

STUDENT-ATHLETE MENTAL HEALTH AND DESIGN THINKING

**# GGNation: A case study exploring student-athlete mental health at a Canadian university
using Design Thinking**

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Table of Contents

LIST OF TABLES	VI
LIST OF FIGURES	VII
ACRONYMS	VIII
ACKNOWLEDGMENTS	IX
PREFACE.....	XI
ABSTRACT.....	XII
CHAPTER 1: INTRODUCTION.....	1
CHAPTER 2: CONCEPTUAL FRAMEWORK.....	3
LITERATURE REVIEW – MENTAL HEALTH & CANADIAN UNIVERSITY SPORTS	3
<i>Mental Health</i>	<i>3</i>
<i>Conceptualizing Mental Health in Sports.....</i>	<i>5</i>
<i>Mental Health & Student-Athletes</i>	<i>8</i>
<i>Mental Health & U Sports</i>	<i>10</i>
THEORETICAL FRAMEWORK - DESIGN THINKING	12
<i>Historical Context.....</i>	<i>12</i>
<i>Conceptualization</i>	<i>13</i>
<i>Paradigmatic Perspective.....</i>	<i>14</i>
<i>Enabling Factors</i>	<i>16</i>
<i>Design Thinking in Sports.....</i>	<i>18</i>
<i>Opportunities for Design Thinking in Sports Psychology.....</i>	<i>19</i>
PERSONAL INTEREST(S) – PERSONAL, PRACTICAL, INTELLECTUAL GOALS.....	20
<i>Personal Goal: To advocate for my younger self</i>	<i>20</i>

<i>Practical Goal: To improve student-athlete mental health across U Sports</i>	21
<i>Intellectual Goal: To introduce Design Thinking to sports psychology.</i>	21
DESIGN CHALLENGE	21
<i>Understand</i>	22
<i>Observe and Point of View</i>	22
CHAPTER 3: JOURNAL ONE (UNDERSTAND)	23
ABSTRACT	25
CONCEPTUALIZATION	30
PURPOSE AND RESEARCH QUESTIONS	33
DATA GENERATION	34
FINDINGS AND DISCUSSIONS	40
<i>Enhancing Accessibility of Mental Health Services</i>	40
<i>Providing Proactive and Holistic Support</i>	45
<i>Building a Sustainable Integrated Support Team Model</i>	47
<i>Strengthening Relationships between Stakeholders Groups</i>	49
CONCLUSIONS	51
REFERENCES	53
APPENDIX A	61
APPENDIX B	62
APPENDIX C	63
CHAPTER 4: SUPPLEMENTAL METHODS AND RESULTS	64
METHODS	67
FINDINGS	68
CONCLUSIONS	76
APPENDIX A	78

CHAPTER 5: JOURNAL TWO (OBSERVE & POINT OF VIEW)	79
ABSTRACT	81
CONCEPTUALIZATION	86
PURPOSE AND RESEARCH QUESTIONS	88
DATA GENERATION	89
FINDINGS	97
PERSONA 1: OLIVIA WILLIAMS	98
PERSONA 2: ADRI CLÉMENT	101
PERSONA 3: PAYTON EVERNEW	103
DISCUSSION	105
IMPLICATIONS, LIMITATIONS, AND CONCLUSIONS	108
REFERENCES	112
APPENDIX A	118
CHAPTER 6: GENERAL DISCUSSION	119
DESIGN CHALLENGE REVISITED	119
INTERPRETATION OF THE FINDINGS	120
CONTRIBUTIONS	129
STUDY QUALITY & STRENGTHS	130
LIMITATIONS	135
CHAPTER 7: CONCLUSIONS	138
REFERENCES	139
APPENDIX A	157
APPENDIX B	159

APPENDIX C 160

APPENDIX D 162

APPENDIX E 163

APPENDIX F 164

APPENDIX G 168

APPENDIX H 169

List of Tables

Chapter 3: Journal Article 1

Table 1: *Enabler groups, descriptions, and identifiers*..... 38

Chapter 5: Journal Article 2

Table 1: *Key service delivery characteristics***Error! Bookmark not defined.**

Chapter 6: General Discussion

Table 1: *Dual career terminology*..... 122

List of Figures

Chapter 2: Conceptual Framework

Figure 1: <i>Two continua model of mental health</i>	4
Figure 2: <i>Three-dimensional model of mental health, illness, and performance</i>	6
Figure 3: <i>Gold medal profile for sports psychology</i>	7
Figure 4: <i>Adapted design framework</i>	14

Chapter 3: Journal Article 1

Figure 1: <i>Hasso Plattner Institute 2018 Design Thinking Model</i>	31
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Chapter 4: Supplemental Methods & Results

Figure 1: <i>Illustration of uOttawa Gee-Gees HP IST model</i>	72
Figure 2: <i>Future directions of core IST pillars</i>	72

Chapter 5: Journal Article 2

Figure 1: <i>Hasso Plattner Institute 2018 Design Thinking Model</i>	87
Figure 2: <i>2x2 Digital storytelling matrix</i>	90
Figure 3: <i>Student-athlete mental health and well-being emoji guide</i>	91
Figure 4: <i>Persona 1- Olivia Williams</i>	100
Figure 5: <i>Persona 2- Adri Clément</i>	102
Figure 6: <i>Persona 3: Payton Evernew</i>	104

Acronyms**Key Terms**

DC	Dual-career
DT	Design Thinking
HP	High-performance
IST	Integrated support team
MH	Mental health
MI	Mental illness
MP	Mental performance

Key Stakeholders

AT	Athletic Therapist
CMPC ®	Certified Mental Performance Consultant
DRVS	Director of Recreation and Varsity Sports
ECC	Eligibility and Compliance Coordinator
MHC	Mental Health Counsellor
MPC-A	Mental Performance Consultant- Apprentice
S&C	Strength and Conditioning
SA	Student-Athlete Advisor

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Preface

I, Sydney Graper (M.A. Candidate), am the principal investigator for the presented thesis. I was responsible for co-conceptualizing the research design and leading the data generation, analysis, and write-up of both journal articles later introduced. Dr. Diane Culver (Thesis Supervisor) co-conceptualized the research design, including the primary questions, methods, and analysis. Dr. Culver reviewed, edited, and offered feedback throughout the entirety of the research process. My TAC, Dr. Fiona Chambers and Dr. Natalie Durand-Bush equally provided feedback on the written proposal and shared academic resources to enhance the development of this thesis. Finally, prior to recruitment and data collection, ethical approval was received from the University of Ottawa's Research Ethics Board (Ethics file number: H-11-22-8383).

Abstract

Canadian university sports are gaining momentum as a high-performance sports culture, leading to greater demands and potential mental health (MH) risks for student-athletes. Despite the abundance of research and resources pertaining to MH, student-athletes continue to experience significant MH challenges. This thesis aimed to reimagine student-athlete MH support at a Canadian university using a Design Thinking (DT) approach. This was achieved through a case study about the University of Ottawa (uOttawa) Gee-Gees. DT is a creative and collaborative approach to understanding your end-users, challenging assumptions, and redefining problems to create innovative solutions you can prototype and test (Brown, 2008). The methodological framework was inspired by Hasso Plattner Institute's (2018) six-step model: 1) understand, 2) observe, 3) point of view, 4) ideate, 5) prototype, and 6) test. This study explicitly engages in the first three steps of the HPI process, otherwise known as the "Compassion space" (Chambers, 2021). Findings from each step are presented through two journal articles and used to inform future research dedicated to the remaining three steps ("Solution space"; HPI, 2018).

Article one focuses on the "Understand" phase, aimed to generate ecological insights from multiple stakeholders into how the varsity sports department at uOttawa supports student-athlete MH. Three activities were conducted incrementally, including stakeholder mapping (to identify relevant stakeholders), stakeholder analysis (to prioritize stakeholder engagement), and enabler interviews (to understand diverse perspectives on the explored topic). Nine enabler interviews were conducted and analyzed using reflexive thematic analysis. The findings are presented through three themes: Enhancing the accessibility of MH services, providing proactive and holistic care, and building a sustainable integrated support team model. This case helps

illustrate the varsity environment as one interconnected system and demonstrates the shared responsibility of all enablers to promote and protect positive MH.

Article Two encompasses two HPI phases. First, the “Observe” phase is to observe the daily realities of uOttawa student-athletes in their localized varsity sports environment. To facilitate this, six digital stories were produced by student-athletes and analyzed using empathy mapping (i.e., interpreting what a person says, thinks, feels, and does). Individual empathy maps informed the subsequent “Point of View” phase, designed to establish a point of view from a student athlete's perspective and present the findings creatively and in an easily digestible manner. Six empathy maps were condensed into three fictional personas that help illustrate student-athlete experiences at uOttawa. Presenting these personable stories to relevant stakeholders will be beneficial to garnering deeper empathy and compassion for student-athletes experiencing MH challenges.

The results of each phase yield a comprehensive understanding of student-athletes’ needs, experiences, and the environment in which they compete and study. Thereby contributing to the design of a (future) desirable, viable, and feasible solution the varsity sports department can implement. Moreover, supplementary methods and results are outlined to showcase the interdisciplinary collaborative approach used to understand further the uOttawa Gee-Gees high-performance integrated support team (IST), a crucial component for understanding the uOttawa’s varsity sports landscape. This thesis addresses new ways to explore student-athlete MH, contributes a Canadian perspective to student-athlete research, and paves the way for DT in the sports psychology field.

Keywords: Student-athletes, Varsity sports, Mental health, Design Thinking, Sport psychology

Chapter 1: Introduction

The World Health Organization defines mental health (MH) as “a state of well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community” (p.8). Positive MH (social, emotional, and psychological well-being; Keyes, 2002) correlates to improved physical health outcomes, sleep, self-regulation, prosocial behaviours, satisfaction with personal relationships, and cooperation in group settings (De Neve et al., 2018; Keyes, 2002). Additionally, individuals who maintain moderate to flourishing levels of MH appear more productive, resilient, and successful in their work (Campbell et al., 2021). Such benefits and abilities have garnered significant attention from post-secondary institutions and varsity sports departments over the past decade, as research links student-athlete participation to positive and negative impacts on MH (Stambulova & Wylleman, 2015).

Student-athletes are dual-career athletes attending a higher education institution, competing at a high-performance calibre in sports, and receiving financial and/or practical support from the institution (Gomez et al., 2018; Stambulova et al., 2015). Unsurprisingly, additional challenges exist when balancing academic responsibilities with intense training and competition demands. Student-athletes report feeling overwhelmed by the little time they must study, train, socialize, work to support themselves financially and develop a career post-sport (Crocker et al., 2021; Gomez et al., 2018; Miller & Kerr, 2002; Stambulova & Wylleman, 2015). As a result, student-athletes are equal or more susceptible to experiencing MH challenges in comparison to non-student HP athletes and non-athlete university students (Gulliver et al., 2012; Kegelaers et al., 2022; Moreland et al., 2018).

In the Canadian context, MH has become a significant concern as nearly 20% of student-athletes surpassed the cut-off for mental illness in the 2019 season (Sullivan et al., 2019). While the ideal outcome would be for student-athletes to achieve a dual-career balance: “a combination of sports and studies that helps achieve their educational and athletic goals, live satisfying private lives and maintain their health and well-being” (Stambulova et al., 2015, p. 12); enhancing effective support services within Canadian varsity sports departments remains a challenge. This is because there is no “one-size-fits-all” approach that can be used to address the contextual needs of all student-athletes while competing in diverse varsity sports environments. This thesis addresses this challenge by exploring student-athlete MH at a Canadian University using a Design Thinking (DT) approach. DT is a creative and collaborative approach to understanding your end-users, challenging assumptions, and redefining problems to create innovative solutions you can prototype and test (Brown, 2008). In this case, DT is used to reimagine student-athlete MH support by first delving into the localized varsity sports context and understanding specific uOttawa Gee-Gees’ needs.

Chapter 2: Conceptual Framework

The ‘conceptual framework’ presented in the following sections will reflect the concepts, assumptions, expectations, beliefs, and theories that support and inform the presented research (Maxwell, 2013). The thesis commences with a review of relevant literature pertaining to MH and examines the intersections between sports, student-athletes, and the Canadian university sports system (U Sports). This framing provides readers with a comprehensive understanding of Canadian student-athlete MH challenges and establishes a rationale for exploring the topic through an unconventional lens such as Design Thinking (DT). An overview of the DT approach situated within Chambers’ (2020) enabling factors (process, mindset, and space) is presented to understand the guiding theoretical framework. Lastly, personal aspirations (i.e., personal, practical, and intellectual goals) are acknowledged, as they have undoubtedly served as motivation for pursuing this research and shaped the overall design challenge (Maxwell, 2013).

Literature Review – Mental Health & Canadian University Sports

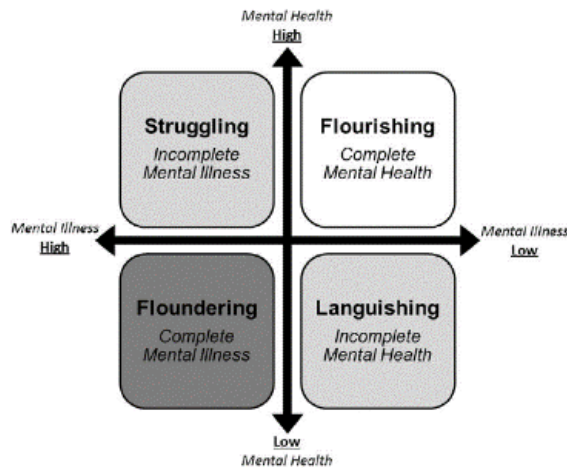
Mental Health

The term ‘Mental health’ (MH) is often mistakenly used interchangeably with the term mental illness (MI). This poses a potential risk for misinterpreting MH as a fixed state only achievable without psychopathology (WHO, 2022; Keyes, 2003). For example, a frequently cited statistic is that one in five Canadians live with a mental illness (Health Canada, 2002). However, a recent study by the Angus Reid Institute (2022) found that one in three Canadians reported MH challenges. We would be remiss not to acknowledge the implications of COVID-19 and the additional stressors it has brought about (i.e., financial security and social isolation). For this reason we may not take the 1 of 5 statistic at face value, as an overreliance on clinical diagnosis would neglect and invalidate the experiences of individuals facing MH challenges.

To unravel this misperception, Keyes' (2002) dual continua model presents MH and MI as two distinct yet interrelated phenomena. Keyes conceptualized MI with a significant focus on depression, "persistent and substantial deviation from normal functioning that impairs an individual's ability to execute their social roles and generates emotional suffering" (2003, p.293). Given the narrowed focus on one specific disorder, the World Health Organization addresses the critique with an inclusive definition for all mental disorders, defining MI as a collective term for "clinically significant disturbances in an individual's cognition, emotional regulation, or behaviour. It is usually associated with distress or impairment in important areas of functioning" (2022, p. 8).

Keyes (2002) maintains that, like MI, MH can be understood as a "syndrome of symptoms" aligning with a specific cognitive and social functioning level. A foundational assumption of Keyes' model conceptualizes MH as a combination of emotional well-being (i.e., happiness and life satisfaction), psychological well-being (i.e., individual functioning and self-realization), and social well-being (i.e., societal functioning). These three dimensions can contribute to MH's languishing, moderate, or flourishing levels and remain dynamic. Additionally, Figure 1 depicts the continua of MH intersecting with the presence or absence of MI. This emphasizes that the absence of MI does not necessarily equate to flourishing levels of MH, nor should one assume that the presence of MI equates to languishing levels of MH. Most importantly, the possibility of the presence of MI and MH co-existing is highlighted. Overall, this theoretical construct affords a more holistic understanding of the complex nature of MH and has proven beneficial when adopting a well-being approach (i.e., promotion-protection) over ill-being (i.e., treatment; Keyes, 2010).

Figure 1

Two-Continua Model of Mental Health (Keyes, 2002)*Conceptualizing Mental Health in Sports*

Keyes' model has been heavily relied on by researchers spanning several disciplines. Adapted versions of this model have emerged to address specific research objectives, including a continuum-based model proposed by Durand-Bush & Van Slingerland (2021) grounded in sports psychology research. This model introduces a third construct of mental performance (MP), highlighting its relevance within the synergetic relationship of MH and MI to foster optimal functioning and performance (Van Slingerland & Durand-Bush, 2021). Each dimension is defined as follows,

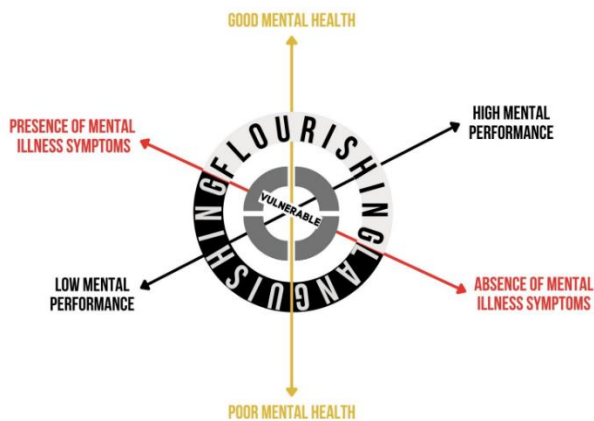
Mental Performance (MP) “The capability to use cognitive processes and mental/self-regulation competencies (one’s feelings, thoughts, behaviours) to perform in one’s changing environment” (Durand-Bush et al., 2022a, p. 4). (High – Low)

Mental Health (MH) is “a state in which one is capable of feeling, thinking, and behaving in ways leading to joy, coping, productivity, and contributions to society” (Durand-Bush et al., 2022a, p. 4). (Good – Poor)

Mental Illness (MI) is “a condition in which significant and persistent changes in feeling, thinking, and behaving lead to impaired functioning and distress in one’s personal and professional life” (Durand-Bush et al., 2022a, p.4). (Absence – Presence).

Figure 2

Three-dimensional model: Mental health, illness, and performance (Durand-Bush & Van Slingerland & Durand-Bush, 2021)



Aligning with Keyes’ (2002) assumptions, this model frames MH, MI, and MP as three intersecting constructs and emphasizes their dynamic interplay. Practical sports examples, including Simone Biles (USA, Gymnastics) and Michael Phelps (USA, Swimming), can help illuminate this notion. Both high-profile athletes openly discussed MH and MI challenges while remaining the most decorated Olympians. Their experiences highlight the potential for high levels of MP to co-exist with the presence of MI and poor MH.

In addition, this model underscores the inter-relationship between MP competencies and MH (Van Slingerland & Durand-Bush, 2021). Developing MP competencies and actively engaging in practices that promote social, emotional, and psychological well-being can effectively facilitate overcoming or preventing MI (Keyes, 2002; Van Slingerland & Durand-Bush, 2021). According to Durand-Bush and colleagues (2022b), core competencies including

motivation, self-confidence, resilience (*fundamental*); self-awareness, stress management, attentional control, emotional and arousal regulation (*self-regulation*); and athlete-coach relationships, teamwork, communication, and leadership (*interpersonal*) are essential to holistic development and consistent with high-level performance. These competencies are presented in the Gold Medal Profile for Sport Psychology (Figure 3), a framework used to guide athlete MP interventions led by certified mental performance consultants.

Figure 3

The Gold Medal Profile for Sports Psychology (GMP-SP)– (Durand-Bush et al., 2022b)



Beyond a more comprehensive and inclusive theoretical understanding of MH in sports, this model has practically guided sports organizations in programming and service delivery (Van Slingerland & Durand-Bush, 2021). For example, the Mental Health Strategy for High-Performance Sports in Canada was underpinned by this model, inspiring the country's first centre to offer collaborative sports and performance-focused MH care services (Durand-Bush et al., 2021). Therefore, this model presents a unique opportunity to conceptualize optimal

functioning in a student-athlete context (i.e., school, sports, and private life; Stambulova et al., 2015) and explore the programming offered by a Canadian varsity sports departments to support student-athlete MH.

Mental Health & Student-Athletes

For emerging adults obtaining a post-secondary education, the prevalence of MH challenges rises dramatically. The Fall 2022 National College Health Assessment Report indicated that over 70% of Canadian university students (n= 33,774) experienced moderate to severe psychological distress over the past 12 months (American College Health Association, 2022). Intense academic demands career, financial, and personal influences measured in this report are commonly attributed to university students' lower levels of MH (NCHA, 2019). During the several lockdowns imposed by the COVID-19 pandemic, university students incrementally struggled with virtual education, financial insecurity, and lack of social support (Grubic et al., 2021). This led to reduced motivation toward completing their studies and many dropping out of their program entirely (Grubic et al., 2021). Fortunately, the pandemic has catalyzed the advanced MH services at post-secondary institutions.

Student-athletes are a diverse demographic from the university student population considered at similar or increased risk for MH challenges (Gulliver et al., 2012; Moreland et al., 2018). In comparison to non-athlete university students, there are niche sports-specific influences such as demanding and inflexible sports schedules, intensive training, overtraining, public performances, limited coping resources, early specialization in sports, team weigh-ins, underperformance, injury, coach personality and communication, team/culture issues, and logistical challenges that can negatively impact student-athletes MH (Bisset & Tamminen, 2022; Gulliver et al., 2012; López & Levy, 2013). Additional psychological, biological, organizational,

and societal influences are reported (Kegelaers et al., 2022) that require further attention as a combination of these influences shapes a student-athlete's overall experience. For example, Carless and Douglas (2013) noted how dominant performance narratives can lead athletes to develop strong and singular attachments to their athletic identity, forcing them to make sacrifices in other life domains. This cultural narrative could pose severe implications throughout a student-athlete's career, especially at the time of graduation, which, for most, coincides with athletic retirement (Stambulova & Wylleman, 2019).

Despite abundant evidence supporting the apparent challenges student-athletes face in response to their intense athletic and academic demands, Canadian student-athlete MH and MI research presents equivocal findings. Hammond and colleagues (2013) examined the prevalence of diagnosed failure-based depression amongst fifty varsity swimmers. These results indicated that 68% of the athletes met the criteria for a major depressive episode before their competition, and the likelihood of such an episode was greater amongst higher nationally ranked athletes (Hammond et al., 2013). Similarly, Sullivan et al., 2019 examined the prevalence of psychological distress and found 19.8% surpassing the assessment for a severe MI. Furthermore, women, individual sports, and 'non-starter' athletes are at greater risk of experiencing psychological distress (Sullivan et al., 2019). These findings demonstrate the vulnerability of this specific demographic.

However, when assessing burnout in a sample of 145 student-athletes (i.e., emotional, and physical exhaustion, reduced personal accomplishment, and sport devaluation), Dubuc-Charbonneau et al. (2014) revealed that very few (1.4%) experienced elevated levels in all three dimensions. Although burnout is a condition distinct from MH and MI, respectively, there are considerable overlapping concerns whereby sustained circumstances can lead to the development

of MI and indicative of poor MH. Evidence supports a positive correlation between burnout and depression (e.g., Bianchi & Laurent, 2015). Additionally, Van Slingerland and colleagues (2018) examined the prevalence of MH functioning and found moderate to flourishing levels from a sample of 388 student-athletes across 30 different universities in a singular season. Notably, there were no significant differences between gender, alcohol use, living situation, year of study, type of sports, or year of participation.

