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Time Management Practices Among Computer Science Students: A Qualitative Investigation of Academic and Professional Preparedness

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Abstract: Time management is a critical competency for computer science students, given the intensive and dynamic nature of their academic and professional environments. This qualitative study explores time management practices among computer science students and examines their implications for academic performance and professional preparedness. Using a secondary data analysis approach, the study synthesises findings from peer-reviewed literature, institutional reports, and prior qualitative research. Thematic analysis reveals that effective time management is closely associated with structured planning, prioritisation, and the use of digital tools, while challenges such as procrastination, digital distractions, and workload intensity significantly hinder students' productivity. The study further highlights the role of self-regulated learning in shaping students' ability to manage time effectively and adapt to complex academic demands. Importantly, time management is identified as a key transferable skill that enhances employability by fostering discipline, accountability, and project management capabilities. The findings underscore the need for integrating time management training into computer science curricula and support systems. This research contributes to the literature by offering a comprehensive, theory-driven understanding of time management as both an academic and professional competency.

Keywords: time management, computer science students, self-regulated learning, procrastination, employability, academic performance, digital distraction

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1. Introduction

Time management is widely recognised as a foundational skill that underpins academic success, personal well-being, and professional effectiveness. In contemporary higher education, where students are expected to navigate complex academic requirements alongside extracurricular and personal responsibilities, the ability to manage time effectively has become increasingly critical. This is particularly evident in the field of computer science (CS), which is characterised by intensive coursework, project-based learning, and the necessity for continuous skill development in response to rapidly evolving technological landscapes (Becker et al., 2017).

Computer science students often encounter a unique set of academic challenges that distinguish their experiences from those in other disciplines. These challenges include the need to engage in prolonged periods of problem-solving, debugging, and coding, which require sustained concentration and cognitive effort. Unlike traditional subjects that may rely more heavily on memorisation or theoretical understanding, CS education demands practical application and iterative learning processes. As a result, students must allocate substantial blocks of uninterrupted time to complete assignments effectively (Robins et al., 2003). This requirement places significant pressure on students to develop robust time management strategies.

Despite the recognised importance of time management, many computer science students struggle to effectively organise and

utilise their time. Research has consistently shown that poor time management is associated with negative academic outcomes, including lower grades, increased stress, and higher dropout rates (Britton & Tesser, 1991; Claessens et al., 2007). One of the most pervasive issues affecting students is procrastination, defined as the voluntary delay of an intended task despite anticipating negative consequences (Steel, 2007). Procrastination is particularly problematic in CS education, where assignments often build upon previous knowledge, and delays can lead to cumulative learning deficits.

In addition to procrastination, the increasing prevalence of digital technologies has introduced new challenges for time management. While digital tools such as coding platforms, online resources, and collaborative software can enhance learning, they also create opportunities for distraction. Social media, online gaming, and streaming services compete for students' attention, often leading to fragmented work patterns and reduced productivity (Rosen et al., 2013). This dual role of technology, as both an enabler and a disruptor, complicates students' efforts to manage their time effectively.

Another critical dimension of time management in computer science education is its relationship with professional preparedness. The technology industry places a high value on soft skills, including time management, communication, and teamwork, alongside technical expertise (Jackson, 2014). Employers expect graduates to demonstrate the ability to prioritise tasks, meet deadlines, and manage multiple projects simultaneously. Consequently, students who

fail to develop effective time management skills during their academic careers may face challenges in transitioning to professional roles.

The importance of time management extends beyond academic performance and employability to include students' mental health and well-being. Poor time management is often associated with increased stress, anxiety, and burnout, particularly in demanding fields such as computer science (Misra & McKean, 2000). Students who struggle to balance their responsibilities may experience feelings of overwhelm and reduced motivation, which can further exacerbate time management difficulties. Conversely, effective time management has been linked to improved psychological well-being, as it enables students to maintain a sense of control over their activities and achieve a better work-life balance.

