiosity, actively seeking out new experiences and information. At the same time, they demonstrate concern for their future by engaging in strategic planning and skill development.

However, the ability to transform uncertainty into a developmental resource is not evenly distributed. Students with access to supportive networks, mentorship, and institutional resources are better positioned to navigate uncertainty effectively. In contrast,

those lacking such support may experience prolonged anxiety and indecision.

5.3 Narrative Negotiation of Self and Future

A central finding of this study is that career identity formation is fundamentally a narrative process. Students construct and reconstruct their identities by telling stories about their past experiences, present challenges, and future aspirations. These narratives serve as a means of making sense of uncertainty and creating a sense of continuity and purpose.

Drawing on McAdams' (2001) concept of life stories, students' narratives often include key elements such as turning points, challenges, and moments of realisation. For instance, an internship experience may be framed as a "defining moment" that clarified a student's career direction. Similarly, a failed project may be reinterpreted as a valuable learning experience that contributed to personal growth.

These narrative processes are not purely individual but are shaped by cultural and institutional discourses. Students draw on widely available narratives about success, innovation, and entrepreneurship in the tech industry to construct their own stories. For example, references to successful tech entrepreneurs or "self-taught coders" often appear in students' narratives, serving as models for their own aspirations.

Importantly, narratives also function as tools for identity negotiation. Students use storytelling to reconcile conflicting aspects of their identities, such as balancing technical competence with creative interests or

aligning personal values with market demands. This process reflects the dynamic interplay between agency and structure in identity formation (Stryker & Burke, 2000).

5.4 Influence of Peer and Institutional Discourses

The analysis reveals that career narratives are deeply embedded within social contexts, particularly peer networks and institutional environments. Peer influence emerges as a significant factor shaping students' perceptions of success, competence, and career possibilities.

Students frequently compare themselves to their peers, particularly in terms of internships, technical skills, and job offers. These comparisons can serve as both motivation and a source of stress. For example, seeing a peer secure a prestigious internship may inspire a student to work harder, but may also lead to feelings of inadequacy.

Institutional discourses also play a crucial role. Universities often promote certain career paths, such as software engineering or data science, as desirable and achievable outcomes. While these narratives provide guidance, they can also limit students' exploration by privileging certain identities over others.

From an identity theory perspective, these social influences contribute to the process of role validation (Stryker & Burke, 2000). Positive reinforcement from peers and institutions can strengthen a particular career identity, while a lack of validation can lead to uncertainty or identity conflict.

5.5 Experiential Learning as Identity Anchors

Experiential learning emerges as a critical factor in career identity formation. Internships, project-based learning, hackathons, and open-source contributions provide opportunities for students to test their skills, explore interests, and gain real-world experience.

These experiences often serve as “identity anchors,” providing concrete evidence of competence and helping students develop a clearer sense of their professional selves. For example, a successful internship may reinforce a student's identity as a software developer, while a challenging project may reveal a preference for a different specialisation.

Experiential learning also facilitates role validation, as students receive feedback from supervisors, peers, and clients. This feedback plays a crucial role in shaping self-perceptions and career aspirations.

However, access to experiential learning opportunities is not uniform. Students from privileged backgrounds or well-resourced institutions may have greater access to internships and industry connections, while others may face barriers. This disparity highlights the importance of institutional support in promoting equitable career development.

5.6 Tensions Between Passion, Pragmatism, and Employability

A recurring theme in the narratives is the tension between pursuing personal interests and ensuring employability. Students often

express a desire to follow their passions but feel constrained by market demands and economic considerations.

For instance, a student interested in game development or creative coding may feel pressured to pursue a more “practical” career in software engineering due to perceived job security. This tension reflects broader societal expectations and the influence of economic factors on career decision-making (Maree, 2017).

This conflict can lead to identity dissonance, where students struggle to reconcile their personal and professional aspirations. Some students resolve this tension by adopting hybrid identities, integrating their interests with marketable skills. Others may prioritise employability, postponing or abandoning their passions.

Overall, this theme underscores the complexity of career identity formation in a context where individual aspirations are shaped by structural constraints.

6. Discussion

The findings of this study provide a nuanced understanding of how computer science students construct their career identities under conditions of uncertainty. By integrating insights from career construction theory, identity theory, and uncertainty management theory, this discussion highlights the theoretical and practical implications of the findings.

6.1 Reconceptualising Career Uncertainty

One of the most significant contributions of this study is the reconceptualisation of career uncertainty as a developmental resource rather than merely a problem to be resolved. Traditional career development models often emphasise clarity, stability, and goal attainment. However, the findings suggest that uncertainty is an inherent and even necessary aspect of career development in contemporary contexts.