Various factors could have been attributed to the mixed findings, such as participant demographics and time of data collection. Nevertheless, the results illuminate the demand for diverse research approaches to develop a more comprehensive understanding of student-athlete MH. While these studies contribute valuable and generalizable data to inform policies, there needs to be more practical and contextual knowledge exploring the MH challenges student-athletes face in their individual varsity sports environment (e.g., Crocker et al., 2021). Consequently, there needs to be more research informing university sports departments on how to support student-athlete MH needs effectively.

Mental Health & U Sports

U Sports is the national multi-sports organization providing oversight for all inter-university sports competitions across Canada, with 56 member institutions and approximately 20,000 student-athletes competing in 12 sports (U Sports, n.d.). Historically, the Canadian university sports system has primarily been defined by its amateurism, participatory values, and ties to the mission of higher education (Danylchuk & MacLean, 2001). However, the current state of U Sports alludes to a shift towards high-performance (HP) sports with performance, visibility, and recognition for student-athletes at the forefront (U Sports, n.d.). For example, Banwell and Kerr (2016) highlighted that several varsity sports departments reduced the number

of varsity teams to reallocate funding to selected teams for enhanced training resources. This financial structure resembles the Canadian High-Performance Sports Strategy (Government of Canada, 2019), which was implemented to shape the training environments to effectively support HP athletes' needs to culminate in improved performances at the Olympic/Paralympic Games and/or single sports Senior World Championships. The increased financial investment enhances the focus on outcomes and pressures to perform consistently.

Although the increased investment to advance Canadian university sports is positive, varsity sports departments should cautiously adopt an HP sports model by carefully considering how student-athletes are supposed to meet new HP sports demands in light of the academic challenges previously mentioned for university students; additionally, how the departments plan to navigate problematic long-held beliefs and cultural practices entrenched within HP sports that may hinder student-athlete MH. Significant evidence supports unique MH challenges and barriers for HP athletes (Kuettel & Larsen, 2020; Poucher et al., 2019; Reardon et al., 2019; Rice et al., 2019; Schinke et al., 2018). Notably, there is a prevailing 'performance at all costs' narrative, even at the expense of an athlete's well-being (Coakley, 2015; Douglas & Carless, 2013). Unfortunately, similar trends have extended to university sports.

A study by Giovannetti and colleagues (2019) found that 47% of student-athletes indicated that there was a time when they wanted to seek services for their MH but chose not to. The most reported barriers for student-athletes to utilize MH services on campus are personal and social stigma, the fear of being perceived as weak for experiencing MH challenges or ill-fit to be a student-athlete (DeLenardo, 2013; Gulliver et al., 2012; López & Levy, 2013; Moreland et al., 2018). These negative attitudes toward help-seeking, coupled with the underutilization of

services, tend to promote a false reality that athletes are less likely to experience MH challenges (Brown, 2023; Giovannetti et al., 2019; Moreland et al., 2018; Chew & Thompson, 2014).

In response to these cultural shifts and increasing performance demands, the U Sports Medical Committee (2020) created a Mental Health Best Practices Document to guide and promote supportive MH practices. This document begins by highlighting the athletic department's role in reducing stigma, providing resources, and assessing MH levels (led by a licensed MH care practitioner) to create an ideal environment conducive to positive MH (U Sports Medical Committee, 2020). Additional recommendations for varsity sports departments included creating clear referral pathways, developing ISTs, and evaluating the scope of people addressing MH concerns (U Sports Medical Committee, 2020). However, little is known about what has been implemented at Canadian universities and proven effective for enhancing student-athlete MH within their context.

Theoretical Framework - Design Thinking

Historical Context

According to Eames (2019), the roots of DT emerged in the early 1960s during the participatory design movement. This movement advocated for quicker software prototype development cycles and the incorporation of customer feedback into the prototyping process (Eames, 2019). During this era, a design theorist, Horst Rittel, coined the term “wicked problems,” which highlighted solving complex and multidimensional problems and eventually became heavily engrained into DT discourse. However, Herbert A. Simon's book (1969), *The Science of the Artificial*, is often cited as the pioneer for DT, discussing the core principles of rapid prototyping and testing through observation (Dam & Siang, 2021). In the 1980s, an increase in publications in architecture and engineering literature such as *How Designers Think*

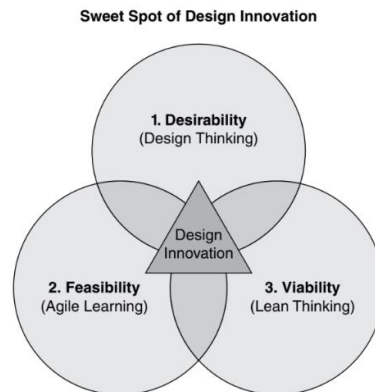
(Lawson, 1980), *Designerly Ways of Knowing* (Cross, 1982), and *Design Thinking* (Rowe, 1987) were influential in shaping the contemporary use of DT as a theory, process, and practice (Dam & Siang, 2021). It was not until the 1990s that DT was introduced to the business world, attributed mainly to IDEO, a leading consulting firm for product and industrial design (IDEO, n.d.). In the contemporary era, DT has gained significant popularity as a problem-solving strategy and is currently being taught at educational institutions and consulting agencies across the globe. For an in-depth review of DT history, refer to (Dam & Siang, 2021; Eames, 2019).

Conceptualization

In this thesis, Brown's (2008) definition of DT is adopted to understand the concept as an approach and serve as a foundation for the process, mindset, and space later discussed (Chambers, 2020). However, it should be noted that there is no universal definition for DT, and multiple interpretations exist (see Johansson-Sköldberg et al., 2013; Liedtka, 2015). Nevertheless, DT is an iterative approach in which you seek to understand your users, challenge assumptions, redefine problems, and create innovative solutions you can prototype and test (Brown, 2008). The objective is to tackle complex problems by creating humanly desirable, technologically feasible, and economically viable solutions (Brown, 2008). Creating a solution that equally satisfies all three components (regarded as the DT sweet spot; Brown, 2008) is essential to ensure the innovative solution is truly transformative rather than merely incremental improvement. Chambers' (2020) Adapted Design Innovation Model (Figure 4) builds on this idea by framing DT as an approach to developing desirable solutions. To ensure sustainability and positive impact, agile learning methods and a lean business canvas facilitate the implementation process with feasible and viable solutions.

Figure 4

Adapted Design Innovation Framework (Chambers, 2020)

***Paradigmatic Perspective***

DT is intended to bring together design principles, methods, and tools for problem-solving (Brown, 2008). However, one of DT's most extensive critiques is that the term and process have become so popular in business that its ontological and epistemological underpinnings are often taken for granted (Johansson-Sköldberg et al., 2013). People have become fixated on the process and overly reliant on templates, which pose limiting risks for the true potential of DT (Johansson-Sköldberg et al., 2013; Nussbaum, 2011). Additionally, a common misconception is that DT's purpose is solely for product development. Buchanan (1992) would refer to such creation as a first and second-order design (e.g., language, symbols, and products). However, DT can go beyond a surface level and be transformative at a systematic and cultural level, also called third and fourth-order design. Therefore, it is imperative that DT is understood as a paradigm rather than a step-by-step methodology. In a paradigmatic lens, Laursen and Tollestrup (2017) conceptualized DT as taking a solution-focused perspective to tackle wicked problems (worldview) through abductive reasoning (way of reasoning) and contextual meaning (the truth criteria).

Wicked Problems. The term “wicked problems” was characterized by Buchanan (1992) as complex, indeterminate, and ill-defined. Viewing problems from a multi-dimensional standpoint is considered a fundamental assumption of DT, as it enables a more holistic and contextual understanding of the challenge at hand and identifies intergenerational, multisectoral, and multicultural influences (Chambers, 2021). To navigate the “wickedness” of each design challenge, embracing a beginner’s mindset is emphasized, free of prejudice and expectations and filled with curiosity and openness to new possibilities (Lewrick et al., 2020).

Abductive Reasoning. As a form of scientific inquiry grounded in empiricism, DT leverages its iterative nature to test promptly, and re-test hypotheses based on user feedback. This is accomplished through abductive reasoning, a concept developed by the philosopher Charles Sander Pierce, who defended that “no new idea could be developed by strict deduction or induction” (as cited in Martin, 2009, 64). According to Pierce’s logic, abductive reasoning is a form of logical inference which starts with an observation and then seeks to find the simplest and most likely explanation (Martin, 2009). The cyclical process of making observations and forming a hypothesis that requires more observations can lead to new insights and possibilities that do not currently fit into existing models (Martin, 2009). According to Tvory and Timmermans (2014), two key components are required in abductive analysis. First, an in-depth familiarity with a broad range of theories enables the emergence of insights extending beyond preconceived theories (contrary to induction) and the use of multiple theories at a time (contrary to deduction). Second, a methodological framework is needed to facilitate such observations (Tvory & Timmermans, 2014). For instance, the collaborative and data-driven processes used throughout DT are advantageous for mitigating cognitive biases and enhancing overall scholarly rigor (Liedtka, 2015).

Contextual Meaning. Given that the purpose of DT is to develop solutions that effectively and adequately meet the needs of end-users, terms such as “human-centred” and “empathy” are deeply rooted in DT discourse (Liedtka, 2015). You need to understand the challenge from the end-user's perspective, including the contextual influences (e.g., environmental, social, cultural). To facilitate this, Laursen and Tollestrup (2017) advocate using reflective practice, framing, tangible synthesis, explorative learning, input probing, and holistic alignment as tools for contextual meaning-making. To echo Krippendorf (2006), solutions need to make sense in the context for which they were intended.

Enabling Factors

Chambers (2020) maintains that to develop an impactful solution. Designers must embrace DT as a) a process, b) a mindset, and c) a space. These are considered enabling factors to reach the innovation sweet spot previously mentioned.

Process. There are several DT models that exist (see Chambers, 2020. p.45 for an extensive list). Regardless of the methodological framework used, most models reflect a variation of a Double Diamond configuration (Tschimmel, 2012), fluctuating between divergent and convergent thinking patterns throughout the design process. Divergent thinking entails widening your design scope to explore your context and value quantity over quality ideas. In contrast, convergent thinking facilitates the winnowing of ideas to choose a solution that best fits the context. For example, designers are encouraged to think big and explore the environment and case context in-depth, then narrow and define the problem, after ideating as many solutions as possible, back to refining a solution. Additionally, DT models commonly share three phases that are also referred to as the three I's: inspiration, ideation, and implementation phases (Brown, 2009). Cuthbert and colleagues (2018) defined these three phases as,

Inspiration is to develop empathy for the end-users and establish an in-depth understanding of the problem at hand; *Ideation* is for generating, developing, and testing ideas; and *Implementation* is the pathway that leads from the project stage to people's lives. (p.27)

Each "I" phase prescribes various investigative methods, including observation, collaboration, fast learning, visualization of ideas, rapid concept prototyping, and concurrent business analysis (Lockwood, 2010).

Mindset. According to Schweitzer and colleagues (2016), a 'designerly' way of thinking starts with being empathic towards people's needs and then working collaboratively with an interdisciplinary team to take deliberate actions. To productively engage in the creative process, a designer must be inquisitive to new perspectives, open to learning, and mindful of different processes and thinking modes (Schweitzer et al., 2016). Most importantly, they must be passionate and determined to make a difference for the end-users. This passion will fuel the Design Thinking mindset to generate more innovative ideas throughout the process and effectively achieve longer-lasting strategic outcomes (Schweitzer et al., 2016).

Space. A DT environment encompasses more than just the physical space but the place, the people, and the meaningfulness of the work (Lewrick et al., 2018). Thoring and colleagues (2018) identified five space types used to occupy the various activities and enable desired outcomes throughout the DT process, including personal, collaboration, presentation, prototyping, and intermission. Designers are encouraged to think consciously about how to organize the layout of each space to foster creativity, productivity, and collaboration (Thoring et al., 2018). Considerations may include colours, noise, room temperature, physical spacing, comfortability, and internet connectivity. For example, orange represents creativity, flexibility,

and agility and blue reflects communication, inspiration, and clarity (Lewrick et al., 2018). The intention should be to provide as much freedom as possible for creativity to unfold (Lewrick et al., 2018).

Design Thinking in Sports

Lewrick and colleagues (2020) conducted a global survey with 2,500 respondents on the relevance and popularity of DT Tools they use in practice. This survey revealed that the majority of professionals using DT worked in the consulting (30%), technology (18%), education (12%), and financial (10%) sectors. Additionally, 65% of DT applications were found in Europe (Lewrick et al., 2020). Contemporary uses of DT have gradually reached several non-traditional design fields, including sports. There have been promising results in sports management (e.g., Joachim & Joachim, 2021; Pierce et al., 2019), sports for development (e.g., Joachim et al., 2020), mentoring and coaching in sport (e.g., Chambers et al., 2018a; Cuthbert et al., 2018), clinical sports research and knowledge translation (e.g., Escalier et al., 2018), officiating (e.g., Pierce, 2021), and physical health education (e.g., Chambers et al., 2020). Additionally, the Global Design Challenge for Sport and Physical Activity was founded in 2020, a group competition and global initiative aimed to generate innovate ideas linked to the United Nations 17 Sustainable Development Goals through sport (University of College Cork, 2022). Thus, demonstrating DT's versatility and impact in academic and applied spaces.

However, to the best of my knowledge, DT has yet to be implemented and published in sports psychology. As demonstrated in the broader consultancy field, Certified Mental Performance Consultants, considered applied sports psychology practitioners, can benefit from using DT. Additionally, most of the listed sports studies that utilize DT have taken place in

Australia, Ireland, and the United States, demonstrating a need for a Canadian HP sports perspective.

Opportunities for Design Thinking in Sports Psychology

Design is the primary driver of technological, social, cultural, and economic developments. Designing keeps cultures and the institutions of societies viable. Without innovations, societies become vulnerable to environmental challenges and collapse in stagnation. (Krippendorf, 2016, p. 2)

This is not to suggest that the sports industry will necessarily collapse. However, topics such as athlete maltreatment and abuse, discrimination and racism, and poor MH have persisted in the sports landscape for decades. These concerns all share wicked traits that make it difficult for social change through sports, an ideal of particular interest to sports psychology researchers, educators, and practitioners. According to Weinberg and Gould (2014), these professionals “seek to understand and help elite athletes, youth, persons with impairments, and master athletes (only to name a few), to achieve maximum participation, peak performance, personal satisfaction, and development through sports participation” (p.4). Thus, an in-depth understanding of people and their behaviours through sports psychology research can complement the DT approach to implement practical solutions to support this demographic.

There is an evident shared focus of human-centredness and behavior change in the sports psychology discipline and DT. Leveraging a DT approach can provide an empathetic, optimistic, and creative way of working to shape a brighter future for the current and next generation of athletes. There is already a presence of empathetic research being done in sports psychology. For instance, much research has been devoted to positive youth development and gender equity in sports to understand specific needs to sustain long-term sports participation. This knowledge is

beneficial for social justice reasons regarding enhanced accessibility and inclusion for marginalized groups in sports. In increment, DT can use gathered insights to advance applicable problem-solving efforts in a sports psychology context.

Personal Interest(s) – Personal, Practical, Intellectual Goals

Maxwell (2013) highlighted how a researcher's personal interests in their work not only serves as an important resource for shaping the research design, but also pose validity concerns that should be acknowledged early on. Therefore, I chose to be explicit with my goals and motivations for pursuing this research up front (e.g., insider-outsider perspective; Minichiello, 1995), with the intention of elevating credibility and trustworthiness of my work.

Personal Goal: To advocate for my younger self

While growing up, sports had always served as a space where I truly felt I belonged. Beyond trying to push my abilities to become the best athlete I could be, it was being part of a team that I cherished most. My competitive drive and desire to stay in a team environment drove my decision to continue my basketball career at the U Sports level. I chose a university where I could also pursue my career aspirations of becoming a certified mental performance consultant (MPC) by completing a bachelor's degree in sports psychology. Unfortunately, my university basketball career ended abruptly. Our team faced challenges off the court that took a toll on my MH, and I gradually lost my love for a game that used to bring me so much joy. I did not expect the uphill battle of finding my identity outside of being an athlete and the ongoing journey to rekindle my relationship with sports. Although my student-athlete experience did not plan out how I expected, it motivates me to pursue a career where I can support HP athletes' mental performance and well-being needs.

Practical Goal: To improve student-athlete mental health across U Sports

It saddens me to know that my varsity sports experience is not unique. During my time as a student-athlete, the topic of MH and where to access resources were rarely discussed. I felt alone and unsupported by the varsity sports department when I decided to leave basketball. I wanted to make a difference through research to reduce the number of athletes experiencing similar challenges. What I enjoy most about research is the knowledge translation component and applying your findings in the real world to make a positive change. To enhance the practicality of the “solution” derived from this research, I wanted to actively involve student-athletes throughout the design process to ensure it would effectively support their needs.

Intellectual Goal: To introduce Design Thinking to sports psychology.

Design Thinking has only recently been introduced in sports research. However, DT has yet to be implemented or published in sports psychology journals, which is surprising considering the overlapping qualities between designers and sports psychology academics/practitioners. For instance, both research fields advocate for person-centred approaches to supporting needs and enhancing experiences. This is an opportunity to employ a new theoretical lens and creative methods to explore sports psychology topics such as student-athlete MH. This thesis would also have theoretical implications in the design field, as limited studies are situated in a Canadian and HP sports context.

Design Challenge

Rather than the conventional “research purposes and questions,” the term “design challenge” felt more encompassing of DT's solution-focused and iterative nature. Therefore, informed by the conceptual framework (literature review, theoretical framework, and personal interests), the presented design challenge is to reimagine student-athlete mental health support at

a Canadian University using a Design Thinking approach. Methodologically, this thesis is guided by the Hasso Plattner (2018) DT model and aimed to explicitly engage in the compassion space – understand, observe and point of view (Chambers, 2021). The objective is to develop compassion for student-athletes, as in “I understand how you feel and am driven to do something that has a positive impact on you” (Chambers, 2021, p. 23). The findings derived from the activities conducted within the compassion space are presented through two original journal articles (Appendix A)

Understand

Article One aims to holistically depict a Canadian varsity sports ecosystem and generate ecological insights from multiple stakeholders into how they support student-athlete MH. Two research questions guided this study: 1) Who are the key stakeholders? 2) How do the stakeholders enable student-athlete MH within their practice?

Observe and Point of View

The purpose of Article Two is three-fold: to observe the daily realities of uOttawa student-athletes in their localized varsity sports environment, establish a point of view from a student-athlete's perspective, and present the findings in a creative and easily digestible way. The primary research question is, what are the daily realities of student-athletes at the University of Ottawa with respect to mental health?

Chapter 3: Journal One (Understand)

The following journal article presents the findings uncovered in the first step of the DT process, the “Understand” phase (HPI, 2018). This phase is aimed to generate ecological insights from multiple stakeholders into how the varsity sports department at the University of Ottawa supports student-athlete MH. Three research activities, including creating a stakeholder map, stakeholder analysis, and nine stakeholder interviews, were conducted and analyzed findings were presented. I intend to submit this manuscript to *Qualitative Research in Sports, Exercise, and Health* for publication.

**A Design Thinking approach to understanding how stakeholders support university
student-athlete mental health: A Canadian case**

Manuscript to be submitted to *Qualitative Research in Sports, Exercise, and Health*.

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Abstract

Mental health (MH) has gained prominence in high-performance sports, leading to greater recognition of how sports ecosystems (i.e., network of various stakeholders) influence athletes' MH. This topic has piqued interest from members of varsity sports departments looking to optimize their environment to improve student-athlete MH outcomes. In our case study about a Canadian varsity sports department, we applied Design Thinking (DT). This human-centred approach involves empathizing with end-users, challenging assumptions, redefining problems, and ideating innovative solutions you can prototype and test (Brown, 2008). Following the Hasso Plattner Institute (2018) DT model, the first step requires an in-depth understanding of the localized context in which the end-users interact. We engaged in a series of commonly used DT methods (stakeholder mapping, analysis, and interviews) to address two questions: 1) Who are the key stakeholders? And 2) How do the stakeholders enable student-athlete MH within their respective practices? Nine interviews were conducted and analyzed using Reflexive Thematic Analysis (Braun & Clarke, 2019), generating four themes. The first three themes reflect the collective efforts of the explored varsity sports department to improve MH support for their student-athletes including a) enhancing the accessibility of MH care services, b) providing proactive holistic care, and c) building a sustainable integrated support team framework. The fourth theme, strengthening relationships between stakeholder groups, alludes to a perceived gap within the explored ecosystem, suggesting areas for further examination in pursuit of optimizing their environment and proceeding to next DT steps (e.g., Observe, Ideate, Prototype, and Test).

A Design Thinking approach to understanding how stakeholders support university student-athlete mental health: A Canadian case

Mental health (MH) refers to “a state of well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community” (World Health Organization, 2022, p.8). Awareness of MH in high-performance (HP) sports is increasing as extensive evidence links positive MH (i.e., social, emotional, and psychological well-being; Keyes, 2002) to optimal sports performance (Durand-Bush et al., 2022a; Schinke et al., 2018). However, long-held beliefs and cultural practices entrenched in HP sports culture tend to promote a “performance at all costs” narrative, even at the expense of athletes’ MH. As a result, HP athletes are flagged as at risk for facing MH challenges. Indeed, Poucher and colleagues (2021) found that 41.4% of HP Canadian athletes (n=186) met the criteria for depression, anxiety, and/or an eating disorder. Barriers like perceived stigma and the emphasis on toughness in sports reduce accessibility to appropriate MH support services for HP athletes (Chew & Thompson, 2014). Stigma may also be attributed to athletic populations exhibiting less help-seeking behaviours (Brown, 2023; Wahto et al., 2016) and poor MH literacy (Gulliver et al., 2012) than non-athletic populations. On a positive note, MH in sports has gained significant attention within the research field (e.g., Henriksen et al., 2020; Rice et al., 2016;). This has contributed to the development of sport-informed MH support services aimed at addressing the aforementioned sport-specific barriers that athletes might experience directly. For example, the Canadian Centre of Mental Health in Sport (CCMHS) was launched in 2020 as Canada's first collaborative sport and performance-focused MH care services (Durand-Bush & Van Slingerland, 2021).