Given these considerations, it is essential to develop a comprehensive understanding of how computer science students manage their time, the challenges they face, and the implications of their practices for academic and professional outcomes. While numerous studies have examined time management in general student populations, there is a need for more focused research that addresses the specific context of computer science education. This study seeks to fill this gap by conducting a qualitative investigation based on secondary data, synthesising insights from existing literature to identify key themes and patterns.

The study is guided by the following research questions:

- What are the common time management practices among computer science students?
- What challenges do they encounter in managing their time effectively?
- How do these practices influence their academic performance and professional preparedness?

By addressing these questions, this research aims to contribute to the growing body of knowledge on student success in computer science education. The findings are expected to inform educators, institutions, and policymakers in designing interventions and support systems that enhance students' time management skills. Furthermore, the study highlights the importance of integrating time management training into computer science curricula as a means of preparing students for the demands of the modern workforce.

2. Literature Review

Time management is a multifaceted construct that encompasses a range of behaviours and cognitive processes aimed at optimising the use of time. According to Claessens et al. (2007), time management involves activities such as goal setting, prioritisation, scheduling, and monitoring progress. These behaviours enable individuals to allocate their time effectively across various tasks and responsibilities.

Macan (1994) proposed a process model of time management that highlights three key components: setting goals and priorities, employing time management mechanics (e.g., planning and scheduling), and maintaining a preference for organisation.

This model suggests that individuals who engage in structured time management behaviours are more likely to experience a sense of control over their time, which in turn enhances performance and reduces stress.

In the context of higher education, time management is often viewed as a self-regulatory skill that supports learning and achievement. Students who effectively manage their time are better able to balance academic and non-academic activities, meet deadlines, and achieve their goals (Zimmerman, 2002).

2.1 Time Management and Academic Performance

A substantial body of research has established a strong relationship between time management and academic performance. Britton and Tesser (1991) found that students who engaged in effective time management practices achieved higher academic grades compared to their peers. Similarly, Claessens et al. (2007) concluded that time management behaviours are positively associated with job performance and academic success.

The mechanisms through which time management influences academic performance are multifaceted. Effective time management allows students to allocate sufficient time for studying, reduce last-minute cramming, and engage in deeper learning processes. It also facilitates better organisation of academic tasks, and students can approach their studies systematically and efficiently.

However, not all time management strategies are equally effective. Research suggests that

simply creating schedules or to-do lists is insufficient; students must also demonstrate consistency and adaptability in implementing these plans (Macan, 1994). This highlights the importance of developing not only time management skills but also the motivation and discipline required to apply them effectively.

2.2 Time Management in Computer Science Education

Computer science education presents unique challenges that make time management particularly critical. Programming tasks often require iterative problem-solving, where students must repeatedly test and refine their code. This process can be time-consuming and unpredictable, making it difficult for students to estimate the time required to complete assignments (Robins et al., 2003).

Becker et al. (2017) emphasise that emotional factors, such as frustration and anxiety, can further complicate time management in programming tasks. Students may spend excessive time debugging or become stuck on a particular problem, their overall productivity. These challenges highlight the need for flexible and adaptive time management strategies that can accommodate the uncertainties inherent in programming.

Group projects, which are common in computer science curricula, add another layer of complexity. Students must coordinate their schedules with team members, manage interdependencies, and ensure the timely completion of tasks. This requires not only individual time management skills but also collaborative planning and communication.

2.3 Procrastination and Self-Regulation

Procrastination is one of the most significant barriers to effective time management among students. Steel (2007) describes procrastination as a self-regulation failure, where individuals prioritise short-term gratification over long-term goals. This behaviour is often driven by factors such as task aversion, fear of failure, and low self-efficacy.

In computer science education, procrastination can have particularly detrimental effects. Since programming assignments often build on previous knowledge, delays can result in gaps in understanding that are difficult to overcome. Moreover, last-minute coding increases the likelihood of errors and reduces the quality of work.

Self-regulated learning (SRL) theory provides a useful framework for understanding and addressing procrastination. According to Zimmerman (2002), self-regulated learners actively plan, monitor, and evaluate their learning processes. They set goals, manage their time, and employ strategies to overcome challenges. Developing SRL skills can help students reduce procrastination and improve their time management.