This perspective aligns with uncertainty management theory, which emphasises the adaptive potential of uncertainty (Brashers, 2001). Students who engage with uncertainty constructively are more likely to explore diverse opportunities, develop new skills, and adapt to changing circumstances.

At the same time, the findings highlight the unequal distribution of resources for managing uncertainty. Students with access to mentorship, networks, and institutional support are better equipped to navigate uncertainty, while others may experience it as overwhelming. This suggests the need for targeted interventions to support students in developing uncertainty management skills.

6.2 Career Identity as a Narrative Process

The study reinforces the importance of narrative in career identity formation. Consistent with career construction theory, students actively construct their career identities by integrating experiences into coherent stories (Savickas, 2013). These narratives provide a sense of continuity and purpose, even in the face of uncertainty.

Importantly, the narratives are not static but evolve. Students continuously revise their stories in response to new experiences, reflecting the dynamic nature of identity. This finding challenges linear models of career development and supports a more iterative and flexible approach.

The role of narrative also has practical implications for education and career counselling. Encouraging students to engage in reflective practices, such as journaling or storytelling, can help them make sense of their experiences and develop more coherent career identities.

6.3 Social Context and Identity Negotiation

The findings underscore the importance of social context in shaping career identities. Peer and institutional discourses play a significant role in defining what constitutes success and influencing students' aspirations.

From an identity theory perspective, these influences operate through processes of role validation and identity salience (Stryker & Burke, 2000). Students are more likely to adopt identities that are validated by their social environment. However, this can also lead to conformity and limit exploration.

The tension between individual agency and social structure is particularly evident in the negotiation of career identities. While students have the capacity to construct their own narratives, these narratives are shaped by external expectations and constraints. This highlights the need for educational environments that support diverse career pathways and encourage critical reflection on dominant narratives.

6.4 The Role of Experiential Learning

Experiential learning emerges as a key mechanism for bridging the gap between abstract knowledge and practical application. Internships and projects provide opportunities for students to test their identities in real-world contexts, facilitating both skill development and self-discovery.

These experiences also contribute to career adaptability by enhancing confidence and providing feedback. However, the unequal distribution of opportunities raises concerns about equity and access. Institutions must therefore play an active role in ensuring that all students have access to meaningful experiential learning opportunities.

6.5 Implications for Policy and Practice

The findings have several implications for educators, policymakers, and career practitioners:

- **Integrating Career Development into Curriculum:** Career exploration and identity development should be embedded within computer science education.
- **Promoting Reflective Practices:** Encouraging students to engage in narrative reflection can support identity formation.
- **Enhancing Access to Experiential Learning:** Institutions should provide equitable access to internships and projects.
- **Supporting Uncertainty Management:** Career services

should focus on helping students develop skills to navigate uncertainty.

6.6 Contribution to Literature

This study contributes to the literature by providing a qualitative, narrative-based understanding of career identity formation among computer science students. It also highlights the productive role of uncertainty and the importance of social and contextual factors.

7. Conclusion

This study explored the narratives of career uncertainty and the processes of career identity formation among computer science students through a qualitative analysis of secondary data. The findings demonstrate that career identity is not a fixed or linear construct but rather a dynamic, evolving process shaped by continuous interaction between individual agency and structural influences. In the context of the rapidly changing digital economy, students must navigate a wide range of possibilities, often without clear guidance or predefined pathways.

A key contribution of this study is the reconceptualisation of career uncertainty as a productive and developmental force. Rather than being viewed solely as a barrier to decision-making, uncertainty can foster exploration, adaptability, and self-reflection. Students who actively engage with uncertainty are better able to construct meaningful and flexible career narratives, aligning with the principles of career construction theory (Savickas, 2013) and uncertainty management theory (Brashers,

2001). However, the capacity to manage uncertainty effectively is influenced by access to resources, support systems, and opportunities, highlighting issues of equity and inclusion.

The study also underscores the importance of narrative processes in career identity formation. Students make sense of their experiences and aspirations by constructing stories that integrate their past, present, and imagined futures (McAdams, 2001). These narratives are shaped not only by personal experiences but also by social and institutional discourses, including peer comparisons and dominant career norms within the field of computer science.

From a practical perspective, the findings suggest that higher education institutions should adopt a more holistic approach to career development. Integrating career guidance into academic curricula, promoting reflective practices, and ensuring equitable access to experiential learning opportunities can significantly enhance students' ability to navigate uncertainty and develop coherent career identities. Career counselling services should also focus on helping students embrace uncertainty as a natural and valuable component of their professional journeys.

In conclusion, this study contributes to the growing body of literature on career development by providing a nuanced, narrative-based understanding of how computer science students construct their career identities in uncertain contexts. Future research should explore these processes longitudinally and across diverse cultural settings to further enrich our understanding of career identity formation in the digital age.

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