Insights from the Canadian HP sports level are noteworthy as research indicates that the Canadian University sports system (U Sports) is shifting towards an HP sports model with performance excellence surfacing in varsity sports departments' mission and operations (Banwell & Kerr, 2016; White et al., 2013). White and colleagues (2013) provided illustrative examples of this shift, including “corporate sponsorships, alumni fundraising, [increased] staff, media relations, athlete recruitment, alumni advancement, strength and conditioning, corporate relations, and athlete retention (i.e., monitoring and counselling athletes academically)” (p. 172). Although this represents an exciting era for Canadian University sports, more research on the implications of increased financial investment on student-athletes well-being is needed.

Student-athletes face challenges balancing academic responsibilities with intense training and competition demands. For example, managing inflexible sports and school schedules, travelling to training and competitions, maintaining peak nutrition and fitness levels, recovering from physical fatigue and injuries, and resolving conflicts with the team (Bisset & Tamminen, 2022; Van Slingerland et al., 2018) all pose unique risks for optimal functioning in comparison to non-athlete university students. Consequently, student-athletes report feeling overwhelmed by the little time they must study, train, socialize, work to support themselves financially, and develop a career post-sport (Bisset & Tamminen, 2022; Stambulova & Wylleman, 2015).

Considering these challenges, Kegelaers and colleagues (2022) conducted a systematic scoping review on student-athlete mental health. The review revealed that most studies broached this topic exploring individual (e.g., age, gender, genetics) and/or sports-specific influences (e.g., injury, training, coaches). Few studies considered dual-career stressors, a resultant of combined academic and sports-related stressors (e.g., Stambulova & Wylleman, 2015). Dual-career insights are particularly important in the Canadian university sports context because many

varsity athletes are not necessarily training for an international competition (e.g., Olympic Games and World Championships) or to play professionally post-graduation. Most often, Canadian varsity athletes are preparing to enter the workforce afterwards, hence the pressures to excel academically and partake in professional development activities. Additionally, scholars have advocated for exploration of student-athlete stressors to go beyond individual and team-level influences and into the surrounding environment (Henriksen et al., 2020). In Canada, academic and sports environments converge under one domain? Thus, understanding the ecosystem (i.e., stakeholders, internal and external structures, and environmental influences) is crucial for the design process to ensure successful implementation of future ideas aimed to improve student-athlete MH outcomes.

Part of our research draws from Bronfenbrenner's Ecological Systems Theory (BEST; 1997), a framework for holistic ecological approaches to examine human development and complex social issues. The word ecology is used in this context to depict the interrelatedness between the individual and environmental layers of the context (Bronfenbrenner, 1997; Norman, 2023). According to BEST, ecological influences can be categorized using five subsystem levels (micro-, meso-, exo-, macro-, and chronosystems). The innermost layer (*microsystem*) represents an individual's immediate surroundings (e.g., work, school, family, and peers). Moving outward, the second layer (*mesosystem*) examines the relationships between stakeholders in your microsystem (e.g., a parent-teacher relationship). The third layer (*exosystem*) considers the environmental context that typically have indirect influences on the individual (e.g., geographical location and access to public transportation). The fourth layer (*macrosystem*) considers the social, behavioural, and cultural elements that influence human interactions. Finally, the outermost layer represents systematic shifts related that have occurred over time (*chronosystem*).

Further details on how we adopted BEST in our study are further explained in the “Activity 1: Stakeholder Mapping” section. Nevertheless, we echo Henriksen and colleagues' (2020) observations that environments will likely vary in structure, processes, philosophy, and efficiency.

From our perspective, Canadian student-athlete MH can be viewed as a ‘wicked’ challenge, a social or cultural issue characterized by its high complexity, uncertainty, and interconnectedness to real-world constraints (Buchanan, 1992; Liedtka, 2015). Embracing this perspective, we employed a Design Thinking (DT) approach to conduct the present research. DT is a human-centred approach and iterative process to empathize with end-users, challenge assumptions, redefine problems, and ideate innovative solutions (Brown, 2008). Contrary to linear and traditional research processes and business models, DT employs integrative systems thinking by considering diverse perspectives to develop holistic solutions to satisfy human and business needs (Laursen & Tollestrup, 2017; Lockwood, 2010).

In keeping with these DT principles, qualitative case study research was suitable for exploring the present varsity sports ecosystem. Although there have been case studies conducted to explore student-athletes’ perceptions of MH (DeLenardo, 2013) and strategies to support their own MH (Pankow et al., 2021), minimal studies exist on how varsity sports departments (i.e., the contribution of multiple stakeholders) address student-athletes MH needs. Singular cases have explored dual-career environments in Denmark (Henriksen et al., 2020), Finland (Korhonen, 2020), Ireland (Gomez, 2019), and Scandinavia (Linnér et al., 2022). One study examined MH programs in five American athletic departments (Ryan, 2022). However, we have not encountered a case study on a Canadian varsity sports department. Such a case may contribute a Canadian perspective to student-athlete literature and suggest a practical starting point for other

institutions to begin optimizing their varsity sports environment to improve student-athlete MH outcomes. Therefore, the overall purpose of the presented case study is to holistically depict a Canadian varsity sports ecosystem and generate ecological insights from multiple stakeholders into how they support student-athlete MH.

Conceptualization

Philosophical Framework

As a form of human-centred research, the DT paradigm is focused on garnering deep empathy for end users and fueling compassion to drive positive and practical change. According to Chambers (2021), to engage in meaningful and impactful innovation, “designers must harness the DT process (structure and way of working), mindset (attitudes and ways of thinking), and space (external empowerment)” (p.6). The cyclical nature of the DT process emphasizes refining ideas in every step based on acquired competence and understanding of the context. This complements the designerly mindset Schweiter and colleagues (2016) described with eleven key characteristics to employ DT productively. Most notably, being empathic towards people’s needs, inquisitive to new perspectives, open to learning, and mindful of different processes and thinking modes are qualities we maintain at the forefront of our case study.

Case study research is committed to the deep exploration of a particular project, policy, institution, program, or system in a real-life context (Simons, 2009). Like other qualitative methodologies, case studies do not subscribe to a singular set of procedures or methods (Simons, 2009). Like DT, multiple methods are encouraged, and data should be analyzed iteratively. Informed by Merriam’s (1998) qualitative case study philosophy, this research is aimed to provide a rich holistic description illuminating one’s understanding of the explored varsity sports department. Merriam’s constructivist perspective on reality as socially and experientially

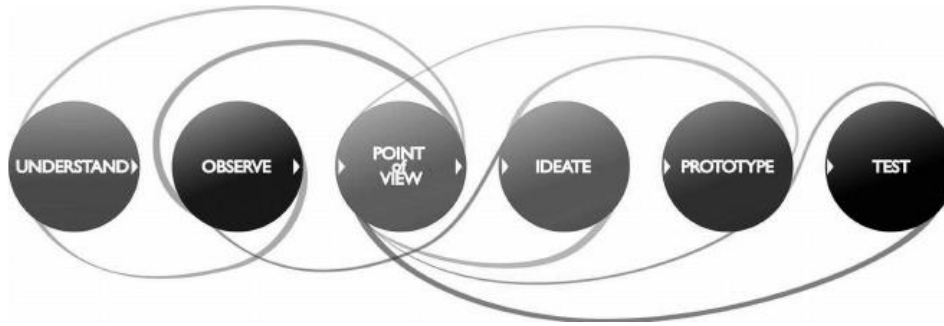
constructed supports the importance of using processes that help interpret, sort, and manage information to convey clarity and applicability of the result. We believe DT to be a constructivist approach, providing a manageable and rigorous process to frame the research study (Merriam, 1988; Thoring & Muller, 2011). For example, DT often relies on visualization to navigate through various stages (Joachim, 2020). As such, several illustrations are provided throughout the write-up to enhance readers' understanding of the case.

Hasso Plattner (2018) Design Thinking Model

This research represents the first study of a multi-phase DT project guided by the Hasso Plattner Institute (2018) DT model and aimed to enhance student-athlete MH at the explored Canadian university (Graper, 2023). As depicted in Figure 1, this model has two phases divided into six iterative process steps (HPI, n.d.). Chambers (2021) referred to phase one as the “compassion space,” where you engage in the first three divergent processes: (1) understand, (2) observe, and (3) point of view. This compassion space should constitute over 80% of the design research timeline, allowing for an in-depth exploration of the research problem, identifying all relevant dimensions, and genuine empathy with the end-users' experiences (Chambers, 2021; Tschimmel, 2012). The remaining 20% is accounted for in the convergent phase, called the “solution space.” The second half of the project entails (4) ideate, (5) prototype, and (6) test multiple solutions until one fulfills the needs of all end-users (Tschimmel, 2012). The presented case study will explicitly engage in the first step of the Compassion space (Understand). This step is committed to a holistic exploration of the localized context in which end-users interact.

Figure 1

Hasso Plattner Institute 2018 Design Thinking Model



Defining the Case

Located in the nation's capital, the University of Ottawa (referred to as uOttawa) is Canada's largest English-French-speaking university and a top-ranked research institute with approximately 41,000 undergraduate and 6,700 graduate students enrolled in a wide array of academic programs (University of Ottawa, n.d.a). Within U Sports, the uOttawa 'Gee-Gees' dress in garnet and grey with an iconic racehorse logo (University of Ottawa, n.d.b).

Approximately 500 student-athletes participate in varsity sports organized in a three-tier system (varsity teams, varsity clubs, and competitive clubs; University of Ottawa, n.d.b). Funding and allocation of resources vary by tier. Beyond athletic achievements, the Gee-Gees exemplify their commitment to educational excellence, with 378 student-athletes (76%) attaining an 8.0+ grade point average in the 2021- 2022 season (University of Ottawa, n.d.b).

uOttawa was the first and remains one of the few Canadian varsity sports departments to employ a full-time Varsity Sports MH Counsellor. This individual has dual competency as a registered psychotherapist in Ontario and a Certified Mental Performance Consultant (CMPC®) with the Canadian Sports Psychology Association. In tandem, these credentials enhance the counselling experience by offering sport-informed MH support. Additionally, uOttawa uses a formalized integrated support team (IST) that promotes holistic athlete development and high-quality care to meet student-athletes' HP needs. Appendix 1 illustrates the six core pillars (i.e.,

MH, mental performance, strength and conditioning, nutrition, academics, and athletic therapy and medicine). Each pillar is led by an IST member to guide varsity-wide programming related to their sports science, medicine, and management expertise. For more detailed information on uOttawa's HP IST structure (refer to Graper, 2023). All these qualities considered provided a rationale for selecting the Gee-Gees as our case to explore student-athlete MH support.

Research Team

Culver and colleagues (2012) asserted that researcher(s) are considered fundamental tools in conducting qualitative research. This is because tactical knowledge shapes methodological decisions throughout a study, including the research questions, choice of methods, and data analysis (Maxwell, 2013). A brief description of the co-authors is provided to explain potential influences that shape our reality as we engage with the data.

Author One was previously a student-athlete at a different Canadian University than the one being explored while studying sports psychology. Due to her own MH challenges, she entered athletic retirement much earlier than expected. This ultimately shaped her career aspirations into becoming a CMPC® and pursuing graduate studies to research student-athlete MH. Author Two is a Full Professor, Social Learning researcher, former high-performance athlete, coach, CMPC® and registered with the Canadian Sport Psychology Association.

Purpose and Research Questions

The purpose(s) of this case study was to holistically depict the uOttawa Gee-Gees ecosystem and generate ecological insights from multiple stakeholders into how they support student-athlete MH. Two questions guided the study: 1) Who are the key stakeholders? And 2) How do the stakeholders enable student-athlete MH within their respective practices?

Data Generation

Data were generated via three activities conducted incrementally, each designed to address a research question and inform the subsequent step. Notwithstanding these steps, the case study structure remained inherently flexible, allowing several iterations throughout the process as our knowledge of the topic and familiarization with the case grew. We would like to emphasize that the first two activities were designed to gain familiarity with the explored case and used to inform our recruitment for stakeholder interviews. The findings under activities 1 and 2 are merely a resource to illustrate the research process, not objective findings.

DT Research Activities

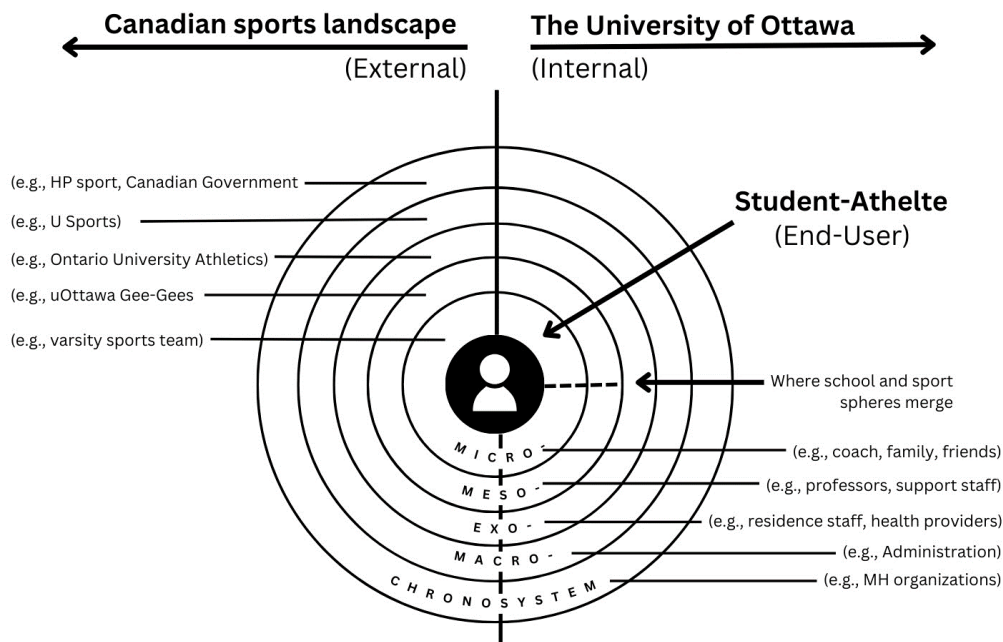
Activity 1: Stakeholder Mapping

Dam and Siang (2022) defined stakeholders as “individuals or groups who have the power either to affect or be affected by the applied research outcomes” (n.p.). To identify and analyze the relevant stakeholders and their relationships in a particular case, a stakeholder map is a practical visual tool to ensure everyone is in your field of vision (Dam & Siang, 2022). Figure 2 depicts the end-users (student-athletes) in the multi-layered environment (varsity sports ecosystem). This stakeholder map was inspired by Chambers et al.’s (2018b) ecology map template “to recognize all those impacted by the events depicted in a case study internally and externally” (p. 89) and underpinned by BEST (Bronfenbrenner, 1979). As illustrated, the map is divided into two halves (left: external and right: internal) to situate the singular institution (uOttawa Gee-Gees) within and the broader landscape (Canadian Sports). This ecological perspective views the case context as an interconnected system (Norman, 2023), making BEST a suitable theory to holistically depict the varsity sports ecosystem and identify the key stakeholders influencing student-athlete MH.

In preparation for Activity 1, Author One thoroughly reviewed several secondary sources (desk research; Bassot, 2022), such as short and long-term strategic plans, organization charts, and services/resources from the University of Ottawa and U Sports websites. This was essential to understand what current resources are being provided to support student-athletes. Author Two reflected on her position within the university and her experience teaching undergraduate and graduate courses in Human Kinetics, a program with a high student-athlete enrollment.

Figure 2

Stakeholder Map Template with Examples



Note. Our stakeholder map is attached as Appendix B

The co-authors then engaged in a 1.5-hour brainstorming session to fill out the stakeholder map based on the knowledge acquired through preliminary desk research and personal reflections (see Appendix A). We began by positioning the student-athlete at the centre and identifying individuals we felt interacted most often within their immediate environment (*microsystem*), including family, peers, teammates, and coaches. In the second layer, we

discussed how stakeholder relationships impact student-athlete MH (*mesosystem*). For example, how might the relationship between a professor and a varsity academic coordinator impact a student athlete's ability to manage academic workload. For the third layer (*exosystem*), we examined the physical environment of a university campus such as food services, residence, healthcare services, and transportation to identify stakeholders with potential indirect influences. The fourth layer (*macrosystem*) considered unique qualities of uOttawa, like the largest bilingual universities in Canada could be comforting for francophone international students. Reducing linguistic barriers may in turn enhance accessibility to university-offered MH resources. Finally, at the outermost layer we discussed how Canada is becoming more aware and receptive to MH challenges. National initiatives like Bell Let's Talk Day have contributed to this positive shift (Bell, n.d.).

Activity 2: Stakeholder Analysis

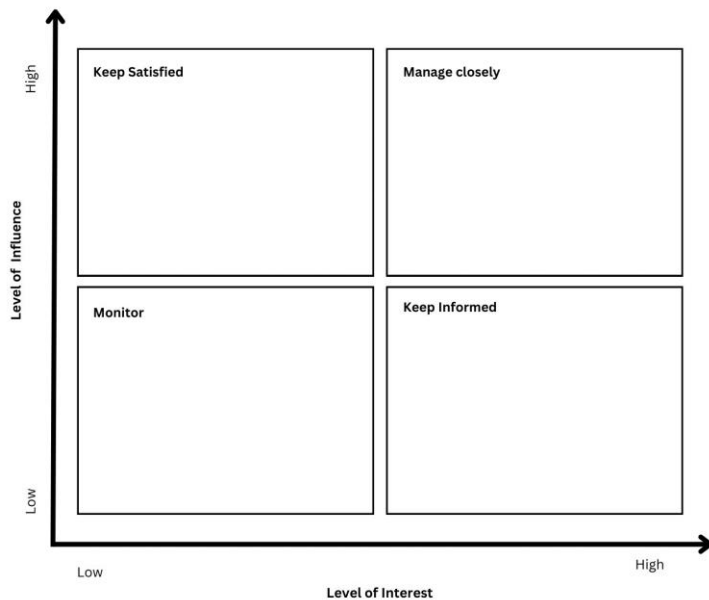
Informed by the stakeholder map above, the next DT activity was designed to assess stakeholder involvement in our research. This was essential for understanding the environment and will prove helpful in future stages when we collaborate on ideas and implement solutions (Hendricks et al., 2018). In the same 1.5-hour brainstorming session mentioned above, the co-authors categorized the key stakeholders depicted in the mapping activity using Eden and Ackermann's (1998) 2x2 matrix according to their level of interest and influence on the research topic. Figure 3 depicts the y-axis as representing a stakeholder's level of influence considering factors such as their position within an organization, role in decision-making processes, and/or financial stakes; the x-axis represents their level of interest in the DT outcomes. Factors such as their perceived level of commitment and priority to improving student-athlete MH are considered. This activity resulted in the creation of four organized groups: monitor (low

influence, low interest), keep satisfied (high influence, low interest), keep informed (low influence, high interest), and manage closely (high influence, high interest).

There were some exceptions where we felt the level of influence was context dependent. For example, coaches influence their team environment more than the administrators of the varsity sports department. Similarly, professors have much more agency in how their classes operate. We provided our stakeholder analysis for reference (Appendix C).

Figure 3

Stakeholder Analysis Template



However, it is important to clarify that these identified stakeholders were not involved in the mapping or analysis activity due to time constraints. These stakeholders were abductively selected based on our perceptions of their capacity to enact meaningful change and positioning within the university. This activity guided intriguing and dialogical conversations between co-authors and informed the recruitment process for the following stakeholder interviews.

Additionally, the map and matrix were often revisited to be adjusted as our knowledge grew with the case.

Activity 3: Stakeholder Interviews

We purposively sampled stakeholders categorized in the “manage closely” quadrant from activity 2 to participate in one semi-structured interview. This sampling method is consistent with Merriam’s qualitative case study approach, as these individuals can provide contextual information relevant to our research questions and goals (Maxwell, 2013). Once the co-authors’ institution granted ethical approval, participants (Table 1) were recruited via email (Thesis Appendix B). Accepting participants signed a consent form (Thesis Appendix C). Nine stakeholder interviews were conducted following a semi-structured interview guide consisting of eight questions designed to understand their role and motivation for working in sports, perception of MH, directly or indirect support they provide to support student-athlete MH, and facilitators and barriers to experience while addressing student-athlete MH (Thesis Appendix D). The interviews ranged between 24-59 minutes and were transcribed at Author One’s earliest convenience (Merriam, 1998), resulting in 136 single-spaced pages. Once transcriptions were complete, documents were sent back to the participants for member reflections (Smith & McGannon, 2018). Interviewees were given four weeks to review their transcripts and edit statements as they saw fit. Additionally, they were asked to disclose how they wished to be presented in the final write-up along with a clear description of their job description. For more details on stakeholder responsibilities, refer to Thesis Appendix E.

Table 1

Stakeholder groups, descriptions, and identifiers

	Group	Identifier	Acronym
1	Administration	Director, Recreation & Varsity Sports	DRVS
2	Administration	Senior Advisor, Student-Athlete Operations	SA
3	IST Member	Varsity Sports Mental Health Counsellor and Coordinator	MHC
4	IST Member	Mental Performance Consultant	MPC
5	IST Member	Lead Performance Coach	PC
6	IST Member	Athletic Therapist	AT
7	IST Member	Eligibility & Compliance Coordinator	ECC
8	Team	Head Coach	HC
9	Team	Mental Performance Consultant Apprentice	MPC- A

Data Analysis

Reflexive Thematic Analysis (RTA) was chosen to analyze the enabler interviews (Braun & Clarke, 2019; Taylor, 2014). RTA involves “later theme development, with themes developed from codes, and conceptualized as patterns of shared meaning underpinned by a central organizing concept” (Braun & Clarke, 2021, p. 3) and is supported by making explicit the researcher’s subjectivity and outlining the reflexive engagement used (Braun & Clarke, 2021). Reflection is crucial throughout the DT process to focus on developing empathy for end-users rather than solutions, leading to a more inclusive and effective design. (Liedtka, 2015).

The data were collected and analyzed in a cyclical nature (Braun & Clarke, 2019) by (re)reading interview transcripts, listening to audio clips, writing personal reflections, and revisiting notes from the stakeholder map and analysis activities. Afterward, we uploaded each transcription document to Nvivo 14 (Lumivero, 2020). Preliminary codes were generated to reflect diverse stakeholder perspectives (e.g., “conceptualizations of MH,” and “support strategies”). Initial themes were then generated by clustering similarities and differences across stakeholders’ experiences. For instance, we examined commonalities in stakeholders’ conceptualization of MH, which was further segregated into more specific codes (i.e.,

“development of coping skills,” “resilience during stressful situations,” and “overall feeling of health and balance”). Overarching themes descriptions and subthemes were developed and reviewed to ensure we were adequately answering our research questions. In Author Two’s research lab meeting, Author One presented each theme along with theoretical support for their interpretations to the group. Our lab mates engaged as critical friends and offered suggestions to improve the articulation of our findings (Smith & McGannon, 2018). We embraced their feedback and collaboratively refined, defined, and named each theme, with final iterations presented in this publication. Finally, relevant literature was threaded into thematic descriptions to support our interpretive findings (Merriam, 1998, p. 199), thereby maintaining epistemic coherence to an abductive-inductive analysis and enhancing overall study quality.