2.4 Digital Distractions and Technology Use

The widespread use of digital technologies has transformed the learning environment, offering both opportunities and challenges for time management. On one hand, digital tools such as learning management systems,

coding platforms, and productivity applications can enhance efficiency and organisation. On the other hand, these technologies also introduce distractions that can undermine students' ability to focus.

Rosen et al. (2013) found that frequent task-switching due to digital interruptions negatively affects academic performance. Students who engage in multitasking often experience reduced concentration and increased cognitive load; their productivity declines. Social media platforms, in particular, are a major source of distraction, as they provide immediate gratification and continuous stimulation.

Managing digital distractions requires a combination of self-control and strategic use of technology. Students must develop the ability to regulate their attention and create environments that minimise interruptions. This may involve setting boundaries for technology use, using productivity tools, and adopting techniques such as the Pomodoro method.

2.5 Time Management and Mental Health

The relationship between time management and mental health is an important area of research. Misra and McKean (2000) found that students who experience high levels of stress often struggle with time management. Conversely, effective time management is associated with lower stress levels and improved well-being.

In computer science education, the high demands of coursework can contribute to stress and burnout. Students who fail to manage their time effectively may experience

feelings of overwhelm, and their motivation and performance are negatively affected. This underscores the importance of integrating time management training with mental health support services.

2.6 Time Management and Employability

Time management is a critical component of employability skills. According to Yorke (2006), employability encompasses a range of attributes that enable graduates to secure and succeed in employment. These include not only technical skills but also transferable skills such as communication, teamwork, and time management.

Jackson (2014) highlights that employers place a high value on graduates' ability to manage their time effectively. In the technology industry, professionals are often required to work on multiple projects simultaneously, meet tight deadlines, and adapt to changing priorities. Students who develop strong time management skills during their academic careers are better prepared to meet these demands.

Furthermore, time management is closely linked to professional identity and work habits. Students who cultivate disciplined and organised approaches to their work are more likely to transition successfully into professional roles. This emphasises the need for educational institutions to prioritise the development of time management skills as part of their curricula.

3. Theoretical Framework

This study is anchored in an integrative theoretical framework that draws on Self-Regulated Learning (SRL) Theory, the Time Management Behaviour Model, and the Employability Skills Framework. Together, these perspectives provide a multidimensional understanding of how computer science students conceptualise, practice, and benefit from time management in both academic and professional contexts.

3.1 Self-Regulated Learning (SRL) Theory

Self-Regulated Learning (SRL) theory serves as the primary theoretical lens for this study. SRL conceptualises learners as active agents who take control of their own learning processes through goal setting, strategic planning, self-monitoring, and self-reflection (Zimmerman, 2002). Within this framework, time management is not merely a behavioural skill but a central regulatory mechanism that enables learners to allocate cognitive and temporal resources effectively.

Zimmerman (2002) outlines three cyclical phases of SRL: forethought, performance, and self-reflection. During the forethought phase, learners set goals and plan their time accordingly. In the performance phase, they implement strategies such as scheduling and task prioritisation while monitoring their progress. Finally, in the self-reflection phase, learners evaluate their performance and adjust their strategies for future tasks.

In the context of computer science education, SRL is particularly relevant due to the self-directed nature of programming and problem-solving activities. Students must

often work independently, debug complex code, and engage in iterative learning processes. Effective time management allows them to distribute effort across tasks, avoid cognitive overload, and maintain sustained engagement (Robins et al., 2003). Conversely, a lack of self-regulation can lead to procrastination, inefficient study habits, and poor academic outcomes (Steel, 2007).

Moreover, SRL theory highlights the role of metacognition in time management. Students who are aware of their learning processes are better equipped to estimate the time required for tasks and adjust their schedules accordingly. This metacognitive awareness is critical in computer science, where task complexity and uncertainty often make time estimation challenging.