Findings and Discussions

The first three themes delve into how the uOttawa Gee-Gees are currently addressing student-athlete MH within their respective practice: (1) Enhancing accessibility of MH services, (2) providing proactive, holistic care, and (3) building a sustainable IST model. A fourth theme (4), strengthening relationships between stakeholder groups, alludes to the perceived gaps within the varsity sports ecosystem, suggesting areas for further exploration to optimize their environment and proceed in the DT process. Data extracts are integrated into thematic descriptions to illuminate each theme and link to the primary research questions.

Enhancing Accessibility of Mental Health Services

Accessibility refers to an individual’s ability to obtain information and access resources designed to protect and improve their health (WHO, 2017b). From an organizational standpoint, it is imperative to recognize potential barriers inhibiting the use of MH services and assess channels for broadening its reach (i.e., stakeholder map in activity one). Therefore, this first

theme highlights how the uOttawa Gee-Gees are tailoring their MH supports to student-athletes' needs by addressing barriers related to counsellor preference, confidentiality, and service design.

Counsellor Preference

To preface, formalizing a full-time varsity sports MHC position was gradual at uOttawa and initially met with much resistance (see Abraham, 2023). When the idea was first proposed back in 2016, the varsity sports department was given a response one might expect from other stakeholders less integrated into the sports sphere; the SA said, "It took a long time for people to understand why [having a varsity sports MHC] would be important. They kept saying, well, we have counselling on campus. Just send people there." However, it was observed that student-athletes were utilizing general campus services far less than non-athlete university students and displayed negative attitudes toward help-seeking (Gulliver et al., 2012; Watson, 2005). This underutilization was of concern as it may perpetuate the misconception that athletes must experience fewer MH challenges (Chew & Thompson, 2014). 2014). MHC refuted:

We sometimes think ... [an athlete's] life is so unique that it must be very different. No. I see the same stuff that I probably would see with the general population. There is a lot of depression, anxiety... grief, and trauma. These are things that happen in life, and they need some support navigating it.

The MHC believes having dual competency as a CMPC ® and Registered Psychotherapist, knowledge of HP sports culture, and lived experience as a competitive athlete helps facilitate deeper connections with her student-athlete clientele. Based on the MHC's experience, having a sport-informed background has enriched the counselling experience for their clients as it has mitigated the need to explain such nuances underlying their dual-career

stressors. The MHC shared an example she often encounters related to student-athletes' perceived capabilities not aligning with their assigned team role:

That can be devastating. When you feel what you offer is your strength, performance, or leadership, you come to university. You are at the bottom of the development chart. Now, you do not have a good relationship with the coach ... it is really helpful to have dual competency in understanding the specific challenges in sports and how that can impact mental health or life stress.

Furthermore, framing sport-informed MH services as a performance-based resource has served as an effective way to segue student-athletes into the counselling space. They tend to be more comfortable talking about performance issues than general MH and lifestyle stressors at first until a trusting counsellor-client relationship is formed (Gulliver et al., 2012; Moreland et al., 2018).

Confidentiality

The MHC has a unique position within the varsity sports department as part of a formalized IST framework. This positioning allows the MHC to have a spot on each varsity team's staff yet separate from the technical coaching roster (See Appendix B). An increased presence of the MHC in sporting spaces (e.g., locker room, on the field, athletic buildings) has helped build rapport with athletes, coaches, and additional support staff, cultivating an environment conducive to positive MH. One way this is achieved is through educational workshops led by the MHC throughout the season. Typically, these sessions aim to educate teams on signs of languishing MH, teach coping strategies, and promote resources.

Notwithstanding, there are still challenges with being integrated into a team environment. Student-athletes may fear that their individual counselling sessions are not kept entirely

confidential, given the MHC's close proximity to the team and coaches (Brown et al., 2023). The MHC assured:

I want to be the athlete's advocate ... It is not like I am talking to coaches about [anything]; it should not have this impact on your standing, your roster spot; it is not that type of support. It is really just about the way you would see your doctor, right? It is just a personal, behind-the-scenes, taking-care-of-you kind of thing.

Maintaining confidentiality is discussed extensively in athlete MH literature (e.g., Poucher et al., 2023) and recognized as a key aspect for ensuring accessible MH resources. However, navigating multiple relationships at the team-, IST-, and administrative levels within the varsity sports ecosystem is challenging at times. Although the MHC is legally obligated to uphold professional and ethical standards related to privacy concerns and conflicts of interest, there is a necessity for establishing trusting relationships with the student-athlete community. For example, the MHC often promotes resources unaffiliated with the varsity sports department to ease some of their valid hesitations.

Service Delivery

To mitigate some of these concerns, the uOttawa Gee-Gees consider the interior and exterior design of the counselling space to foster inclusion and promote accessibility. For example, the MHC said, "I try to create a safe space ... I decorate it in a way that makes me comfortable with posters of athletes that have gone through adversity". As per the physical location, the topic of a permanent office has resurfaced. Since the COVID-19 pandemic, the MHC services have been moved from her temporary office on campus to completely virtual. The MHC has advocated for a permanent office that is not only convenient for her clients but symbolic in normalizing MH in sports settings:

It needs to be in one of the sports buildings ... it is private so that they can enter and exit, and a coach would not see them from their office. But I am still close enough to collaborate with my peers, and people know that I am there.

Although a physical office remains a priority, remote services have proven to be beneficial for accommodating diverse MH needs and lifestyles of student-athletes. The MHC elaborated:

Depending on the day's situation, it would be nice to do an in-person session. Sometimes, with depression, it is like, thank God, I can be in my bed, put my computer on, and see [the MHC]. However, for some people, having a reason to get up and go to campus is really helpful.

The hybrid format affords flexibility in offering continuous care with minimal disruptions. The MHC reflected on pre-pandemic times when seeing a client throughout the school year, and then they would leave for four months to return to their hometown over the summer. This limited the MHC's reach to primarily local student-athletes and impeded progress for others. However, such circumstances were normalized at the time and are now no longer a barrier.

Lastly, the uOttawa Gee-Gees have eliminated financial barriers and session restrictions to ensure the MHC services remain accessible. This is significant because enforcing a limitation on the number of sessions would ultimately shape the nature of each session. For example, the MHC discussed a case about a student-athlete with a chronic mental illness. She said,

The fact that ... I do not have to cap it. I think that is just great versus just being solution-focused because sometimes that is just not going to be what a client needs ... I can see

you every couple weeks for your five years as a gee-gee.... If that is something that you need.

This feature also encourages student-athletes to use services as a preventative measure or performance enhancement rather than a treatment after a traumatic event, reducing overall stigma for seeking support.

Providing Proactive and Holistic Support

This theme emphasizes uOttawa's proactive strategies used by various stakeholders to support student-athlete MH within their respective roles. This style of support embraces a perspective of protecting and promoting well-being rather than reacting to ill-being (Kuettel & Larsen, 2020). Additionally, the focus on holistic development is emphasized through individualized strategies tailored to the student-athletes unique needs (e.g., athletic, academic, personal, social, and career). This is enabled through the various IST supports.

Shared Vision

Having a shared vision across the varsity sports department was viewed as fundamental by the uOttawa Gee-Gees to enhance their environment and subsequently improve student-athlete MH outcomes. When stakeholders were asked how they best understood the concept of MH, a shared perception of "development of coping skills" was conveyed. These are skills that can help student-athletes better adapt to stressful demands. The SA explained:

Mental health/well-being is having the tools to be able to tackle any challenges that come across your plate ... having the resources to know where to get help, having self-awareness of when you are not doing well, and be able to self-regulate and adjust to make sure that you stay healthy and balanced.

Adopting a proactive approach in a student-athlete context is of particular importance as the MPC pointed out the sharp ebbs and flows regarding the intensity of academic and athletic demands throughout a semester: “The low times are all about anticipation and preparation... And then peak times... [we] can help student-athletes acknowledge what is going on and how they are feeling”. Thus, developing adequate coping skills is deemed critical in this case.

Everyone has a Role to Play

While acknowledging their professional competency to deal with certain MH challenges, shared responsibility was interpreted throughout the team and IST members' (indirect) support strategies. Notably, there was a strong emphasis placed on preventing MH challenges from escalating. For example, suffering an injury is a commonly cited stressor in HP sports (Rice et al., 2016). The uOttawa Gee-Gees proposed multiple ways to preserve positive MH by incorporating their expertise. The AT provided an example of informational support:

We try really hard to educate them on exactly what is happening with their body. I feel the more they understand, the more they will work for it or understand why they are doing this exercise, why it is vital to their body, and why it is important to their return. At the same time, the MPC explained how the injured athlete can work on other tactics during practice to continue progressing athletically:

I remind [student-athletes] that it is OK. In the absence of physical improvements, we still improve mentally ... your awareness, sensitive game, IQ, visualization, and imagery. Can you watch what is going on and anticipate what will happen next? That development can still happen when athletes are injured ... I find that that feeling of moving forward is something that athletes are so attached to. So, to remind them or to discover ways in which they can repossess that feeling during practice.

Another notable stressor for student-athletes is managing academic demands (Kegelaers et al., 2022). The ECC often emphasized the importance of student-athletes having a positive relationship with their professors. In pre-season, student-athletes are advised “to show up with your competition schedule once you have your course syllabus, identify the scheduling conflicts, and try to resolve it as early as possible” (ECC). The ECC iterated that this is not to seek special treatment but to demonstrate a reciprocal professor-student relationship to enable success in academics and sports.

Building a Sustainable Integrated Support Team Model

Our third theme outlines essential support structures for uOttawa to build a sustainable IST model and functioning team (e.g., case management, collaboration, personal support, and professional support). These interactions help protect the well-being and job satisfaction of the IST members and improve the quality of student-athlete support and care. The strategic positioning of the IST at the mesosystemic level (depicted in activity 2- stakeholder map) helps facilitate seamless interactions within the IST and between external structures at the institution.

Case Management

Providing holistic student-athlete support often requires the attention of multidisciplinary practitioners. uOttawa's HP IST framework embodies what the WHO refers to as the “spoke of the wheel” design, where practitioners from varied educational backgrounds work together to deliver the highest quality of care (2010, p.7). A cohesive design streamlines an efficient process for IST members to manage individual cases and provide holistic support tailored to student-athletes' needs. The MHC provided a classic scenario, “I will talk with our nutritionist if we are dealing with someone with disordered eating, only if the client wants.” However, cases can

become much more complex and require the support of multiple IST members, as demonstrated in the case of a concussion provided by the AT:

In the event of a severe concussion, we work closely with the academic [pillar]... to ensure they have the medical notes and faculty support they require. We also work with strengthening conditioning to ensure they do not have any deficits. And then, if needed, refer to mental health or performance to ensure a smoother transition returning to play.

Collaboration

The IST framework fosters collaboration by prioritizing time and space to engage in consistent dialogue, share ideas or concerns, and learn from one another. For example, the IST has bi-weekly virtual meetings typically lasting 45-60 minutes. The AT described these meetings as “Temperature checks ... a lot of quick conversations... What are you seeing? What are we doing? What can we do?”

Personal Support

Additionally, the enablers demonstrated a consensus for the invaluable personal support gained through IST participation. Most members characterized work in a varsity sports environment as fast-paced, challenging, yet rewarding. IST members noted a sense of belonging, as the S&C said, “It is a good opportunity to share your experiences, maybe get some frustration off your chest and to have a crew to kind of grow with.” The MHC spoke of a sense of human connection, “Everyone has different hours... And yes, sports are wild, but you do not really get a chance to stop and talk to people. ...I think [the IST] is great because then we are not alone in our profession”. The MPC also discussed extreme cases:

We have gone through a few difficult times in the past couple of years regarding student-athletes passing ... those are times when it gets really difficult. And in those moments, there is a real emphasis on making sure and checking in with each other as staff.

Professional Support

Finally, formalized partnerships with external structures at uOttawa (e.g., the Health and Wellness Hub) have been an integral professional support resource for the MHC specifically. The Health and Wellness Hub invites the MHC to professional development events and offers clinical supervision required to maintain a professional license. Most notably, the MHC displays gratitude for the coverage the Hub provides in case of urgent events (e.g., an unexpected team issue) or when she is on a personal break. She said,

It has been a huge relief for me to know that the counsellors on campus will take any student-athlete who maybe I have not met yet or who needs an urgent session and cannot wait for me to get back ... Just knowing they will be seen [while I am away], makes me feel really supported by the university... and I can actually rest and relax on personal holidays.

Strengthening Relationships between Stakeholders Groups

The final theme is distinct from the first three, as the focus is on a perceived gap within the Gee-Gees' ecosystem, specifically, the need to strengthen the relationships between varsity sports, professors, and faculty members. In a university context, where sports and education converge within the same ecosystem, it is especially important for stakeholders to align their efforts and practices to cultivate positive MH. For instance, there were contrasting outlooks pertaining to institutional support from various stakeholders in the Gee-Gees case. For example, the DRVS alluded to having a positive connection with the administration, "we have a great

relationship with most of our faculties, from the deans down. When we need help around kids going off to national championships and missing an exam, we generally get the help pretty easily”. Whereas a disconnect between varsity sports and professors was indicated by the ECC, “We don't communicate with professors all that much unless they are specific issues and in specific courses.” There are several reasons why these two truths may co-exist as each stakeholder group has different priorities within the university. The economic benefits of varsity sports, such as through image, student retention, and alumni support, could be more realized at the faculty level. Hence, making an accommodation would seem much more obvious from a faculty point of view. However, such benefits do not align with the goals of professors, for whom making accommodations implies extra work like making changes to their syllabi or exam format.

Academic accommodations were of concern for several varsity sports stakeholders. The ECC believed “somewhat of a problem with the whole situation is that the faculties leave those decisions up to the discretion of the professors with the exception of the final exam.” Despite having a policy that indicates an accommodation must be granted if a student-athlete is away at a university-affiliated sports event, there are no specific guidelines for professors to follow when deciding upon such accommodations, leading to inconsistency and distress for student-athletes. The ECC stated, “if the professor is willing to make accommodations, then they do it. If they don't want to, then you know technically.... rarely do they outright say no... Most say OK we're gonna put that 10% onto the next exam”. Further, the HC expressed discontent, “I really don't like the accommodation [of combined %] when someone has to miss a midterm or an assignment for competitions. I feel we let our athletes down”. These accounts indicate a need for more

flexible accommodation options that are designed collaboratively to satisfy the individual needs of everyone involved, including student-athletes, coaches, professors, and faculties.

Conclusions

This study aimed to holistically depict a Canadian varsity sports ecosystem and generate ecological insights from multiple stakeholders into how they support student-athlete MH. The uOttawa Gee-Gees case aimed to explore two questions: 1) Who are the key stakeholders? 2) How do the stakeholders support student-athlete MH within their respective practices? To address RQ1, we crafted a stakeholder map to provide readers with an overview of the uOttawa Gee-Gees ecology. This activity enriched our ‘thick description’ of the case context (Merriam, 1998) and contributed an illustration to help readers grasp the broader and localized context comprehensively. Our second activity, the stakeholder analysis, helped inform recruitment for the stakeholder interviews. This may serve as a reference for researchers, demonstrating how one might integrate stakeholder assessment into their research blueprint. The outputs from both activities will prove useful for the later ideate, prototype, and test phases in a DT process (Hendricks et al., 2018; HPI, 2018).

In response to RQ2, our findings were generated through nine interviews with a diverse sample of varsity sports stakeholders (i.e., team, IST, and administration). The first three themes suggest that multiple stakeholders within uOttawa’s varsity sports department support student-athlete MH by enhancing the accessibility of MH services, providing proactive holistic care, and building a sustainable IST model. This case showcases how a Canadian university can make these evidence-based MH resources, like having a designated varsity sports MHC, a reality if prioritized and appropriately implemented. Further, the proactive and holistic approach demonstrated by uOttawa Gee-Gees contributes to the relatively small body of research using a

well-being perspective (i.e., promotion-protection) for supporting student-athlete MH (e.g., Kuettel & Larsen, 2020; Pankow et al., 2021).

Viewing uOttawa's varsity sports department as an interconnected system helped illustrate the shared responsibility of all enablers to provide student-athletes with MH support from all enablers (Norman, 2023). However, sports and education stakeholders were perceived as operating within separate silos, presenting an opportunity for improvement to facilitate positive student-athlete MH outcomes. The lack of participation from academic stakeholders (i.e., administration and professors) throughout the present research was considered a notable limitation. It is common throughout student-athlete research to stay within the athletic sphere regarding participant recruitment, literature review, analytic decisions, etc. However, these academic perspectives are needed to support the development of a cohesive and design-friendly environment at the University of Ottawa and elsewhere (Lockwood, 2010; Stambulova et al., 2015). The minimal scholarship exemplifying this lens (e.g., Kuntz, 2011) presents an avenue for future research with untapped potential for advancing student-athlete MH research, policies, and applied initiatives.

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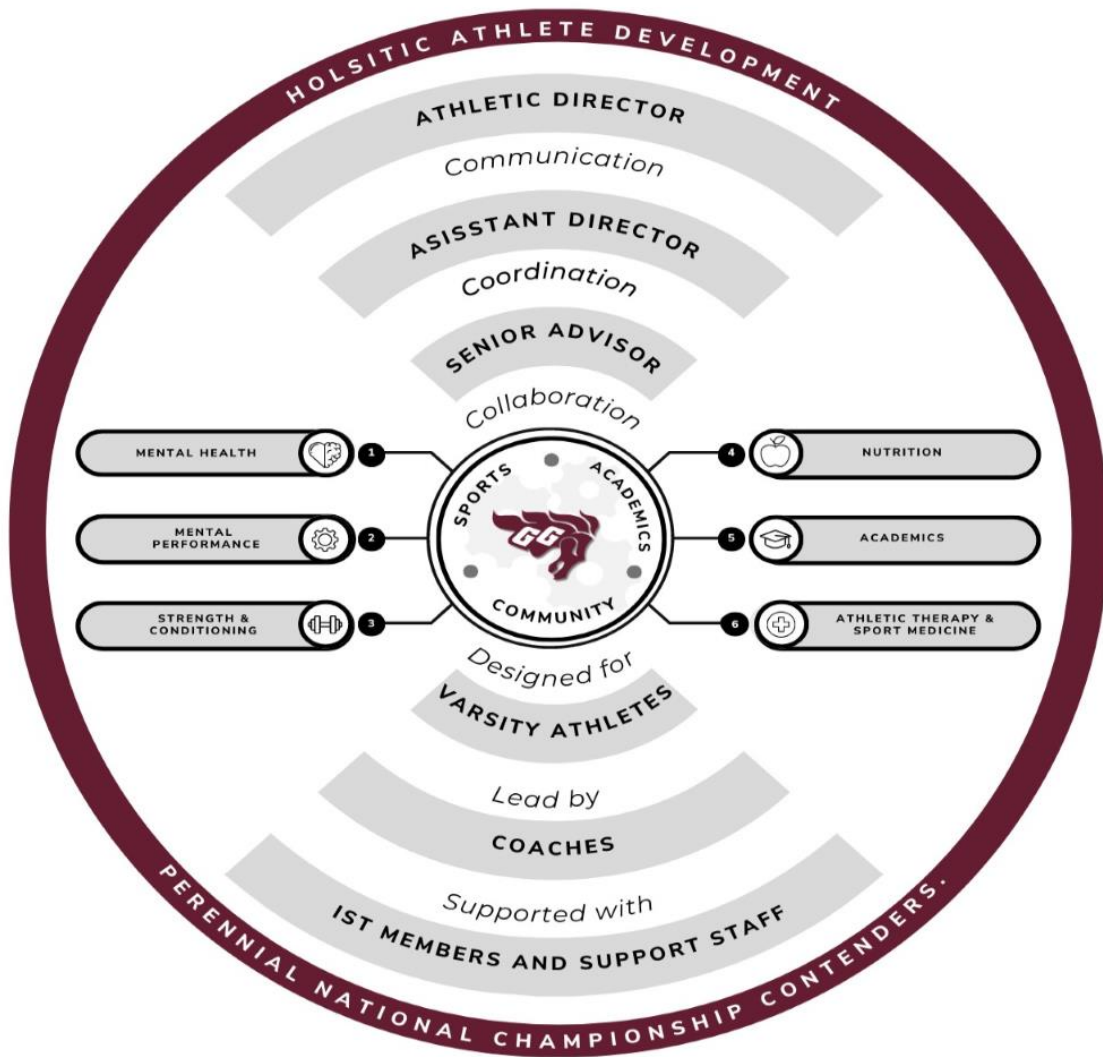
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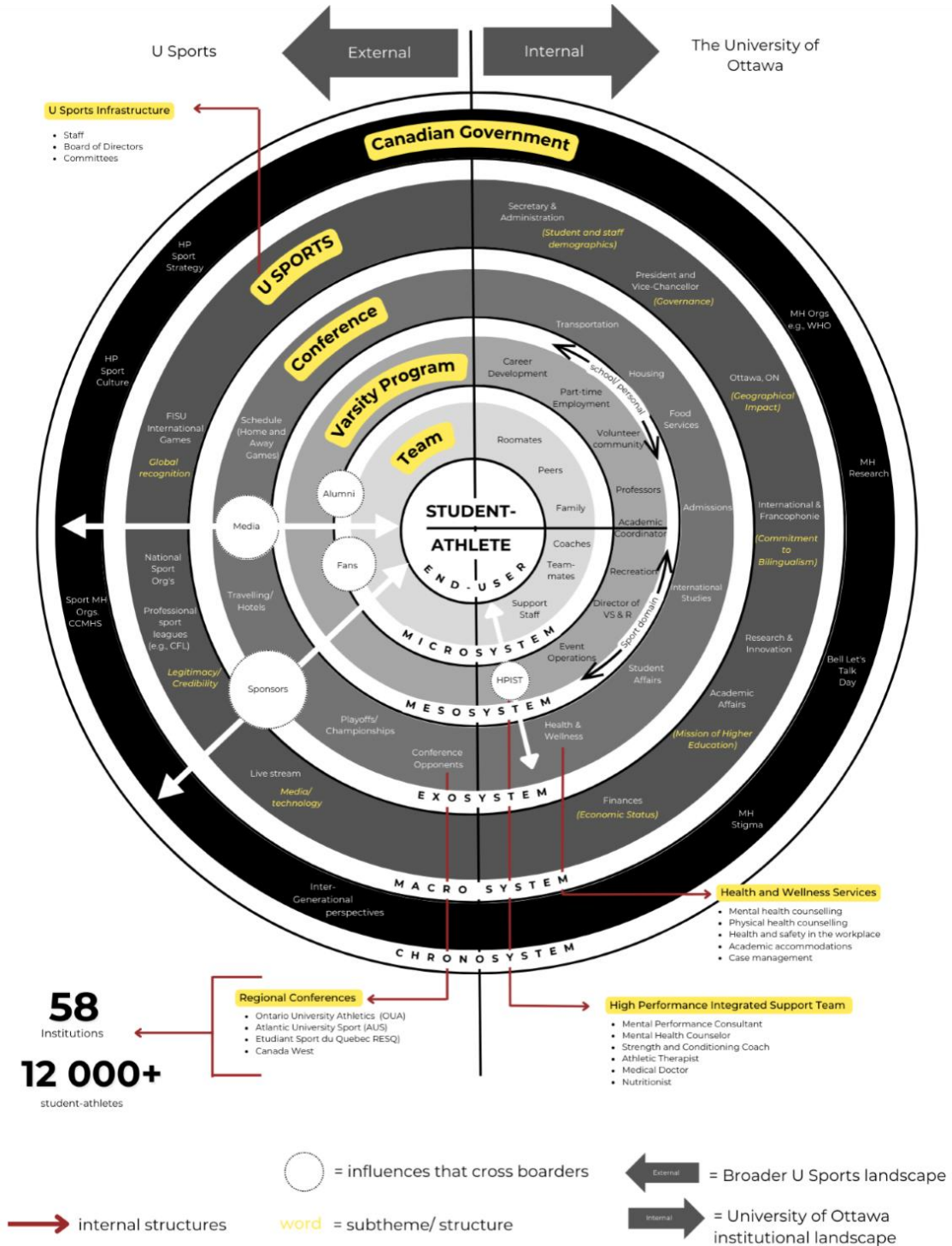
Appendix A