3.2 Time Management Behaviour Model

The Time Management Behaviour Model proposed by Macan (1994) provides a complementary perspective by focusing on the specific behaviours that constitute effective time management. According to this model, time management consists of three core components: goal setting and prioritisation, time management mechanics, and preference for organisation.

Goal setting and prioritisation involve identifying tasks and determining their relative importance. For computer science students, this may include deciding whether to focus on coding assignments, exam preparation, or group projects. Time management mechanics refer to practical strategies such as scheduling, creating to-do lists, and using calendars or digital tools. A

preference for organisation reflects an individual's inclination toward structured and orderly approaches to managing tasks.

Macan (1994) further argues that these behaviours influence an individual's perceived control of time, which mediates the relationship between time management practices and outcomes such as performance and stress. Students who feel in control of their time are more likely to experience lower stress levels and higher academic achievement.

In computer science education, the applicability of this model is evident in the use of digital productivity tools such as task management applications and version control systems. These tools support planning and organisation, enabling students to manage complex and interdependent tasks. However, the model also underscores that the mere use of tools is insufficient; students must develop consistent habits and disciplined routines to achieve effective time management (Claessens et al., 2007).

3.3 Procrastination and Temporal Motivation Theory

To further enrich the theoretical framework, this study incorporates insights from Temporal Motivation Theory (TMT), which explains procrastination as a function of expectancy, value, delay, and impulsiveness (Steel, 2007). TMT posits that individuals are more likely to delay tasks when the perceived rewards are distant or uncertain, and when immediate distractions are more appealing.

This perspective is particularly relevant for computer science students, who often face long-term projects with delayed rewards. For

example, the benefits of completing a complex programming assignment may not be immediately apparent, whereas the gratification from engaging in social media or entertainment is instant. This imbalance can lead to procrastination, undermining effective time management.

By integrating TMT with SRL and the Time Management Behaviour Model, this study provides a comprehensive understanding of both the behavioural and psychological dimensions of time management.

3.4 Employability Skills Framework

The Employability Skills Framework extends the analysis beyond academic contexts to consider the implications of time management for professional preparedness. Employability is defined as a set of achievements, skills, and attributes that make graduates more likely to gain employment and succeed in their careers (Yorke, 2006).

Time management is widely recognised as a critical employability skill, particularly in the technology sector, where professionals are expected to manage multiple tasks, meet deadlines, and adapt to dynamic work environments (Jackson, 2014). For computer science students, developing time management skills during their academic careers is essential for transitioning into professional roles.

This framework emphasises that time management is not an isolated skill but part of a broader set of competencies, including communication, teamwork, and problem-solving. For instance, effective time management in group projects requires

coordination with team members, negotiation of deadlines, and conflict resolution. These experiences contribute to the development of professional identity and workplace readiness.

3.5 Integrative Perspective

By combining these theoretical perspectives, this study adopts an integrative approach to understanding time management among computer science students. SRL theory highlights the internal processes of self-regulation, the Time Management Behaviour Model focuses on observable practices, TMT explains motivational challenges such as procrastination, and the Employability Skills Framework connects these elements to professional outcomes.

This integrative framework enables a holistic analysis of how students manage their time, the challenges they face, and the implications for their academic and professional development. It also provides a robust foundation for interpreting the findings of the qualitative analysis and for generating practical recommendations.

4. Methodology

This study adopts a qualitative research design based on secondary data analysis, aiming to explore time management practices among computer science students and their implications for academic and professional preparedness. Qualitative research is particularly suitable for this study because it allows for an in-depth understanding of complex behaviours, perceptions, and experiences (Creswell & Poth, 2018).

Secondary data analysis involves the systematic examination and interpretation of existing data sources, including published research articles, reports, and qualitative studies (Johnston, 2014). This approach is appropriate for the present study as it enables the synthesis of a wide range of findings from diverse contexts, providing a comprehensive understanding of the research topic.

4.1 Data Sources and Selection Criteria

The data for this study were collected from multiple secondary sources, including:

- Peer-reviewed journal articles
- Academic books and book chapters
- Conference proceedings in computer science education
- Institutional and policy reports

To ensure the quality and relevance of the data, specific inclusion criteria were applied:

- Studies focusing on time management, self-regulated learning, or procrastination among university students
- Research specifically addressing computer science or related disciplines
- Publications in English
- Peer-reviewed or published by reputable academic institutions

Exclusion criteria included studies with insufficient methodological detail, non-academic sources, and articles not directly related to time management.

This purposive selection process ensured that the data corpus was both relevant and credible, enabling rigorous analysis.

4.2 Data Analysis Procedure

The study employed thematic analysis, a widely used qualitative method for identifying, analysing, and reporting patterns within data (Braun & Clarke, 2006). The analysis followed a six-phase process:

Familiarisation with Data: The researcher conducted an extensive review of the selected literature, reading and re-reading the texts to gain a deep understanding of the content.

Initial Coding: Relevant segments of the data were coded based on recurring concepts and themes related to time management practices, challenges, and outcomes. Codes such as “procrastination,” “digital distraction,” “scheduling,” and “workload pressure” were identified.

Theme Development: Codes were grouped into broader themes that captured the underlying patterns in the data. For example, codes related to procrastination and distraction were combined under the theme of “barriers to effective time management.”

Reviewing Themes: The identified themes were reviewed and refined to ensure coherence and consistency. This involved comparing themes across different studies and ensuring that they accurately represented the data.

Defining and Naming Themes: Each theme was clearly defined and labelled to reflect its significance in the context of the research questions.

Interpretatio: The final step involved interpreting the themes in relation to the theoretical framework and research objectives, drawing connections between time management practices and academic and professional outcomes.

4.3 Trustworthiness and Rigour

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

- **Credibility:** The use of multiple data sources enhanced the validity of the findings through triangulation (Creswell & Poth, 2018).
- **Dependability:** A transparent and systematic analysis process was followed, allowing for replication.
- **Confirmability:** The study maintained objectivity by relying on established literature and avoiding personal bias.
- **Transferability:** The findings apply to similar contexts, particularly in higher education and computer science programs.

4.4 Ethical Considerations

As the study is based on secondary data, it does not involve direct interaction with human participants, thereby minimising ethical risks. However, ethical standards were maintained by:

- Properly citing all sources in accordance with APA (7th ed.) guidelines
- Avoiding plagiarism and misrepresentation of data
- Ensuring accurate interpretation of findings

4.5 Limitations of the Methodology

Despite its strengths, the methodology has certain limitations. Secondary data analysis relies on existing studies, which may vary in quality, context, and methodological approaches (Mannan & Farhana, 2026). This can introduce inconsistencies and limit the ability to draw definitive conclusions.

Additionally, the absence of primary data means that the study cannot capture the lived experiences of students in real-time. Future research could address this limitation by incorporating interviews, focus groups, or surveys.

4.6 Justification of the Approach

The choice of a qualitative secondary data approach is justified by the exploratory nature of the research. It allows for the integration of diverse perspectives and provides a comprehensive understanding of time management practices among computer science students. Furthermore, it is a cost-effective and efficient method for synthesising existing knowledge and identifying gaps for future research.

5. Findings and Analysis

This section presents the key findings derived from the thematic analysis of secondary data. The analysis reveals several interconnected themes that characterise time management practices among computer science students. These include structured and strategic time management behaviours, procrastination and self-regulation challenges, digital distractions and fragmented attention, workload intensity and time pressure,

adaptive coping strategies, and the development of professional competencies.

5.1 Structured and Strategic Time Management Practices

A dominant finding across the reviewed literature is that successful computer science students tend to adopt structured and strategic approaches to time management. These practices include the use of schedules, task prioritisation frameworks, and digital productivity tools. Students frequently rely on calendars, task management applications, and deadline tracking systems to organise their academic responsibilities (Claessens et al., 2007).