HP IST Model

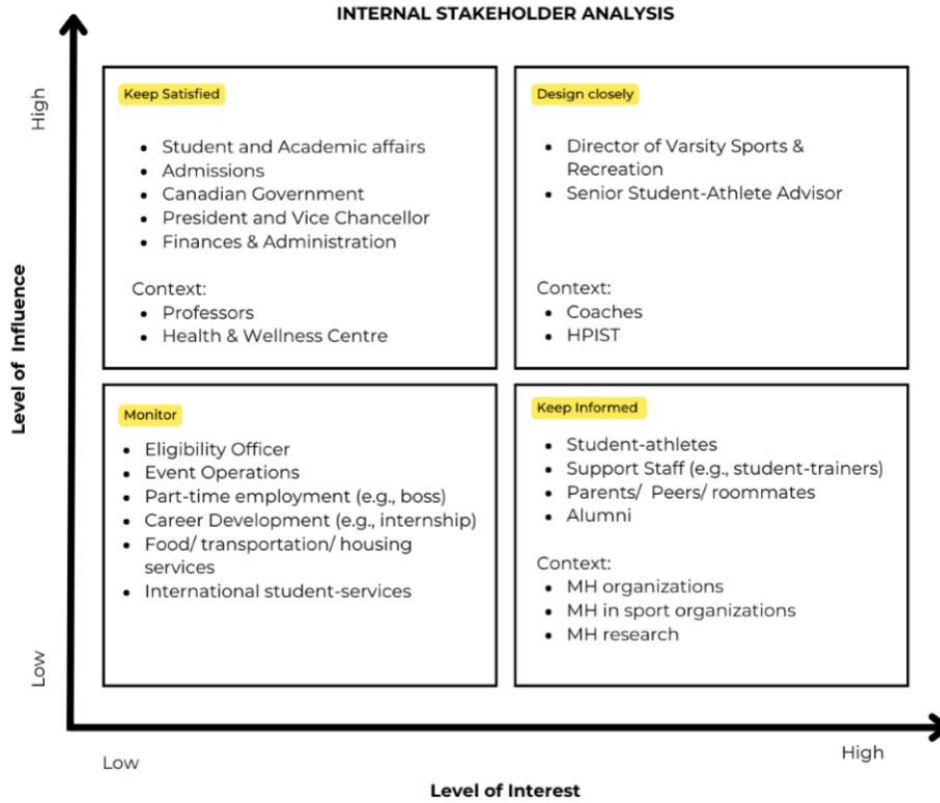
Appendix B

Stakeholder Map



Appendix C

Internal Stakeholder Analysis



Chapter 4: Supplemental Methods and Results

This chapter is dedicated to the supplementary information excluded from the previously presented manuscript due to journal submission parameters. Nonetheless, this information holds significance whereby readers can develop a comprehensive understanding of the case explored. Given the integral part the uOttawa's integrated support team (IST) plays in supporting student-athlete MH, this section aims to provide further detail into their contextual IST framework. This chapter was strategically positioned after the first manuscript to provide a complete picture of the Gee-Gees varsity sports ecosystem. In continuance of using a variety of DT methods, interdisciplinary collaboration was fostered to learn more about the foundational values and pillars that constitute the uOttawa Gee-Gees' HP IST framework. The outcomes of the collaborative endeavour include a list of current and future pillar descriptions, two co-created illustrations, a table of key IST service delivery characteristics, and effective implementation strategies.

Understanding the uOttawa Gee-Gees high-performance integrated support team framework

In HP sports, integrated support teams (ISTs) consist of sports science, medicine, and management professionals working collaboratively to optimize athletes' development and team performance (Durand-Bush & Van Slingerland, 2021). Typically, experts from exercise physiology, mental performance/psychology, biomechanics, data analytics, nutrition, strength and conditioning, and medicine are brought together for group consultations (Durand-Bush & Van Slingerland, 2021). The overarching goal is to provide holistic, sport-informed healthcare services and adapt delivery to meet athletes' needs. Despite ISTs being well-established in HP sports (e.g., Schinke et al., 2018) and advocated for in the U Sports Mental Health Best Practices document (U Sports Medical Committee, 2020), anecdotal evidence suggests ISTs are underutilized throughout Canadian university varsity sports departments. Thus, a case study on the uOttawa Gee-Gees varsity sports department not only allows us to increase our knowledge about student-athlete MH support but also showcases a functional and adaptable IST model to inspire other institutions.

The uOttawa Gee-Gees

The uOttawa Gee-Gees varsity sports department emphasizes the importance of holistic support for optimal performance and perennial national championship contention (University of Ottawa, n.d.b). Their mission statement reflects a commitment to consistent programming and diverse resources to support athletes' training, competition, recovery, and retirement needs (University of Ottawa, n.d.b). This is all attainable through their high-performance IST (HP IST) framework. The uOttawa Gee-Gees HP IST is a model designed for all varsity athletes, led by coaches, and supported by IST leads. Currently, the model consists of six core pillars: 1) mental

health, 2) mental performance, 3) academics, 4) strength and conditioning, 5) nutrition, and 6) athletic therapy and sports medicine. Within each pillar, there are two components: applied practice and education. The tasks associated with these components are fulfilled in some cases by one individual and in other cases by two or more individuals (e.g., the strength performance team comprises about 25 individual strength coaches). As demonstrated in the previous manuscript, the uOttawa Gee-Gees HP IST is integral in supporting student-athletes' needs and influencing their overall MH outcomes. A deeper understanding of uOttawa's HP IST is critical to contextualize the case and contribute to the design challenge.

Design Thinking & Interdisciplinary Collaboration

In line with the DT paradigm (i.e., wicked problems, abductive reasoning, and contextual meaning-making; Laursen & Tollestrup, 2017), interdisciplinary collaboration was encouraged to explore the uOttawa Gee-Gees HP IST framework. Interdisciplinary collaboration brings together people from diverse disciplines with differing perspectives, backgrounds, competencies, and approaches to collectively develop innovative solutions (Brown, 2009). Ideas should be produced on a collective basis where, in the end, everyone feels responsible for the overall output (Lewrick et al., 2018). A group of individuals with T-shaped skills, strong expertise in one area and a breadth of knowledge in neighbouring fields is considered necessary for collaboration of this nature (Thoring & Muller, 2011). However, what is arguably more important is that individuals on the design team adopt a collaboratively geared and open-to-diversity mindset to participate in this process productively (Schweitzer et al., 2016). This entails embracing others' personalities, expertise, and working styles, without judgment, to catalyze effective interdisciplinary collaboration (Schweitzer et al., 2016). Such qualities naturally materialize into the design space, fostering inclusivity and accessibility for group brainstorming.

Laursen and Tollestrup (2017) proposed a taxonomy of DT, which presents the concept as an all-encompassing paradigm, method(s), and tools(s). The second level, the methods of DT, are of particular interest to this chapter. Activities centred on reflective practice, framing, tangible synthesis, explorative learning, input probing, and holistic alignment guide practical action throughout the DT process and maintain paradigmatic coherence (Laursen & Tollestrup, 2017). In our case, we embraced these defining characteristics of DT methods through interdisciplinary and collaborative activities. These activities were designed to co-generate knowledge with the IST members in hopes of better understanding how the uOttawa's HP IST framework operates. The objectives of this chapter include describing the process and presenting the outputs of our interdisciplinary collaborative endeavour. This aligns nicely with Merriam's (2002) case study philosophy geared towards thick, rich, and holistic descriptions underscoring the intricacies of a case.

Methods

During the stakeholder interviews from the previous manuscript, IST members were asked to describe their scope of responsibilities within the varsity sports department. Based on the interview data, a description for each core pillar was crafted by Author One. Along with their original interview transcripts, each pillar description was sent to the IST members to engage in member reflections (Smith & McGannon, 2018). Interviewees were asked to add or remove anything they felt necessary to enrich both documents and were given a 4-week period to submit their changes. Once member reflections concluded, all IST members (n=6) were invited to engage in one 1-hour group consultation to elaborate on the findings generated through individual stakeholder interviews (outlined in the previous manuscript). Author One facilitated the discussion and questions were geared toward learning more about how the IST works

together. Four IST members from the stakeholder interviews (AT, ECC, S&C, MHC; see Thesis Appendix E) participated in the group consultation. Two were unable to attend due to scheduling conflicts. However, an additional two members (belonging to the AT and medicine pillar) contributed to the discussion and Author Two (thesis supervisor) was in attendance. Based on the dialogue between attendees, we agreed that an illustration of the HP IST framework would help others (i.e., readers external to uOttawa) comprehend the holistic, collaborative, and integrated approach. Multiple rough sketches were created as a group using Canva, a free-to-use online graphic design tool (Canva, 3.0, 2023). We were focused on ideating as many ideas as possible to depict each pillar accurately, including the department's core values and multi-level influence (Lewrick et al., 2020). Following the group consultation, each IST member contributed feedback via email exchanges. This evolved into several incremental iterations (see Appendix A). The idea of an illustration also guided a fruitful discussion on future directions of the IST structure. This led to a second illustration to propose additional pillars that would enrich the IST's development and quality of services (See Figure 2).

Findings

The presented findings are intended to be descriptive, encapsulating central themes from the group consultation and multiple rounds of member reflections. Further, the collaborative outputs are presented, including a complete list of IST pillar descriptions, two co-designed illustrations (current and future), effective implementation strategies, and a table of key IST service characteristics.

HP IST Core Pillars

Pillar 1: Mental Health

The purpose of this pillar is to address the mental health and well-being of student-athletes' mental health. The Varsity Athlete Mental Health Counsellor, a full-time registered psychotherapist with a background in performance psychology, leads this pillar. Services include sports-informed mental health care for all tier-one varsity athletes. Other responsibilities include coordinating mental health training/workshops, speaker series, and social media posts to educate athletes and coaches on positive mental health and prevention of ill-being.

Pillar 2: Mental Performance

This pillar aims to optimize athlete performance (in and beyond sports) with mental skills training. This pillar is led by a part-time Certified Mental Performance Consultant (CMPC) with a background in applied sports psychology. Services include individual consultations and group interventions to develop core mental performance competencies (e.g., arousal regulation, stress management, visualization, mindfulness, goal setting) and to consult coaches as necessary. Additionally, the CMPC is critical in recognizing languishing mental health symptoms and referring athletes to appropriate resources.

Pillar 3: Strength and Conditioning

This pillar aims to design, implement, and evaluate strength training programs tailored to sports-specific needs. Based on individual and team goals, training programs can vary in focus (e.g., agility, endurance, power, mobility). This pillar is led by the Lead Varsity Performance Coach (VPC), a high-performance strength and conditioning coach with a kinesiology and human kinetics background. Strength and conditioning are the largest pillars, with over 25 coaches (I.e., lead-, senior-, and student coaches). The lead VPC is also responsible for developing a competent team of strength coaches through professional development, mentorship, and student supervision.

Pillar 4: Nutrition

This pillar aims to help student-athletes meet their performance and personal goals and educate teams on proper nutrition, hydration, and rest/ recovery. This pillar is led by the Lead Performance Dietician, a registered dietitian specializing in sports nutrition. Services include assessing athletes' needs, developing personalized plans based on sports and lifestyle demands, and monitoring client progress. This pillar often coordinates with the medical and mental health pillars. Prominent examples include eating disorders, dietary deficiencies, and blood work requests.

Pillar 5: Academics

The purpose of this pillar is to guide student-athletes throughout their academic journey from admission to graduation. This pillar is led by the High-Performance Coordinator, Compliance and Eligibility and is responsible for creating and implementing the structure providing academic support to student-athletes: onboard and oversee student-mentors; admission guidance and support; course enrolment guidance and support; liaison with Faculties and Services; meets with student-athletes regarding academic challenges; connecting student-athletes to the appropriate university resources (e.g., financial aid, academic support, tutoring services); facilitating academic accommodations for travel or injury purposes; provides recommendations for student-athletes to remain eligible to compete; and overseeing the compliance and eligibility requirements for varsity sports participation.

Pillar 6: Athletic Therapy & Sports Medicine

This pillar aims to assess, diagnose, treat, and support the rehabilitation process of varsity athlete injuries. This pillar is led by three full-time Athletic Therapists (ATs) and supported by a team of four sports physicians and fellows in partnership with the Carleton Sports Medical Clinic

at the Minto Sports Complex. The ATs are responsible for educating athletes and coaches on injury prevention, administering medical clearance to ensure athletes are safely returning to sports, providing continuous care for games and practices (pre-, during- and post-), supervising student internships, and executing the Student-Trainer Work Study program. The work-study program takes place over two semesters (winter courses and fall practicum) and trains 18 students to support the varsity teams. Fundamental skills such as athletic taping and standard first aid are taught for student trainers to apply in their assigned team context. ATs and sports medicine physicians often work together on formulating an athlete's return-to-play transition following a serious injury. Treatment plans are regularly communicated to sports coaches and strength coaches to ensure athletes train safely.

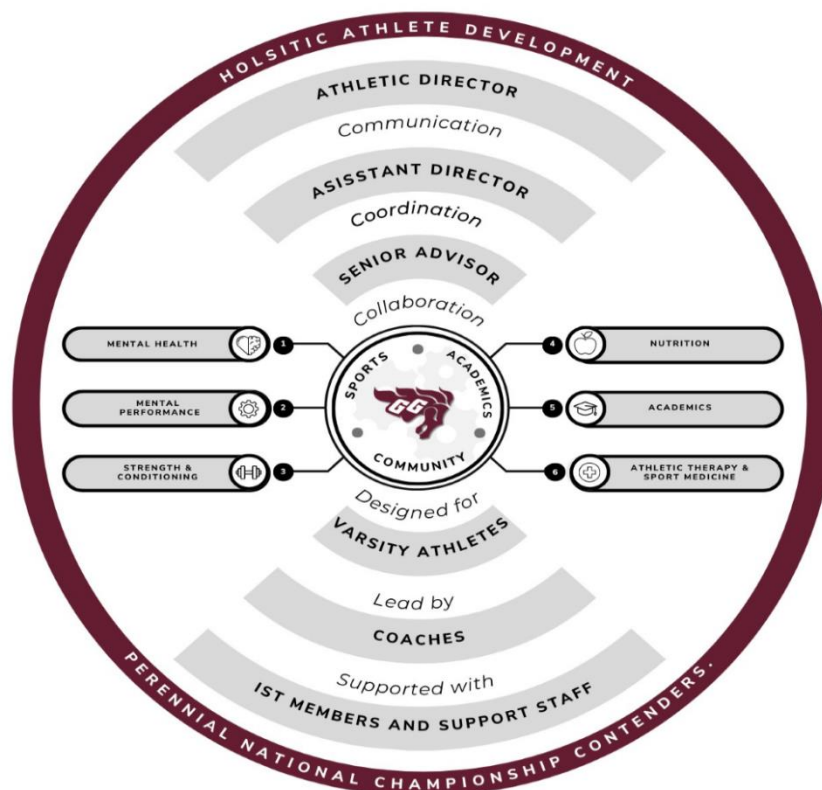
A crucial piece of IST functionality is having designated mediator(s) responsible for facilitating communication, collaboration, and coordination among all key stakeholders in the varsity sports ecosystem. In this case, the SA and Assistant HP Director work together to oversee the athlete referral process, IST collaboration, conflict resolution, resource management, and implementation and evaluation of the IST. Additionally, the DRVS ensures alignment between the IST operations and the 2022-2030 Strategic Plan. Support from management positions assures a positive environment for IST members to succeed in their individual roles and as a team to enact meaningful change throughout the varsity sports department.

It is also noteworthy to emphasize that the SA has previous educational experience in mental performance with a Master's degree in Human Kinetics: Intervention and Consultation. This is significant in light of Durand-Bush and McNeil's (2016) perspective on the potential for MPCs to contribute toward the functionality of the IST by enhancing team communication and team dynamics. Furthermore, the versatility of MPCs is recognized through their ability to lend

expertise to support other core pillars such as coping with an injury or preventing MH challenges (Durand-Bush & McNeil, 2016).

Figure 1

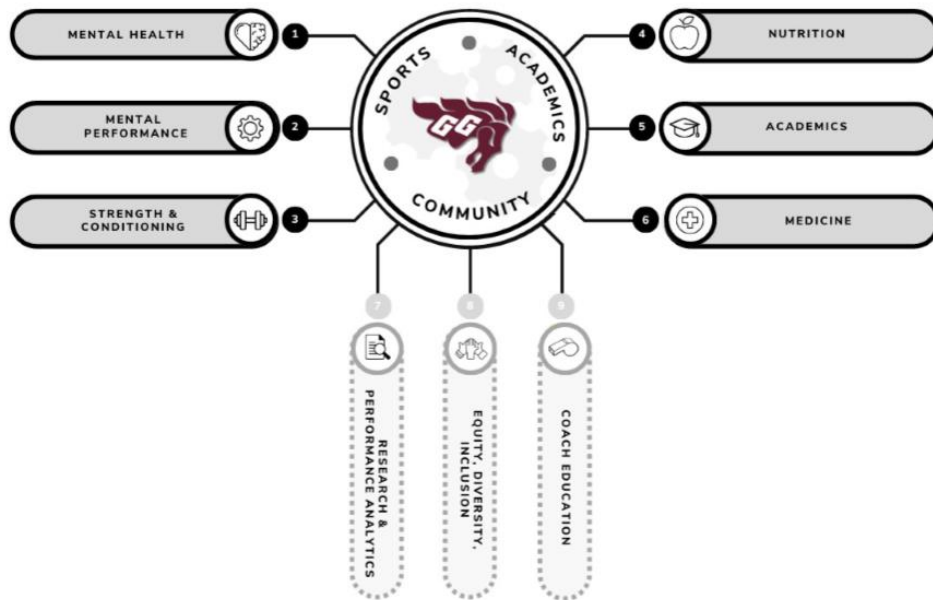
Illustration of uOttawa Gee-Gees HP IST Model



IST members emphasized the need for the overall framework to maintain adaptability based on meeting student-athletes' evolving HP needs. Commentary from the SA provides valuable insights into the future direction uOttawa intends for the IST model, incorporating three additional core pillars: Equity, Diversity, and Inclusion (EDI), Coach Development and Education, and Research and Sports Analytics. This eventual addition will reflect the Gee-Gee's commitment to anti-racism, preventing athlete maltreatment, and fostering innovation.

Figure 2

Future Direction of Core IST Pillars



Effective Implementation Strategies

Despite these innovative services available to the Gee-Gees, there were perceived inconsistencies regarding the teams' utilization of these services. IST members expressed disparities in their level of integration within specific team settings. Their involvement appeared to be heavily influenced by the coaches' priorities (e.g., view toward holistic development). This is a concern, as it can lead to varied accessibility levels for student-athletes to use the IST services based on the sports they play. In response, the IST created intentional strategies to facilitate buy-in from coaches to ensure service utilization. Two effective implementation strategies were discussed in our collaborative session.

Sports Review Panel (SRP)

The SRP is a holistic performance review jointly led by the IST and the coaching staff of each team. This collaborative process occurs twice a season (pre-and post) to facilitate adequate preparation and evaluation. The purpose is to engage in open dialogue, identify prominent issues, receive expert guidance from various pillars, and co-design actionable solutions for coaches to

implement. The SRP addresses various challenges, including injury prevention and management, adequate rest, leadership, and team dynamics. This ensures that the varsity sports department employs a holistic and safe developmental approach. Moreover, the SRP is essential to maintain a consistently positive student-athlete experience.

Varsity Sports Social Media Page

@geegee_performance is a public Instagram account and private Facebook page led by the IST aimed to produce engaging digital content related to holistic student-athlete development. A diverse range of multimedia, including images, videos, research articles, and podcasts, are posted to this platform. To manage content distribution, the IST created a schedule to maintain consistent engagement with the varsity sports community. Each IST lead has a designated day each week to produce or repost content related to their respective field. Social media has been proven to be a powerful tool, especially in the realm of MH, by enhancing the visibility of professional athletes discussing personal challenges and how to access support on campus. Furthermore, the Gee-Gees' performance social media presence has served as an effective outlet for sharing knowledge with coaches throughout the season and reinforcing brand values such as the co-existence of high-performance sports and holistic development.

Although fostering buy-in from coaches can take time and effort, the IST proposed these strategies to enhance integration within each team. These strategies go beyond a generic introductory presentation and demonstrate the valuable contributions IST members can bring to team programming. Building trust and enhancing collaboration between coaches and the IST will ideally incline coaches to actively promote IST services and foster a supportive varsity sports environment.

Key Service Delivery Characteristics

To conclude the collaborative group session, IST members were asked what key service delivery characteristics other institutions should consider if interested in adopting a similar framework within their context. After an engaging deliberation, the responses were thematically organized into four categories: financial, confidential, integrative, and convenient (see Table 1). These findings complement the third emergent theme in the previous manuscript, contributing to building a sustainable IST model (case management, collaboration, personal and professional support).