From the perspective of the Time Management Behaviour Model (Macan, 1994), these practices reflect the components of goal setting, prioritisation, and time management mechanics. Students who clearly define their academic goals, such as completing programming assignments or preparing for examinations, are better able to allocate their time effectively. Furthermore, prioritisation enables them to distinguish between urgent and important tasks, reducing the likelihood of last-minute work.

However, the analysis also indicates that the mere adoption of these tools does not guarantee effectiveness. Some students create detailed schedules but fail to adhere to them consistently. This inconsistency highlights a gap between planning and execution, which can be attributed to weak self-regulation (Zimmerman, 2002). In such cases, time management practices become performative rather than functional.

Another notable observation is the increasing reliance on digital tools tailored to computer science workflows, such as version control systems and collaborative platforms. These tools not only support task organisation but also facilitate teamwork and project coordination. As such, time management practices are embedded within broader technological ecosystems that shape students' learning experiences.

5.2 Procrastination and Self-Regulation Challenges

Procrastination emerges as one of the most pervasive and detrimental challenges affecting time management among computer science students. The literature consistently identifies procrastination as a form of self-regulation failure, where students delay tasks despite being aware of negative consequences (Steel, 2007).

In computer science education, procrastination is often linked to the complexity and perceived difficulty of programming tasks. Students may postpone assignments due to fear of failure, lack of confidence, or uncertainty about how to begin (Becker et al., 2017). This behaviour is further reinforced by the non-linear nature of programming, where progress is not always immediately visible.

Temporal Motivation Theory (Steel, 2007) provides a useful lens for understanding this phenomenon. According to this theory, tasks with delayed rewards and high uncertainty, such as long-term coding projects, are more likely to be postponed. In contrast, activities that offer immediate gratification, such as social media use, are prioritised.

The consequences of procrastination are significant. Students who delay their work often experience increased stress, reduced quality of output, and missed learning opportunities. Moreover, procrastination can create a cycle of negative reinforcement, where poor performance leads to decreased motivation, further exacerbating time management difficulties.

Importantly, the findings suggest that procrastination is not merely a behavioural issue but also a psychological one. Interventions aimed at improving time management must therefore address underlying factors such as motivation, self-efficacy, and emotional regulation.

5.3 Digital Distractions and Fragmented Attention

The pervasive use of digital technologies introduces both opportunities and challenges for time management. While digital tools can enhance productivity, they also create environments characterised by constant interruptions and distractions. Social media platforms, messaging applications, and online entertainment compete for students' attention, disrupting their focus and workflow (Rosen et al., 2013).

The analysis reveals that many computer science students engage in multitasking, frequently switching between academic tasks and non-academic digital activities. Although multitasking is often perceived as efficient, research indicates that it leads to reduced cognitive performance and increased error rates (Rosen et al., 2013). For programming tasks that require deep concentration, such interruptions can be particularly detrimental.

From an SRL perspective, digital distractions represent a failure of attentional control. Students who cannot regulate their focus are more susceptible to external stimuli, and their time management becomes fragmented. This fragmentation not only reduces productivity but also increases the time required to complete tasks.

Interestingly, some students attempt to mitigate these challenges by using productivity-enhancing technologies, such as website blockers and focus timers. These tools reflect an awareness of the negative impact of digital distractions and a proactive effort to manage them. However, their effectiveness depends on consistent use and underlying self-discipline.

5.4 Workload Intensity and Time Pressure

Computer science students frequently report experiencing high levels of workload and time pressure. This is due to the cumulative demands of programming assignments, group projects, examinations, and extracurricular activities (Robins et al., 2003). The intensity of these demands often exceeds students' capacity to manage their time effectively, particularly during peak academic periods.

The analysis indicates that workload intensity is a key driver of time management challenges. Students must allocate significant amounts of time to tasks that are both time-consuming and cognitively demanding. For example, debugging code can require extended periods of trial and error, making it difficult to predict the time required for completion.

From the perspective of perceived control of time (Macan, 1994), a high workload can reduce students' sense of control, leading to stress and anxiety. When students feel overwhelmed, they may resort to maladaptive coping strategies, such as procrastination or avoidance.