Table 1*Key Service Delivery Characteristics*

Characteristic	Description
Financial	<ul style="list-style-type: none"> • No financial cost associated with IST service usage. • No usage of student health benefits with IST service usage. • Resource allocation varies depending on a sports tier system
Confidential	<ul style="list-style-type: none"> • Athletes must sign a pre-participation consent form to authorize any discussions of relevant medical information between IST members. • Services made exclusively available to coaches or support staff for consultation purposes.
Integrative	<ul style="list-style-type: none"> • Listed on team's support staff, distinct from technical coaching staff. • Strong presence in individual team environments. • Reduce conflicts of interest where possible.
Convenient	<ul style="list-style-type: none"> • Located at sports facilities. • Remote options are available when necessary. • No capacity limitations for usage of IST services.

Conclusions

This chapter presents additional DT activities incorporated in the Understand phase (HPI, 2018) but ultimately removed from the previous manuscript due to journal submission parameters. The purpose of the chapter was to describe the process and present the outputs of an interdisciplinary collaborative endeavour aimed at better understanding uOttawa's HP IST framework.

First, the methods section is intended to describe the processes taken to facilitate interdisciplinary collaboration throughout the research process. The level of engagement between the stakeholders and researchers was noted as a limitation in the previous manuscript. Thus, providing additional context as supplementary methods and results were essential to reflect the number of interactions more accurately between groups and support our analytical decision-making. Interactive platforms such as Zoom and Canva played a pivotal role in facilitating these interactions and shaping the virtual space whereby IST members could work and learn from one another, contribute their unique perspectives to the discussion, and empathize with each other's needs (Thoring et al., 2018).

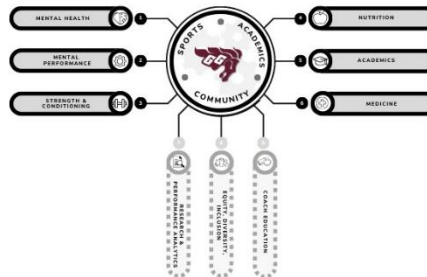
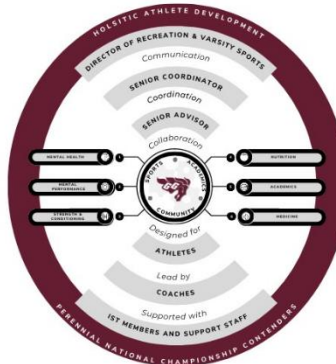
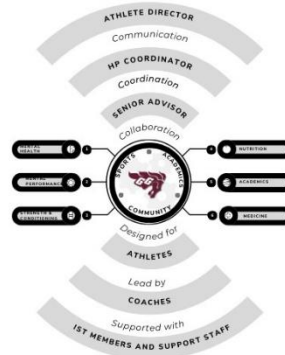
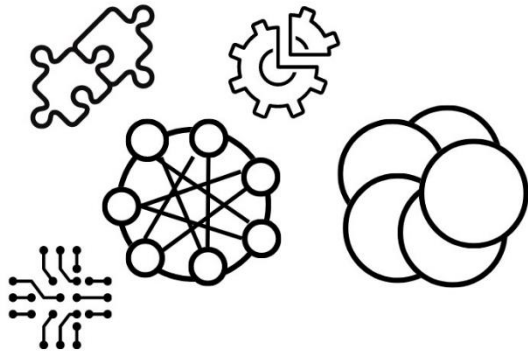
To address the second aim of this chapter, presenting the outputs was achieved through detailed textual and visual accounts. Descriptive insights related to core pillars, effective implementation strategies, and key service delivery characteristics can be used to inspire other institutions interested in implementing a contextually adapted version of the framework. Illustrations were useful in this case to convey the intricacies of uOttawa's HP IST framework. An overview of the framework (Figure 1) was co-designed by IST members and primary investigators to develop a shared understanding amongst the team and outsiders. Given the diverse perspectives that contributed to the development of this illustration, creating common

ground was essential for productively moving forward in the DT process (i.e., contextual meaning-making; Laursen & Tollestrup, 2017). Not only will the visuals be advantageous for helping readers external to uOttawa comprehend the concept, but also for internal purposes such as onboarding new IST members and annual athlete introductions to varsity teams.

These illustrations (i.e., Figures 1 and 2) also served as tangible syntheses, a technique to demonstrate our abductive reasoning applied throughout the interdisciplinary and collaborative process (Laursen & Tollestrup, 2017). DT approaches commonly use visual resources as a productive way to move forward in the development process (Joachim, 2020). In our case, we presented the progressions of our illustrations (Appendix A) to depict the creative process behind the final output. This progression can also represent “reflection-in-action and for upon-creation” (Laursen & Tollestrup, 2017, p.235), an attempt to enhance study quality (e.g., trustworthiness; Smith & Sparkes, 2016), and reduce cognitive biases (Liedtka, 2015).

Appendix A

Progression of IST Illustrations



Chapter 5: Journal Two (Observe & Point of View)

The following journal article presents the findings uncovered in the second and third steps of the DT process, “Observe” and “Point of View” (HPI, 2018). These phases aim to empathize with the end-users’ experiences and understand student-athletes’ unique thoughts, emotions, needs, and challenges related to mental health. To contribute to the overall design challenge, the guiding research questions for this study is, what are the daily realities of student-athletes at the University of Ottawa (i.e., what do they say, do, think, and feel) with respect to MH? Digital storytelling was used for student-athletes to document the mundane moments throughout a typical day as a uOttawa Gee-Gee student-athlete. These participant-produced stories were analyzed using empathy mapping and findings were through fictional personas. This article will be submitted to *Qualitative Research in Sports, Exercise, and Health* for publication.

**Picture this! A Design Thinking case study using digital storytelling to explore
student-athlete mental health**

Manuscript being submitted to *Qualitative Research in Sports, Exercise, and Health*

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Abstract

Design Thinking (DT) encourages using creative methods to collect end-user insights, enabling researchers and stakeholders to develop empathy for their needs and inspire solutions to enact meaningful change. In our case study underpinned by a DT approach, we used digital storytelling to explore the daily realities of student-athletes at a Canadian University (i.e., what do they say, do, think, and feel) with respect to MH? Digital storytelling provides a creative and convenient way for student-athletes to document a typical day in their life using various technical multimedia methods (e.g., audio, visual, textual). Six digital stories were produced by student-athletes. Participants could opt-in to automatic text reminders sent periodically throughout a single day, asking: 1) What are you doing? 2) What are you thinking about? And 3) How are you feeling? An emoji scale facilitated participants' reflections on their emotional state. The analysis led to the creation of empathy maps (i.e., coding what a person says, thinks, feels, and does). The six individual empathy maps were later synthesized into three fictional personas, affording an impactful way to present findings to stakeholders and permitting them to emotionally connect with student-athletes experiencing mental health challenges. Findings reveal an array of pains (e.g., academic stress, burnout, and injury) and gains (e.g., social support, flexible sports schedule, accessible support services, and mental skills) as portrayed in the student-athletes' digital stories.

Picture this! A Design Thinking case study using digital storytelling to explore student-athlete mental health

The literature consistently acknowledges student-athletes' challenges while balancing sports, academics, and life demands. Implications of these challenges on student-athletes mental health have garnered considerable attention over recent years (e.g., Kegelaers et al., 2022). Mental health (MH) is defined by Durand-Bush and colleagues (2022) as “a state in which one is capable of feeling, thinking, and behaving in ways leading to joy, coping, productivity, and contributions to society” (p. 4). While the greater recognition of MH in sports is a positive development, anecdotal evidence suggests student-athletes' MH levels have worsened, possibly due to increased pressures to perform in school and sports. Banwell and Kerr (2016) alluded to the Canadian university sports system adopting a high-performance sports model. Such a model may inherently pose risks to student-athletes' overall personal development if appropriate measures to safeguard MH and wellbeing are not accounted for.

Current research on Canadian student-athlete MH demonstrates an overarching concern. A study by Sullivan et al. (2019) found that 19.8% of student-athletes (n= 284) experienced significant psychological distress that would surpass the assessment of a mental illness. Further, this sample identified females, non-starters, and athletes not on a scholarship as subgroups at an even higher risk for experiencing psychological distress (Sullivan et al., 2019). Not only are student-athletes experiencing MH challenges, but they were also found less likely to seek support than non-athlete university students to seek support. Giovannett et al.'s (2019) exploratory survey revealed that 47% of their 113 student-athlete sample experienced a time when they wanted to seek MH services but chose not to. Factors such as social stigmas have traditionally

negatively impacted student-athletes, reducing MH help-seeking behaviour, service utilization, and literacy (DeLenardo, 2013; Moreland et al., 2018).

Keyes' (2002) dual-continuum model of mental health and illness has been heavily relied on to contextualize MH in multiple disciplines. From Keyes' perspective, MH and mental illness are posed as two separate yet interrelated constructs based on the presence and absence of psychopathologies. MH is framed as a combination of emotional well-being (i.e., happiness and life satisfaction), psychological well-being (i.e., individual functioning and self-realization), and social well-being (i.e., societal functioning). Moreover, these constructs are presented as continua (i.e., languishing to flourishing), suggesting that levels of functioning remain dynamic. Therefore, clinical diagnoses do not necessarily equate to poor MH, nor does positive MH imply the absence of an illness. This distinction is significant as it enables the co-existence of MH and illness and contributes to destigmatizing MH challenges, especially within historically highly stigmatized environments like sports. For example, this model established the groundwork for sport-informed MH assessment tools (e.g., Sport Mental Health Continuum—Short Form; Foster & Chow, 2019). Building on Keyes' MH model, Durand-Bush and Van Slingerland (2021) adopted these foundational concepts to contextualize MH in sport, presented in their three-dimensional model of MH, mental performance, and mental illness. Mental performance (MP) is “the capability to use cognitive processes and mental/self-regulation competencies (one's feelings, thoughts, behaviours) to perform in one's changing environment” (Durand-Bush et al., 2022a, p. 4). Such MP core competencies are further outlined in the Gold Medal Profile (Durand-Bush et al., 2022b, organized into three categories: fundamental (i.e., motivation, self-confidence, resilience), self-regulation (i.e., self-awareness, stress management, attentional control, emotional and arousal regulation); and interpersonal (i.e., athlete-coach relationships,

teamwork, communication, and leadership). Our study to qualitatively explore student-athletes' daily realities in relation to their MH is supported by these frameworks.

Interviews are the most common method to generate qualitative knowledge through various analyses (Culver et al., 2012; Smith et al., 2014). However, there are a growing number of methods to present qualitative findings. For example, Crocker and colleagues (2021) represented Canadian University student-athletes' experience through composite vignettes, presenting matters related to time constraints, first-year challenges, injuries, and competing pressures to perform and excel in all domains (Crocker et al., 2021). This medium is effective for highlighting nuanced experiences, enhancing the accessibility of knowledge beyond academia, and paving new pathways for qualitative knowledge dissemination.

Visual Methods in Sports Research

Visual research methods (VRM) are an innovative way to explore issues in sports psychology (Phoenix & Rich, 2016), helping sports researchers understand phenomena through new lenses, generate knowledge, and communicate findings. Digital media use has transformed from merely a space for information and observation to a space for creation (Costa & Condie, 2018). The potential for VRM in sports is reflected in the growing body of social media research on athletic populations. For example, Hayes (2022) leveraged public digital data to explore athlete MH and well-being from a sociological perspective, examining virtual maltreatment of professional athletes on social media and how they use their platform to destigmatize MH. The significance of this research lies in the possibility of reaching professional athletes whose participation would otherwise be challenging to obtain using traditional research methods. Leveraging VRM enhances the overall accessibility of knowledge, leading to a more comprehensive understanding of MH influences in sports.

However, visual and digital research on student-athlete MH is limited. DesClouds et al., (2022) asserted that 81% of student-athletes self-identified as moderate to heavy smartphone users. Paradoxically, smartphone usage both benefitted and threatened sports preparation, performance, recovery, and well-being (DesClouds et al., 2022). A sample of student-athletes averaged 31.1 hours per week of phone usage, predominately for social media purposes (DesClouds et al., 2021). Therefore, VRMs (i.e., digital storytelling) seem apt to understand student-athletes' MH challenges from their viewpoint.

Digital storytelling, a participant-produced multimedia form, tells an authentic and personal story by weaving together images, videos, music, and voice (Haigh & Hardy, 2018). Drawing from Georgakopoulou's (2007) conceptualization of 'small and big stories,' digital storytelling can enable student-athletes to showcase the more mundane, ordinary, and, in some cases, trivial everyday life events. These insights can garner deep empathy from relevant stakeholders (e.g., coaches, administrators, varsity sports department, and support staff) and inspire future MH support ideas to address student-athletes' day-to-day needs.

Design Thinking

Design Thinking (DT) is well known as an iterative process for understanding end-users, challenging assumptions, redefining problems, and creating innovative solutions for prototyping and testing innovative solutions (Brown, 2008). These collaboratively designed solutions are intended to be equally desirable, technologically feasible, and economically viable (Brown, 2008). Recently, DT has emerged in sports management (e.g., Joachim et al., 2020), coaching (e.g., Cuthbert et al., 2018), and physical health education (Chambers, 2021). However, the use of DT in sports psychology remains limited (Graper & Culver, 2023).

While there are several working models of DT (see Chambers, 2020, p. 45), most frameworks begin with an inspiration phase to develop empathy for the end-users and establish an in-depth understanding of the problem at hand (Brown, 2009). To enact meaningful change, creative and visual methods show rather than tell stakeholders what the users' needs are. Within the sports system, HP athletes tend to have the least amount of authority and influence in shaping the culture of their environment (Fletcher & Arnold, 2011). Moreover, with the immense pressure sports organizations face to succeed (Fletcher & Arnold, 2011), stakeholders' abilities to truly empathize with their athletes are inhibited. Thus, DT's human-centred and empathetic nature is a novel approach to exploring student-athlete MH through digital storytelling.

Conceptualization

This study illustrates how DT can lend its creative and collaborative processes to capture visual and digital holistic accounts of student-athlete experiences. Our aim was to advance the research on student-athlete MH by offering a Canadian perspective and using a Design Thinking approach to empathize with the student-athletes' daily realities.

Theoretical Framework: Design Thinking Paradigm

DT is well known in the business, architecture, and engineering fields as an end-to-end process for problem-solving (Liedtka, 2015). It is, however, much more than that, bringing together design principles, approaches, methods, and tools for problem-solving (Brown, 2008; 2009). With this notion, DT is best understood from a paradigmatic lens: A solution-focused outlook to tackle wicked problems (worldview) using abductive reasoning and contextual meaning (Laursen & Tollestrup, 2017). Wicked problems are complex, indeterminate, and ill-defined (Buchanan, 1992) requiring a flexible theoretical framework to adapt to increasingly complex environments. The abductive approach, which is an 'inference to the most plausible

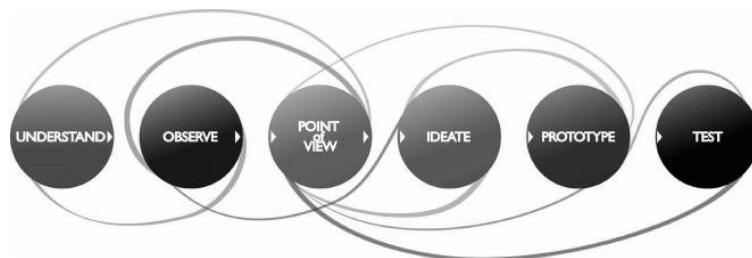
explanation for incomplete observations’ (Bhagavatula et al. 2020), enables design thinkers to engage with the voice of end-users through ongoing iterations of the problem statement and collaborative work towards a contextual solution (Brown, 2009). It is important to note that the knowledge needed to develop an innovative solution is not defined at the beginning nor is it ever complete (Laursen & Tollestrup, 2017). Therefore, each phase of the DT process prescribes a variety of investigative methods, including observation, collaboration, fast learning, visualization of ideas, rapid concept prototyping, and concurrent business analysis (Lockwood, 2010). Such attributes promote a “learn quickly through failing often” philosophy, encouraging designers to embrace uncertainty and ambiguity (Liedtka, 2015; Chambers, 2021).

Methodological Framework: Hasso Plattner Institute (2018) Design Thinking Model

Unlike a linear process, the DT approach commonly moves back and forth between the inspiration, ideation, and implementation phases based on end-users’ feedback (Brown, 2008; Cuthbert et al., 2018). Figure 1 depicts this study's HPI (2018) DT Model of two phases and six overlapping process steps. The first phase, “problem space,” also known as the “compassion space” (Chambers, 2021), encompasses the first three steps (Understand, Observe, and Point of View). Considerable time is spent learning about your end users’ needs and defining the problem before jumping into the “Solution space” (Ideate, Prototype, and Test).

Figure 1

Hasso Plattner Institute (2018) Design Thinking Model



Project Overview

This study is the second part of a multi-phase case study aimed at re-imagining Canadian student-athlete MH support (Graper, 2023). The first part (Graper & Culver, 2023) was dedicated to the “Understand” step, generating ecological insight into how a Canadian University varsity sports department addresses student-athlete MH support. This second study is dedicated to the “Observe” and “Point of View” phases, empathizing with the student-athletes’ daily realities with respect to MH. These findings will help refine the problem statement and inform a future study dedicated to the ideation, prototype, and test processes.

In alignment with our epistemic commitments to DT and qualitative research, we delimited the case and introduced ourselves in part one (Graper & Culver, 2023). This was essential as we engaged in reflexivity throughout the design process and acknowledged how our previous experience and knowledge shaped methodological decisions, such as the research questions, methods, and data analysis.

Purpose and Research Questions

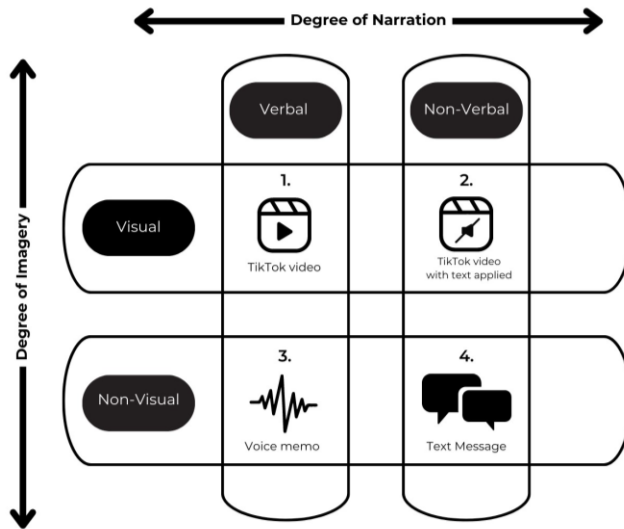
For this study, we engaged in the “Observe” and “Point of View” steps by observing student-athletes in their natural environment and interpreting the gathered findings to identify their needs (Lewrick, 2020). Three objectives framed this study: 1) understand the daily realities of a uOttawa student-athlete, 2) establish a point of view from a student-athlete's perspective on the topic of MH, and 3) present the findings in a creative and easily digestible way. Digital stories created by student-athletes were used to answer the primary research question: What are the daily realities of student-athletes at the University of Ottawa (i.e., what do they say, do, think, and feel) with respect to MH?

Data Generation

To preface, we recognize the complexities associated with exploring daily realities when in retrospect we are capturing a singular moment in time through a digital story. In addition, MH (i.e., psychological, emotional, and social wellbeing; Keye, 2002) are influenced by several factors such as personal, social, and environmental conditions. Thus, fluctuation in MH levels across a single day may not be captured visually or made explicit through narration in the digital stories. The purpose of the data generation tools presented in the subsequent sections was to explore seemingly mundane, ordinary, and, in some cases, trivial everyday life events (Georgakopoulou, 2007). These stories are used to garner empathy with student-athletes' experiences and contribute to a future innovative solution to improve student-athlete MH.

Four-Way Digital Storytelling

Student-athletes were tasked with creating one digital story to document a typical day in their life using one of the four methods shown in the 2 x 2 digital storytelling matrix (Figure 2). A variation of the experience sampling method (Moneta, 2019) enabled student-athletes to share a digital story: a compilation of responses presented in a streamlined and cohesive manner. Three questions were asked periodically throughout the day: 1) what are you doing? 2) what are you thinking about? And 3) How are you feeling? This framework is helpful for categorizing digital storytelling methods based on their level of narration (non-verbal – verbal) and visual imagery (non-visual – visual). The matrix was intentionally designed to empower student-athletes to autonomously share their stories, allowing them to create how they want, express what they want, and communicate their story within their desired level of confidentiality. See Appendix A for a summary of specific instructions and Thesis Appendix F for a complete overview.

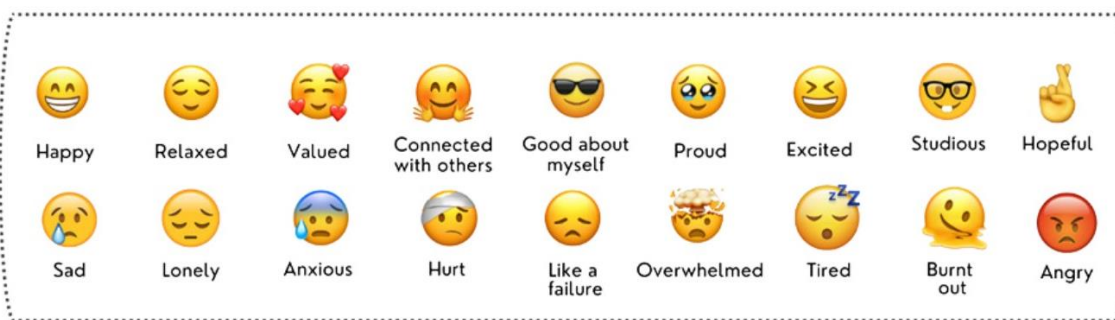
Figure 2*2x2 Digital Storytelling Matrix**Student-Athlete Mental Health Emoji Guide*

To answer the third question, “How are you feeling?” a Student-Athlete MH and Well-being Emoji Guide (Figure 3) was developed to allow student-athletes to communicate their response creatively and conveniently through emoticons (‘emojis’ for short). Emojis provide an accessible, inclusive way of conveying nuanced emotions through a universal dialect, providing valuable insights into student-athlete MH while overcoming social and linguistic limitations. Our guide was inspired by Davis and colleagues’ (2022) Emoji Current Mood and Experience Scale (ECMES). The ECMES is the first emoji-based and self-reported tool to measure various psychosocial domains, including MH, well-being, resilience, and community connections in non-clinical settings (e.g., sports). In comparison to more conventional methods for measuring subjective well-being, emojis provide an efficient way for end-users to participate in using any mobile device in a time-sensitive manner.