Group projects further complicate time management by introducing interdependencies among team members. Students must coordinate schedules and responsibilities and meet collective deadlines. This requires not only individual time management skills but also effective communication and collaboration.

5.5 Adaptive Coping Strategies

Despite these challenges, many computer science students develop adaptive strategies to manage their time effectively. These strategies include breaking tasks into smaller components, setting incremental deadlines, and using techniques such as the Pomodoro method to maintain focus.

Such practices align with the principles of self-regulated learning, where students actively monitor and adjust their behaviour to achieve their goals (Zimmerman, 2002). By dividing complex tasks into manageable units, students reduce cognitive load and increase their sense of progress.

Peer support also plays a significant role in time management. Collaborative learning environments allow students to share resources and tasks and provide mutual encouragement. This social dimension of time management highlights the importance of community and interaction in academic success.

Additionally, some students develop metacognitive awareness, enabling them to reflect on their time management practices and identify areas for improvement. This reflective process is critical for long-term skill development and professional growth.

5.6 Development of Professional Competencies

A key finding of this study is the strong link between time management practices and the development of professional competencies. Students who effectively manage their time tend to exhibit higher levels of discipline, responsibility, and reliability, qualities that are highly valued in the workplace (Jackson, 2014).

Time management also contributes to the development of project management skills, such as planning, scheduling, and resource allocation. These skills are directly transferable to professional contexts, where employees are expected to manage multiple tasks and meet deadlines.

Furthermore, the experience of working on group projects fosters teamwork and communication skills, which are essential for professional success. Students learn to coordinate their efforts, negotiate deadlines, and resolve conflicts, thereby enhancing their employability.

Conversely, students who struggle with time management may find it difficult to meet professional expectations. Poor time management can lead to missed deadlines, reduced productivity, and negative perceptions among employers.

6. Discussion

The findings of this study provide a comprehensive understanding of time management practices among computer science students and their implications for academic and professional outcomes. This section interprets these findings in relation to the theoretical framework and existing literature, highlighting key insights and implications.

6.1 Time Management as a Self-Regulatory Process

The findings strongly support the conceptualisation of time management as a self-regulatory process, as proposed by Zimmerman (2002). Students who demonstrate effective time management engage in goal setting, planning, monitoring, and reflection. These processes enable them to allocate their time strategically and adapt to changing demands.

However, the analysis also reveals significant variability in students' self-regulatory abilities. While some students exhibit high levels of autonomy and discipline, others struggle to translate their intentions into action. This gap underscores the importance of developing SRL skills as part of computer science education.

Educational interventions should therefore focus on enhancing students' self-regulatory capacities, including metacognitive awareness, motivation, and emotional control. By fostering these skills, institutions can help students overcome common barriers such as procrastination and distraction.

6.2 The Paradox of Technology

One of the most salient themes in the findings is the paradoxical role of technology in time management. On one hand, digital tools enable efficient organisation, collaboration, and access to information. On the other hand, they introduce distractions that undermine productivity.

This dual role of technology reflects broader trends in contemporary education and society. As Rosen et al. (2013) note, the constant connectivity afforded by digital devices can lead to fragmented attention and reduced cognitive performance. For computer science students, who rely heavily on technology, this paradox is particularly pronounced.

Addressing this issue requires a balanced approach that emphasises both technological proficiency and digital discipline. Students must be equipped with the skills to use technology effectively while maintaining control over their attention and time.

6.3 Procrastination as a Motivational Challenge

The prevalence of procrastination highlights the importance of motivational factors in time management. Temporal Motivation Theory (Steel, 2007) provides a useful framework for understanding why students delay tasks, particularly those with delayed rewards and high complexity.

The findings suggest that interventions aimed at reducing procrastination should focus on enhancing task value, increasing self-efficacy, and reducing perceived barriers. For example, breaking tasks into smaller

components and providing timely feedback can make assignments more manageable and rewarding.

Furthermore, addressing the emotional aspects of procrastination, such as fear of failure and anxiety, is critical. This requires a supportive learning environment that encourages risk-taking and resilience.

6.4 Implications for Academic Performance

The relationship between time management and academic performance is well-established in the literature (Britton & Tesser, 1991), and the findings of this study reinforce this connection. Students who effectively manage their time are better able to meet deadlines, engage in deep learning, and achieve higher academic outcomes.

However, the findings also indicate that time management is not a standalone factor. It interacts with other variables, such as motivation, cognitive ability, and environmental conditions. This suggests that improving time management alone may not be sufficient; a holistic approach is needed to support student success.

6.5 Professional Preparedness and Employability

A significant contribution of this study is its emphasis on the role of time management in professional preparedness. The findings demonstrate that time management skills developed during academic studies are directly transferable to the workplace.

From the perspective of the Employability Skills Framework (Yorke, 2006), time management is a core competency that

underpins other skills, such as teamwork and communication. Employers expect graduates to manage their time effectively, prioritise tasks, and meet deadlines (Jackson, 2014).

The findings suggest that computer science curricula should explicitly incorporate time management training as part of professional development. This could include project-based learning, internships, and reflective exercises that simulate real-world scenarios.

6.6 Institutional and Pedagogical Implications

The findings have important implications for educational institutions and educators. First, there is a need to integrate time management training into the curriculum, rather than treating it as an implicit skill. This could involve workshops, courses, or embedded activities that teach students how to plan, prioritise, and manage their time.

Second, educators should design assignments and assessments that promote effective time management. For example, providing incremental deadlines and feedback can help students distribute their workload more evenly.

Third, institutions should provide support services that address both academic and psychological aspects of time management. This includes counselling services, peer mentoring programs, and resources for managing stress and anxiety.

6.7 Limitations and Future Research

While this study provides valuable insights, it is important to acknowledge its limitations. The reliance on secondary data limits the

ability to capture the lived experiences of students in specific contexts. Future research should incorporate primary data through interviews or surveys to gain a deeper understanding of individual perspectives.

Additionally, the findings may not be universally applicable, as time management practices can vary across cultural and institutional contexts. Comparative studies could provide further insights into these variations.

7. Conclusion

This study provides a comprehensive qualitative examination of time management practices among computer science students, emphasising their significance in both academic success and professional preparedness. Drawing on secondary data and guided by an integrative theoretical framework, the research highlights that time management is not merely a technical skill but a multidimensional competency encompassing behavioural, cognitive, and motivational dimensions.

The findings reveal that students who adopt structured and strategic time management practices, such as goal setting, prioritisation, and scheduling, are more likely to achieve positive academic outcomes. These practices align with the principles of self-regulated learning, where students actively plan, monitor, and evaluate their use of time (Zimmerman, 2002). However, the study also identifies significant barriers, including procrastination, digital distractions, and heavy academic workloads, which undermine students' ability to manage their

time effectively. These challenges are particularly pronounced in computer science education due to the complexity and iterative nature of programming tasks (Robins et al., 2003; Steel, 2007).

A key contribution of this research is its emphasis on the relationship between time management and employability. The ability to manage time efficiently is shown to be a critical transferable skill that supports professional competencies such as project management, teamwork, and deadline adherence (Jackson, 2014; Yorke, 2006). Students who develop strong time management habits during their academic careers are better equipped to transition into professional roles in the technology sector.

The study also underscores the paradoxical role of digital technology, which simultaneously facilitates and disrupts effective time management. While digital tools enhance organisation and collaboration, they also introduce distractions that require disciplined self-regulation (Rosen et al., 2013). This highlights the need for balanced and mindful technology use.

From a practical perspective, the findings suggest that educational institutions should integrate time management training into computer science curricula, provide structured learning environments, and offer support services that address both academic and psychological challenges. Such interventions can help students develop sustainable time management practices and improve their overall well-being.

In conclusion, time management is a vital skill that significantly influences the

academic and professional trajectories of computer science students. Future research should build on these findings by incorporating primary data and exploring contextual variations across different educational settings.

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