Given the population we were exploring, convenience was essential to minimize major disruptions to already busy lives. Additionally, the ability to express emotive thoughts non-verbally was significant as uOttawa has a high population of francophone students, and Author One is Anglophone. To increase convenience, inclusivity, and accessibility, removing the researcher from plain sight and using emojis could enhance the overall quality of participation and facilitate vulnerability among student-athletes. The Student-Athlete Mental Health Emoji Guide consisted of 19 emojis. Ten emojis were adopted from the ECMES (happy, relaxed, valued, good about myself, connected to others, sad, anxious, bored, a failure, and lonely). To situate the adopted scale in a student-athlete context, the remaining nine (proud, excited, hopeful, angry, hurt, tired, burnout, overwhelmed, and studious) were selected based on supporting sports psychology and student-athlete scholarship (e.g., Jones et al., 2005; Lazarus, 2000). In many scenarios, a participant might be feeling multiple emotions at once. Thus, we did not limit the number of emojis used in response to the third question.

Figure 3

Student-Athlete Mental Health and Well-Being Emoji Guide



Sampling

Once approval was obtained from the co-authors' Institutional Research Board of Ethics, participants were purposefully sampled, enabling the deliberate selection of participants to

provide information relevant to our questions and goals (Maxwell, 2013). To be eligible, student-athletes had to compete on a tier one varsity sports team, enrolled as full-time students, and currently in season. As is common in U Sports (Banwell & Kerr, 2016), financial and resource allocation are funnelled toward tier one ($n = 9$) teams at the uOttawa. Beginning in January 2023, our participant pool was drawn from seven teams in the season. We prioritized in-season to capture realistic and authentic experiences during arguably the most stressful time periods (e.g., playoffs and exams). Team coaches were sent a recruitment email using addresses derived from the varsity sports department's website. A recruitment email was emailed to team coaches briefly introducing the study (See Thesis Appendix D). While three varsity teams (first-come, first-serve) varying in gender and sports type were desired, this proved very difficult due to the timing of recruitment during a high-stress period.

Procedure

Two Head Coaches invited Author One to attend a practice with their teams (1 women's and one mixed) to provide an overview of the study. Author One also shared her story as a student-athlete and what motivated her to pursue this research. Finally, a recruitment poster was given to each team (Thesis Appendix G) with two QR codes to enhance participation accessibility. A PDF poster with a link was also shared through team mobile group chats (e.g., WhatsApp) to augment participant anonymity.

The first QR code linked to the consent and pre-participation forms. Student-athletes were asked to scan this QR code at least 24 hours before doing a digital story, sign the consent form virtually, select their digital story format, and opt in or out of automatic reminders. Reminder Base, a two-way messenger application, was used for automatic text messages and email reminders (Reminderbase, n.d.). One text message was sent within 24 hours of the start

time with clear instructions for what was expected and providing the opportunity to withdraw. The participants chose their start time, and a reminder was sent every 2 hours until 10:00 pm that day. Scanning the second QR code would allow the participant to submit their completed digital story (if applicable) and a brief demographic questionnaire with nine questions about personal characteristics (e.g., sports, gender, age, race, residence, scholarships, program of study, and year of eligibility). The form concluded with a long-answer opportunity for the student-athlete to add any additional insight not fully reflected in their digital story.

The start and end times for storytelling ranged from 5:30 AM – 10:00 PM, except for one student-athlete responding to their final text the following morning. Digital stories were considered complete once the participant submitted the submission form (QR2). Author One was notified when a new response was collected, triggering the analysis (Thesis Appendix H).

Digital Ethics

Inspired by McGannon and colleagues (2022), a digital ethics section was essential. We echo IDEOs' (2016) notion that the design quality depends on end-users' willingness to spend their time, energy, and openness to share vulnerable experiences. Thus, ethical principles, including respect, responsibility, and honesty, were maintained at the forefront of decision-making throughout this study (IDEO, 2016). These principles were embodied through our instructions for digital storytelling, safeguarding the collected data, and communicating the findings with sensitivity. For example, the privacy policy and intellectual property policies for using TikTok and Reminderbase were attached to the consent form to ensure student-athletes understood the terms and were informed on potential risks related to the collection, use, and disclosure of personal data (Thesis Appendix H). Participation in this study did not require the student-athletes to make their stories public through personal social media accounts. However,

one of the participants showed interest in sharing their story publicly, which was left to their discretion. Author One was the only person to have access to the pre-participation responses and coding list (e.g., Athlete A-F), which included personal contact information traceable back to the submitted digital stories. Lastly, data sensitivity was accomplished by describing digital story details and aggregating student-athletes' quotes in the final write-up (McGannon et al., 2022). These insights were used to construct fictional personas expressing shared pain and gain points across stories rather than individual experiences. The purpose of the personas is to facilitate emotional empathy and compassion (Liedtka & Ogilvie, 2011). Being explicit with our ethical guidelines inevitably fed into our reflexivity practice and enhanced the rigour of the overall research.

Participants

Six student-athletes agreed to produce one digital story each: five swimmers and one volleyball player ranging from first to fifth year of varsity sports eligibility. Four were enrolled in a program in the Faculty of Health Sciences, one in Political Science, and one in Sciences, ranging from the first to the fifth year of their academic career. All the participants identified as Caucasian females between 18-22 years old. Two participants lived in residence, and five of six received an athletic scholarship.

All six participants opted for text reminders. Five participants chose Option Four (text messages), and one chose Option One (TikTok) to format their story. Student-athletes were encouraged to document a day when a game/competition, practice, or exam took place. All six stories included at least one training session, although most indicated multiple team training sessions or events.

Data Analysis

Empathy mapping, a form of target group analysis, was employed (Lewrick et al., 2020) to “identify feelings, thoughts, and attitudes of existing (or potential) users and to understand their needs” (Lewrick et al., 2020, p. 93). Empathy maps consist of four quadrants: say, do, think, and feel. This tool facilitated a deep understanding of student-athletes’ behaviours (do), thoughts (think), emotions (feel), and language (say) demonstrated through their digital story. Empathizing and synthesizing observations in this manner generated unexpected insights regarding student-athletes MH needs. Despite being presented as linear steps, the analytic process should be viewed as a recursive, iterative, reflexive, and interpretive activity (Denzin & Lincoln, 2011; Taylor, 2014). Additionally, the procedure was kept flexible to adapt to the diverse storytelling mediums.

Author One became familiar with the data by reading or viewing each story several times. Narrations, including text messages or transcriptions of verbal responses, were then documented for each participant. A template was created to organize responses by time stamps, noting what time the text reminder was sent, when a response was received (option four-participants only), and a space to jot down initial reflections. Author One began the empathy mapping by highlighting key passages with various colours to represent the four quadrants (say, do, think, and feel). There were multiple instances interpretable as a combination of codes. For example, in Athlete E’s 8:00 am response, she noted, “Just woke up, planning my schedule for today while making breakfast ... I have a lot to do, so it is going to be a busy day, but I am excited to get it all done *studious emoji*”. The student-athlete is “doing” some planning right after waking up, while eating breakfast, “saying” there are a lot of things to get done today based on these plans, “thinking” it is going to be a busy day, yet “feeling” excited and eager to get it all done. A reflection on this story by Author One included, “Being proactive by organizing her

schedule in advance appears to help the student-athlete feel more efficacious in achieving her to-do list. This made her feel studious and productive rather than overwhelmed by her multiple demands”.

In this manner, keywords and sentiments were organized into the four quadrants of the empathy map to provide an overview for abductively generating initial themes interwoven throughout an individual’s digital story. For instance, Athlete C explained how she was experiencing a personal issue that made her feel sad, tired, and like a failure (selected emojis) throughout the day. This personal matter (could have) resulted in stress throughout her day, as reflected in some of her voiced statements, “I should have gotten more sleep” and “I feel behind in my next class.” One empathy map was created per digital story, resulting in six individual maps. To gain more context and clarity in support of the stories, a list of questions accompanied the transcripts sent to student-athletes. This iterative and participatory technique of sending materials back and forth led to a robust understanding of the student-athlete’s experience (Smith & McGannon, 2018). Fortunately, we had five of six student-athletes provide supplementary insights. For instance, Athlete E responded to our interpretation of not enjoying morning practice times,

That is not entirely true- only some mornings. I like to sleep until 7:30/8 a.m., and rarely do I go later. I am most mentally productive in the morning, so I would rather wake up, study, and then work out in the early afternoon when I am mentally tired but physically still fine. After a long study day, that is when I don’t look forward to early morning workouts.

Next, the individual empathy maps and member reflections were synthesized into one condensed empathy map, encompassing common themes across all six digital stories. The co-

authors clustered and re-titled keywords and similar passages to generate second-order themes. For example, under the “thoughts” code, a common theme was “navigating uncertainty” which was supplemented with school and scenarios. Athlete B wondered “if I’m going to feel good in the water and if I will start to swim better.” Whereas Athlete A struggled with “all the schoolwork I have to do and the weight session coming up, do I have time to do all the things”? These second-order themes were then categorized into “pains” (challenges) or “gains” (benefits) of the user experience pertaining to MH, inspiring the central plots for the user scenarios presented below. Additionally, data generated through the original digital stories, empathy maps, and the demographics questionnaire were all revisited to add finer details in the persona profiles.

Findings

Three fictional personas are presented. Calde et al. (2002) defined personas as “fictional and detailed archetypical characters that represent distinct groups of behaviours, goals, and motivations observed and identified during the research phase” (p. 2). Personas are commonly used in DT to synthesize findings from the empathy maps and present end-users’ attributes (i.e., needs, interests, aspirations, behaviours, and values). The purpose is not to depict one singular student-athlete experience but rather to illuminate collective thoughts, sayings, experiences, and emotions presented across all digital stories (Liedtka & Ogilvie, 2011). A “typical day in the life” of each persona is presented for readers to understand and interpret the perspectives of end users and the problems they face. To achieve this objective, prominent pains and gains were strategically embedded throughout each user scenario to present the persona narrative cohesively and elicit emotional responses from readers. There were five sections highlighted on each profile: 1) profile, 2) identity continuum, 3) MH influences, 4) Pains and gains, and 5) Jobs-to-be-done.

As previously mentioned, data from our demographic questionnaire was used to inform the persona's characteristics such as their physical (e.g., gender, age, race) and personal attributes (e.g., sport, educational degree, residence). The visuals were intended to bring the personas' profiles to life and communicate our interpretations visually (Laursen & Tollestrup, 2017). To provide more context into our personas' unique features, we included an identity continuum to reflect diverse ranges of student-athletes' identity attachment styles on a spectrum with student and athlete presented as binaries. Athlete identity literature alludes to significant implications associated with dominant athlete identity attachment such as increased challenges with athlete retirement and MH outcomes (e.g., O'Neil et al., 2021). Thus, understanding if the persona identifies more intensely with a student or athlete identity, it may help readers contextualize the written scenarios presented alongside each visual profile. It is important to note that athlete identity was not explicitly measured with our sample, and the continuums presented in the top right corner are an extension of our interpretations as we engaged in the data.

Next, the MH influences present real examples derived from the student-athletes' stories that were perceived as either facilitators or barriers to optimal MH. Whereas the "pains" and "gains" are linked to the broader benefits and challenges associated with student-athlete experiences. To address the challenges and barriers, "jobs-to-be-done" are presented in the bottom left corner. These questions were designed as probes to generate suggestions from multiple perspectives in future ideation sessions (Laursen & Tollestrup, 2017).

Persona 1: Olivia Williams

"I woke up at 7:30 a.m. It felt good to sleep in after travelling and playing two away games. My roommates and I walked to the cafeteria for breakfast. This is my favourite way to start the day because ... well, my roommates are NARPs (non-athletic regular people), and I get

to hear their wild adventures from the night before. As we eat, all I am thinking about is what practice will be like tonight. We went 0-2 this weekend, and I did not perform as well as I hoped.

I dread Mondays, three classes and one lab in a single day... I guess that is the life of an engineer. I also have a report due tomorrow that I have not started. I thought I would have written it on the bus ride home, but I slept most of the way. I feel overwhelmed after my first class, so I head straight to the library to get to work.

While walking to my next class, I considered getting a coffee and bagel. But wait, I should watch what I eat if I want to get more playing time in our next game. I can't risk being slow on the pitch.

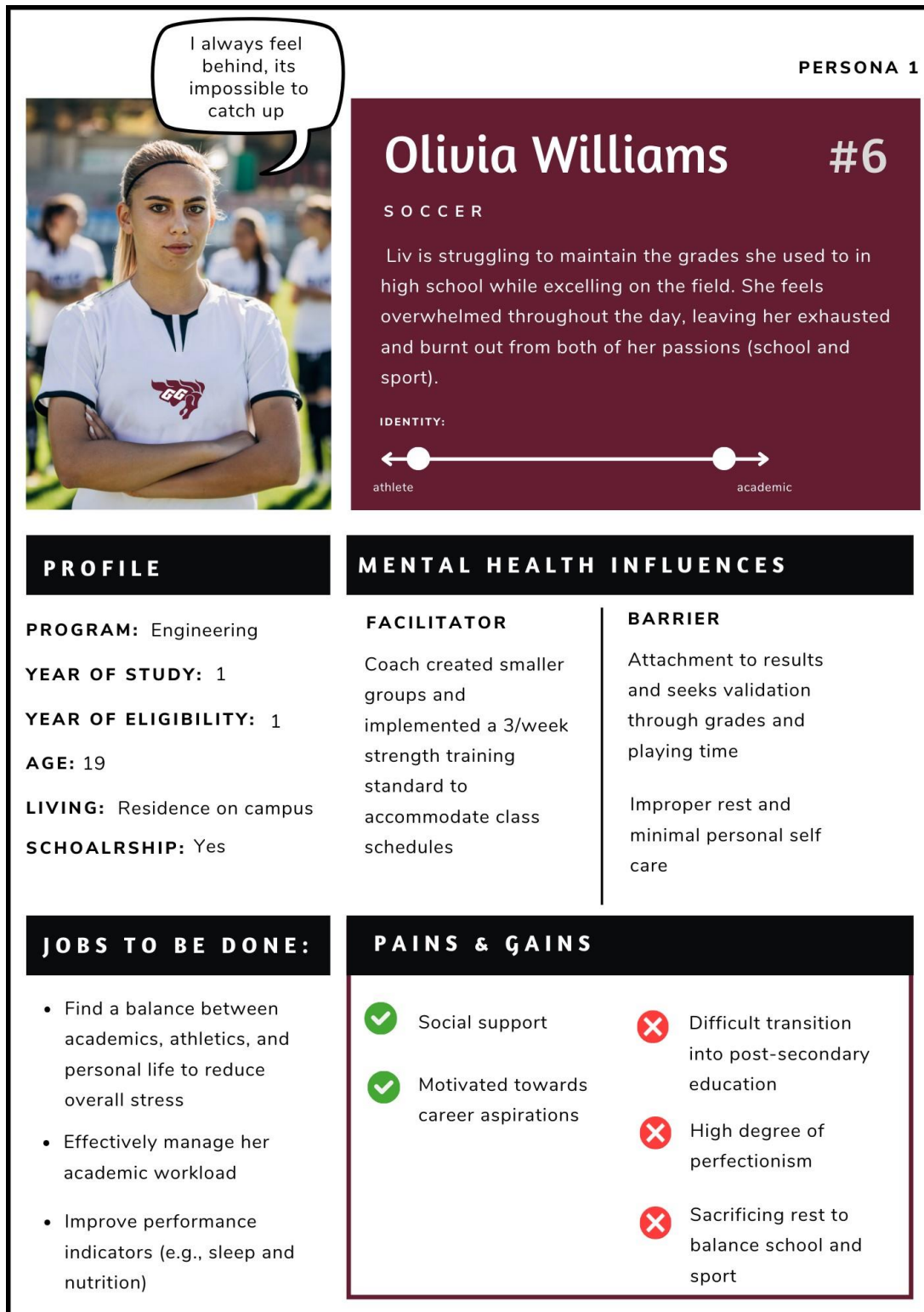
There is a team lift before practice. I'll be in my lab, but that is okay because Coach expects us to lift three times a week (I try to do 4 or 5). I appreciate our coach doing this because working around everyone's class schedule is challenging, and we stay accountable for our fitness levels.

Practice was OK; I felt my stress starting to show on the field. I missed a few wide-open shots, which is very unlike me. Typically, my last class is at 7:30 p.m. I decided to skip it ... whoops! I really needed to finish my lab report, and it felt like I had no time to work on them all day!

I walked back to my residence and quickly caught up with my roommates. We were laughing and having a good conversation, but all I could think about was getting back to work. It is getting late. I do not know what is worse, handing it in when it is not the quality I usually produce or simply taking the zero. I chose to stay up late... We have an early practice tomorrow morning ... ugh".

Figure 4

Persona Profile 1



Persona 2: Adri Clément

“I rolled out of bed at 5:45 am and got ready for practice. I take pride in being the first one in the gym every morning. This gives me time to get a few extra shots up and a thorough warm-up in.

I was frustrated with how practice went. My knee was hurting again, so I had to sit out for most of the drills. Nobody tells you how difficult it is to feel sidelined while everyone around you progresses. After practice, I limped straight to physio to see the athletic therapist (AT) for a session and then an ice bath. Even though the AT is taking care of my physical health, she does a lot for me mentally. I usually go to her if I need to get something off my chest.

I went to the cafeteria to grab some lunch before heading to my noon class. Around this time, I feel like I am hitting a wall. Sitting still while listening to a lecture leaves me feeling unengaged, extremely tired, and sore. I decided to go back to the team room after class. It is my favourite place to do schoolwork because when I need a break, I usually have a teammate to talk to, or I am close enough to the varsity gym to get a lift in.

At 4:30 p.m., we had a team film session to scout our opponents for the game this Friday. I study our scouting reports and team playbook more than I do for school... oops! I am feeling nervous about the game. Even though I have been cleared to play, my knee has been flaring up. Fortunately, I have really supportive teammates and coaches.

Around 6:00 p.m., I go home and cook some dinner. I like to have lots of leftovers to use as meal prep for the rest of the week. I spend the rest of my night relaxing, watching Netflix while applying heat to my knee. I wish I were able to get more schoolwork done today. Hopefully, tomorrow, I can be more productive. In the meantime, I am getting ready for bed around 10:00 p.m. so I can do it all over again tomorrow.”

Figure 5

Persona Profile 2



Persona 3: Payton Evernew

“I woke up at 6:00 am, extra early to put a load of laundry in before I went for my morning run. When I came home, I cleaned up my room... I have been putting this off for a while now. It feels good to have things in order again. I make a protein smoothie for breakfast and plan a detailed to-do list for the day ahead. With nationals and midterms coming up, it is best to stay organized. Luckily, I have no classes today, so I can focus on studying for my upcoming exams.

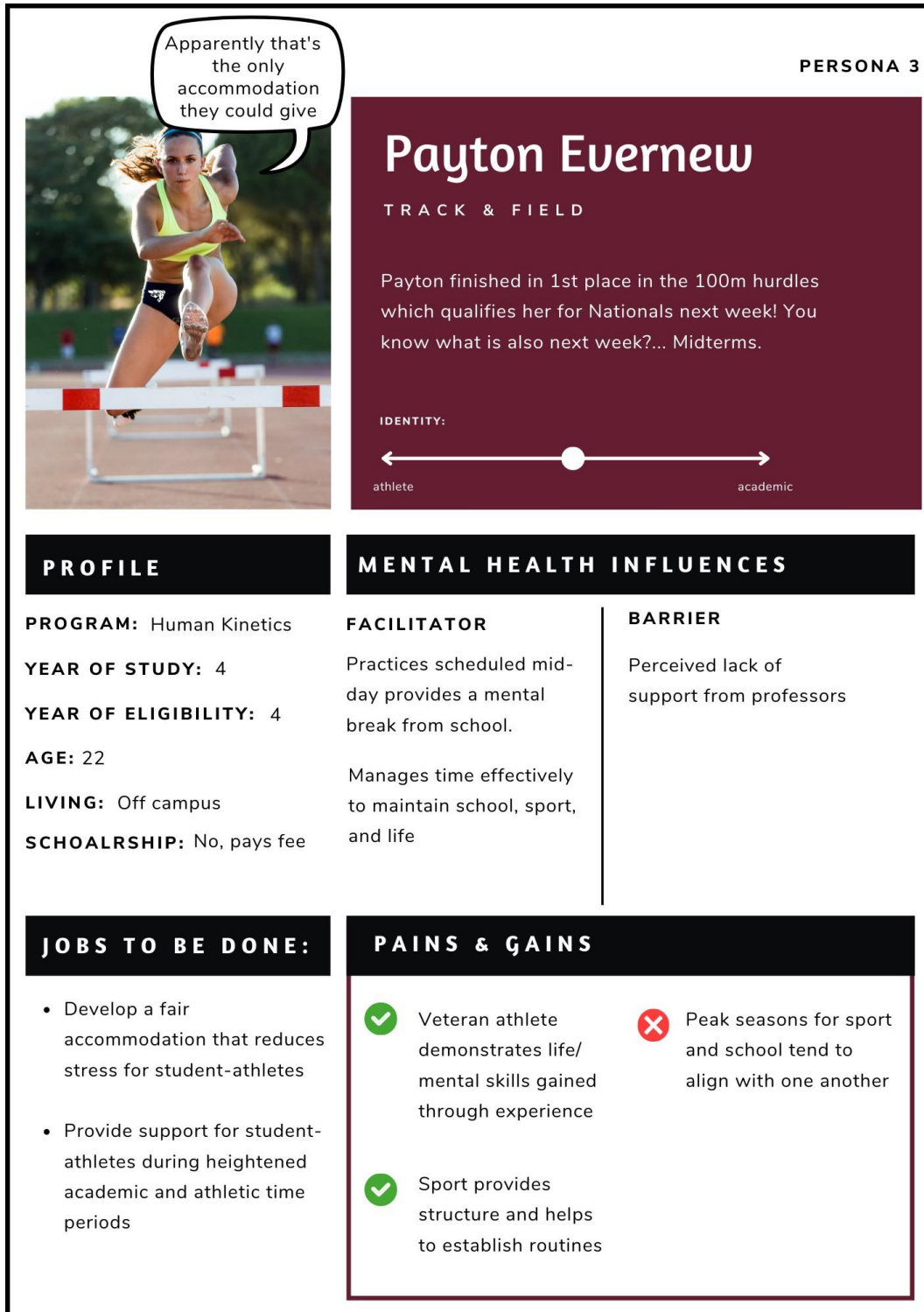
This time of year is usually pretty stressful. It feels like professors tend to schedule assignments and exams around the same time. This week, I have two mid-terms. It would have been three, but I will be away for the third, travelling for Nationals. I am feeling frustrated with my professor because there was minimal accommodation given. The weighted percentage of my missed midterm has been added to the final, making 50% of my grade dependent on that one exam! It really stresses me out, but I guess I will have to deal with it later.

Around 10:00 a.m., my roommate (also a teammate) and I walked to a café close to our house. I find it difficult to do work from home, and I enjoy the change of scenery. Later, we walked over to practice together. I love having midday practices as they help schedule breaks in my busy life. I felt I had a good practice today, which made me feel more confident about my meet coming up. This is my final year, and there is much pressure to finish on a high note.

After practice, I went to the library to start studying for midterm #1 tomorrow. I created some cue cards and went over my review with a classmate. I find this is the best way to study for me! After a long day, I walked home and faceted my parents. They have always been my biggest supporters and know exactly what to say to encourage me during these extra stressful times. I put my phone on silent around 9:00 p.m. and did one last review before bed. I need to be well-rested if I want to do well on my test!”

Figure 6

Persona Profile 3



Discussion

Our interpretive findings were presented in a unique format, combining visual and narrative elements to address our primary research question: What are the daily realities of student-athletes at the University of Ottawa (i.e., what do they say, do, think, and feel) with respect to MH? Overall, the personas in the current study revealed deep insights into (some of) the daily realities of uOttawa student-athletes in their localized varsity sports environment. The personas were designed to be illustrative, symbolic, and easily memorable to elicit a stronger emotional bond with the readers (Tschimmel, 2012). While the findings present interpretations made by the authors, we hope some aspects within each story resonate with readers personally, as this viewpoint reflects the constructivist underpinning of our study. To situate this discussion, we draw from various MH in sport and student-athlete theoretical frameworks: Stambulova and Harwood's (2022) three dual-career pathway, Durand-Bush and Van Slingerland's (2021) three-dimensional model of mental health, mental performance, and mental illness, and the Gold Medal Profile (Durand-Bush et al., 2022).

According to Stambulova and Harwood (2022), there are three dual-career pathways which student-athlete might adhere to depending on their relative importance placed on school and sport. First, some students engage in sports whereby they are investing "in education while maintaining sports engagement for social reason and/or the love of the game" (Figure 1). Second, some athletes "invest more in training and competitions while doing just enough to maintain their studies" (Figure 1). Third, other student-athletes search for an optimal dual-career balance, accomplishable by making "shifts between prioritizing sports and studies; combining planning for the sports season and educational year; developing support networks and communication skills to get help when needed; and working on dual-career competencies" (Figure 1). Although

the ideal would be to achieve a dual-career balance, our study presents student-athletes who may or may not be fit to achieve this. These three pathways should not be perceived as rigid, as a student-athletes might demonstrates fluid shifts between pathways at any given time (Stambulova & Harwood, 2022). Nevertheless, this framework helped with our interpretations of diverse identity attachment styles exemplified throughout the digital stories. For instance, Olivia William (Persona One) was designed to illustrate the risks associated with equally dominant and static attachments to student and athlete identities. In Olivia's scenario, her stress associated with a demanding school schedule begins to seep into other life domains such as sport and social realms. In addition, she experienced difficulties in coping with decreased athletic performance, resulting in maladaptive behaviours like nutrition compromises. Evidence has demonstrated that this dual commitment profile presents a significantly higher risk for burnout in sports and school (O'Neil et al., 2021). Specifically, first-year university student-athletes often exhibit this profile (Miller & Kerr, 2003; Crocker et al., 2021). Therefore, a plausible explanation for Olivia's challenges might stem from underdeveloped self-regulation competencies such as self-awareness, stress-management, emotional and arousal regulation, and attentional control (Durand-Bush et al., 2022b). On the other hand, Payton Evernew (Persona 3) represents a seasoned student-athlete who has acquired various competencies over the course of her degree. For example, she has established effective morning and bedtime routines that even amid "peak season" she continues to allocate time for self-care (e.g., cleaning room, planning day, and turning phone off before bed). Forming healthy habits such as these contribute to the development of self-regulation competencies (Durand-Bush et al., 2022b), essential to facilitate seamless shifts between priorities and enabling positive performance and MH outcomes (Durand-Bush & Van Slingerland, 2021).

Another common theme in the digital stories comprised injuries, physical pain and discomfort, or constant soreness. Adri Clément (Persona 2) emphasized the additional resources (e.g., time, energy, equipment, mental skills) required to maintain their physical health and performance. Injuries are inconvenient and time-consuming, two unfavourable conditions for student-athletes who note time constraints as one of the most prominent dual-career stressor factors (Crocker et al., 2021). Nevertheless, the student-athletes from our study recognized the value behind injury prevention tactics such as attending practices early or staying later to get a more thorough warm-up and cool down. Additionally, the student-athletes exemplified different approaches to coping with injury/physical soreness which we perceived in conjunction with the three dual-career pathways. For example, Adri's behaviours were aligned with the second pathway, prioritizing sport over education (Stambulova & Harwood, 2022). Despite, suffering a season-ending injury last year, Adri has difficulties celebrating her progress coming back thus far. Although she remains highly motivated and invested in her team (interpersonal competencies; Durand-Bush et al., 2022b), her lack of self-compassion paired with a strong attachment to athletic identity might pose future MH challenges in the return to play process (Stambulova & Harwood, 2022).

Social support was a prevalent theme manifested differently across all three personas. Our study interpreted social support through friends (outside of sports), teammates, roommates, and family members. Interestingly, living situations with teammates and non-teammates present paradoxical implications for MH. In Persona 3, we showcased some of the social and convenient benefits of living with teammates while simultaneously demonstrating the advantages of creating distance and forming connections outside of sports in Persona 1. Additionally, the relationship with athletic therapists (ATs) was deemed an important one, as multiple student-athletes

included attending physical therapy appointments in their digital stories. Some even elaborated in their member reflections that they turn to the ATs for emotional support. Emotional wellbeing is a key component to maintaining positive MH (Durand-Bush & Vanslingerland, 2021). Given the frequent interactions and trusting relationship between AT and student-athletes, further exploration into their role in supporting MH will be crucial.

Our final theme highlights the challenges associated with coinciding spikes in academic and athletic demands throughout the academic year and sports season. The challenges of balancing both careers are well-documented. However, how students adapt to fluctuating circumstances is less reported (Graper, 2023). For example, periods after submitting an assignment are relatively calm, making athletic demands more manageable. However, there are intense intersecting time periods for sports and academics (e.g., playoff and exam time), posing significant risks for psychological distress. A more comprehensive understanding of these stressors and coping mechanisms during these peak times will help other stakeholders become adept at improving the student-athlete university experience, and potentially enhancing MH outcomes.

Implications, Limitations, and Conclusions

Practical and feasible strategies were outlined throughout the persona profiles. In our study, affording flexibility throughout sports schedules (when possible) appeared to be a prominent MH facilitator for student-athletes. Scheduling practices mid-day and offering multiple options for team lifts gave student-athletes more agency in creating a schedule that best suited their individual needs. Coaches might consider integrating these strategies into their team environment as an initiative to facilitate optimal dual-career balance (Stambulova & Harwood, 2022). For varsity sports administrators, the “Jobs-to-be-done” section found in the bottom left

corner of each persona serves as a starting point for collaborative and interdisciplinary discussions on finding new solutions to improve MH at your institution (Lewrick et al., 2020).

Our study also inspires future research to improve student-athletes' experiences and MH support through unconventional theoretical and methodological approaches. The participant-produced data in our case allowed student-athletes to share potentially vulnerable experiences confidentially, reducing or eliminating the traditional researcher-participant power imbalances (Pink, 2007). In contrast to more traditional qualitative methods such as interviews or focus groups, digital stories avoid face-to-face interactions with a researcher. Although participants were given prompts (i.e., what are you doing? Thinking? And feeling?) and a pre-set emoji guide, student-athletes were left with creative control over what and how they shared their stories. Additionally, the different mediums allowed student-athletes to tailor their digital stories to their storytelling goals. For example, student-athletes who chose a non-visual method tended to express more emotions in their responses. In contrast, the one student-athlete who chose a visual method showcased how busy their lifestyle was with multiple activities.

We believe our study contributes to the potential of digital storytelling for exploring topics within student-athlete populations. However, there were some notable limitations that need to be addressed. Most of which stem from our smaller sample size ($n=6$). These digital stories were created during "peak" stressful times, providing valuable insights but limiting overall recruitment efforts. Out of the six participants, all were female and Caucasian which restricts the opportunities for naturalistic generalizability and addressing issues using an intersectional lens. Further, only one student-athlete chose a visual method as opposed to text messages. Nonetheless, this study highlights the potential of adopting digital storytelling on a larger scale. Future research should consider using digital methods with the experience sampling

method for understanding the lived experiences of people who might not otherwise participate in research initiatives due to time constraints.

We conclude this DT phase having closely observed and empathized with the student-athletes' daily realities, enriching our understanding of the student-athletes' needs at the explored university. We intend to bring these fresh perspectives and insights to future ideation sessions aimed to creative innovative solutions to improve Canadian student-athlete MH outcomes.

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Both authors are members of the institution explored as graduate students (Author 1) and full-time professor (Author 2) respectively.

Notes on Contributors

S. Graper, her research focuses on employing Design Thinking to address complex sports psychology issues. She is interested in mental performance consultation and intervention, student-athlete MH, and gender equity in sports.

Dr. D. Culver, her research focuses on coach and sports leadership development, women in sports leadership, and the use of communities of practice to enhance professional development and ongoing learning.

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Appendix A

Four-Way Digital Storytelling Instructions

1. What are you doing?
2. What are you thinking?
3. How are you feeling?

	Medium	Visual x Audio	Description
1	TikTok	Visual Verbal	Create one 1–3-minute video using TikTok to capture visual representations of your day. Verbal narration can be pre-recorded, live, or a voice-over to discuss what you are thinking and feeling during the captured moment. In addition, “captions” can be turned on for live transcription to show throughout the video.
2	TikTok	Visual Non-Verbal	Create one 1–3-minute video using TikTok to capture visual representations of your day. Written narration can be done by recording the story and applying text afterward by tapping the “Aa Text” icon in the upper right corner of the screen. You may select which emoji best represents how you are feeling based on the student-athlete MH emoji guide*.
3	Text Messages	Non-Visual Non-Verbal	Document your day through text messages by responding to the automatic text reminders. You can type what you are doing and thinking and select an emoji that best reflects how you’re feeling using the student-athlete MH emoji guide.
4	Voice Memos	Non-Visual Verbal	Document their day through voice memos by responding to the automatic text reminders. Hold the microphone icon on the keyboard to record and send. Messages should describe what you are doing, thinking, and feeling.

Note: * - Refer to the emoji guide (Figure 3) for “How are you feeling?”

Chapter 6: General Discussion

After an immersion within the compassion space – understand, observe, and point of view (Chambers, 2021; HPI, 2018) – this chapter aims to interpret important issues contributing to student-athlete MH challenges based on the findings of each DT step. First, the original design challenge is revisited to situate the overarching findings of the thesis. Interpretations emphasize how ecological and empathetic insights contribute to a comprehensive understanding of student-athletes' needs and will be used to inform future stages of the DT process. Following, the strengths and limitations of the thesis are addressed. The chapter concludes by highlighting theoretical, methodological, and practical contributions to the broader sports psychology and Design Thinking domains.

Design Challenge Revisited

The overall design challenge was to reimagine student-athlete MH support at the University of Ottawa using a Design Thinking approach. The HPI (2018) DT model served as the guiding methodological framework to inform the employed research activities aimed at facilitating compassion towards student-athlete MH.

The purpose of Article 1 was to generate ecological insights from multiple stakeholders into how the varsity sports department at the uOttawa supports student-athlete MH. Two research questions guided this study: 1) Who are the key stakeholders? And 2) How do the stakeholders enable student-athlete MH within their respective practice?

Supplementary methods and results were intentionally placed following this manuscript, as they contain information whereby readers can develop a comprehensive and contextual understanding of the case explored. Interdisciplinary collaborative methods afforded a detailed understanding of the current IST framework.

The purpose of Article 2 was three-fold: to observe the daily realities of uOttawa student-athletes in their localized varsity sports environment, establish a point of view from the student-athlete perspective, and present the findings in a creative and easily digestible way. The primary research question was: What are the daily realities of student-athletes at the University of Ottawa with respect to MH?

Interpretation of the Findings

From an ecological standpoint, the results demonstrate how uOttawa is currently supporting student-athlete MH by enhancing the accessibility of MH services, providing proactive holistic care, and building a sustainable IST model. However, a day in the life from a student athlete's perspective unveiled various pain points such as burnout, injuries, and intense fluctuations in school and athletic demands. Nonetheless, there were several positive gains, including social support, flexible sports schedules, accessible support services, and acquired mental skills. Despite the impressive and evidence-informed resources uOttawa offers, student-athletes continue to encounter considerable adversities that could lead to MH challenges. This further signifies a need for innovation to transform the student-athlete experience to become more conducive to positive MH. The overall findings can be summarized into two prominent yet complementary problem areas: 1) Dual-Career stressors and 2) Varsity sports and education working in silos. Each theme is designed to facilitate compassion towards the design challenge.

Dual Career Stressors: Competing Sports and School Demands

Consistent with the broader student-athlete literature, the results of this thesis suggest student-athletes are indeed experiencing MH challenges in response to their intense academic and athletic demands (e.g., Crocker et al., 2021; Gomez et al., 2018; Gulliver et al., 2012). Interestingly, very few sports-specific stressors (e.g., athletic training load, performance anxiety,

team environment, and coaches; Kegelaers et al., 2022) were documented throughout the student-athletes' digital stories. In fact, varsity sports participation was often perceived as an MH facilitator by spending time with teammates, team lifts, and a mental break from academics. In this thesis, the majority of student-athlete stress arose from how sports and academic demands interact with one another and, more often than not, compete for first priority. Even in the event of an injury when athletes were experiencing pain and discomfort, it was perceived that the extra time spent resting, recovering, and attending athletic therapy was stress-provoking, as this took time away from fulfilling academic and other life demands.

These compound stressors can be understood from dual-career (DC) literature. As a preamble to the following findings, terminology from Stambulova and Wylleman's (2019) state-of-the-art review of DC discourse is presented in Table 1 to support interpretations. Importantly, this particular discourse is situated within a European context. Thus, this thesis contributes a global perspective, providing a Canadian outlook on DC factors influencing student-athlete MH. This distinction is significant as European countries typically separate sports and education, whereas in the Canadian system, these two entities are combined and pose unique challenges for student-athlete MH (Morris et al., 2021).

A multitude of DC barriers has been documented while exploring student-athletes' dual roles, including lack of flexibility from both commitments, financial uncertainty, lack of leisure and social time, living on campus, and role strain (Condello et al., 2019; Stambulova & Wylleman, 2019). Above all, student-athletes perceive pressure to excel in school, sports, and life domains, which can pose substantial challenges to maintaining positive MH (Crocker et al., 2021; Giovannetti et al., 2019; Miller & Kerr, 2003).

Table 1*Dual Career Terminology*

Term	Definition
Dual career	“A career with major foci on sports and studies or work.” (Stambulova & Wylleman, 2015, p.1)
DC balance	“A combination of sports and studies that helps student-athletes achieve their educational and athletic goals, living satisfying private lives and maintaining their health and well-being.” (Stambulova et al., 2015, p.12)
DC barriers	“Personal and external factors interfering with successful adjustment/ coping.” (Stambulova & Wylleman, 2019, p. 83).
DC resources	“Personal and external factors facilitating adjustment/coping and implementing adequate coping strategies.” (Stambulova & Wylleman, 2019, p. 84).
DC development environment (DCDE)	“(1) Centred on a dual career support team serving to support communication and coordination between the sports, study, and private domains; (2) Focused on providing individual solutions for each athlete; (3) Teaching student-athletes to plan, prioritize, communicate, and take responsibility for the balance in their DC endeavour; (4) Deeply rooted in a shared DC philosophy ... that recognizes that the student-athletes must be seen as whole persons” (Henriksen et al., 2020)

Time constraints are a prominent DC barrier (Crocker et al., 2021; Gomez, 2019) and one apparent in the presented research. This idea was illuminated through the persona scenarios and the time stamps throughout the day. The student-athletes' daily realities exemplified how fast-paced and demanding their lifestyle is. They often relied on maximum proficiency to remain on top of school and sports demands. However, this can be seen as problematic, as it can create unrealistic self-expectations and unsustainable practices for effectively balancing these two commitments. Even seemingly minor 'setbacks' (e.g., Olivia choosing to sleep on the bus ride home instead of doing schoolwork) can have a ripple effect throughout the remainder of a day, week, or possibly entire semester. The student-athletes from this research resonated with the idea of constantly feeling behind and incapable of catching up (Crocker et al., 2021). For some, this overwhelming stress throughout the day appeared to lead to mental exhaustion. These findings support and extend the research of Gomez (2019), who found that student-athletes experienced deficiencies in academic and athletic performance due to over-training and burnout, ultimately increasing the risk of dropout from their educational degree and sports (Gomez et al., 2018).

These insights are recognized at the uOttawa's varsity sports department level, which is why they have been intentional about holistic student-athlete development. The department addresses MH concerns by fostering an environment that resembles a DCDE (Henriksen et al., 2020). A key component of their DCDE is the IST, which plays a crucial role in helping student-athletes develop holistic coping skills to equip them better to navigate their demanding lifestyle (i.e., time constraints). For example, time management is constantly promoted as an essential DC resource for balancing school and sports (Gomez, 2019; Pankow et al., 2021). The results from Article 2 presented distinct approaches to time management, some more maladaptive than others.

Personal resources like time management are strong indicators for optimal DC balance (Stambulova & Wylleman, 2015), enabling student-athletes to shift between priorities more fluidly. Such resources can be attributed to and developed through varsity sports participation over time (e.g., persona 3 in Article 2). Incrementally, these resources can be further enhanced through mental skills training (Durand-Bush et al., 2022b). There is considerable overlap between DC resources and the MP competencies outlined in the Gold Medal Profile (Durand-Bush et al., 2022b) that can be advantageous for protecting student-athletes' MH while optimizing performance in school and sports. The findings of this thesis provided compelling examples of student-athletes exhibiting MP competencies (or lack thereof) including self-regulation, fundamental, and interpersonal mental skills; and opportunities to develop and refine such competencies through varsity sports department resources such as the IST (i.e., sports-informed MH counselling and MP consulting). Future research should investigate the role of MPC in facilitating optimal DC balance with student-athletes and functionality within ISTs. Insights would be significant as both MPCs and IST frameworks are underutilized in U Sports.

The significance of developing these DC resources and competencies will prove useful beyond athletic retirement, post-graduation, and into adulthood. However, a lingering thought prevails: Should these conditions under which student-athletes perform for 4-5 years be accepted as the status quo? Or are there organizational changes that could be made to reduce DC barriers and in turn, improve student-athlete MH? This thought is explored further in the subsequent theme.

Varsity Sports and Education Working in Silos

The findings depict the uOttawa Gee-Gees varsity sports department as an integrated system, effectively addressing student-athletes' holistic needs. Additionally, varsity sports are

situated within a broader institutional ecosystem. Despite the interconnected nature of varsity sports and education, the findings suggest these parties tend to operate within separate silos. The minimal communication, coordination, and collaboration have inevitably led to increased MH challenges for student-athletes. Thus, the need to strengthen the triad of varsity sports, administrators, and professors is considered a major takeaway of this research.

All stakeholders must recognize their role in providing regular social support and promoting positive MH to student-athletes (Pankow et al., 2021). A reciprocal relationship built on trust, respect for each other's goals, and communication can minimize previously mentioned compound stressors and foster a supportive environment for student-athletes to achieve DC success. For example, consistent interaction between professors and varsity sports academic coordinators would enhance proactive support to student-athletes struggling academically. Heightened support could lead to increased engagement in class and improved academic success (Chew & Thompson, 2014), meeting eligibility and compliance requirements for varsity sports participation and celebrating outstanding academic attainment through prestigious sports awards.

The effectiveness of purpose-led partnerships in sports organizations is supported by Hermens et al. (2019). Such effectiveness is contingent on several conditions, including partnership visibility, task management, communication structures, and appropriately using partners' capacities. Similarly, Lockwood (2010) recommended maximizing opportunities for human interaction, communication, and connection and breaking down the formal structures separating sports and education. These qualities set a foundation for design-friendly environments that cultivate "empowerment, lessons from failure, long-term success, reflection, collaboration, honesty, heuristics and agility" (Lockwood, 2010, p. 25). In contrast, dysfunctional environmental qualities such as maximum productivity and performance-focused

goals inhibited student-athletes' abilities to work productively in both domains (Lockwood, 2010).

Within student-athlete scholarship, including this thesis, the perspectives of professors and administrators are far less represented (e.g., Kuntz, 2011). This gap within literature presents a potential avenue for future research, leading to innovation across an entire ecology (Chambers, 2018b). As it currently stands, without their participation in the design process, any outcome would be considered incomplete. Based on these findings, the varsity sports department's surrounding educational infrastructure is fundamentally misaligned (Lockwood, 2010). Echoing a sentiment by Eames (2019): "designed solutions are only good if deemed so by their actual stakeholders" (p.19). This underscores the importance of a shared vision of student-athlete MH amongst all stakeholders to facilitate the design process, which was perceived as lacking based on these findings. For instance, the initial hesitancy in hiring a designated varsity sports MHC alluded to in Article 1 supports this notion, demonstrating the administration's limited comprehension of the specific accessibility barriers student-athletes encounter seeking MH support (e.g., Brown et al., 2023; Giovannetti et al., 2019; Moreland et al., 2018). Further, the results of Article 2 suggested that student-athletes felt undervalued by professors through the minimal effort to accommodate their academic needs, even when their absence was related to representing the university.

Drawing from Durand-Bush & Van Slingerland's (2021) three-dimensional model outlined in the literature review section, a contextual understanding of student-athlete MH may be fostered through an MP lens. The additional MP construct underscores that positive MH influences performance outcomes in both academic and athletic settings. This is significant considering the pressures to perform in school and sports evidenced through the daily realities of

student-athletes. Moreover, embracing this perspective may incline stakeholders to actively promote and reduce stigma toward seeking MH support, underscoring the importance of coordination and communication between professors and varsity sports. Raising stakeholders' awareness about the services of the varsity sports department is one way to enact this partnership. This would, in turn, provide student-athletes with a broader range of MH support options, including sports-informed or general campus services. Addressing informational gaps will inherently enhance agencies throughout the help-seeking process and increase MH service utilization at the university. As previous research suggests, one of the numerous reasons student-athletes refrain from seeking help is that they do not know where to go or how to access the support they need (Giovanetti et al., 2019; Lopez & Levy, 2013). Based on Henriksen et al.'s (2020) definition, the uOttawa Gee-Gees are on their way to becoming an established DCDE. However, more effort toward developing a shared DC philosophy needs to be maintained and permeated across the borders of the ecological system.

Building Compassion toward the Design Challenge

These two emerging themes offer valuable ecological and empathetic insights into the case and foster a sense of compassion toward the design challenge. By leveraging various visual and narrative methods, the results of both articles were presented with an additional layer of clarity and emotion (Liedtka et al., 2014; Tschimmel, (2012). Visual tools are commonly prescribed in DT (Liedtka, 2015; Lockwood, 2010). In this thesis, a stakeholder map and personas played a pivotal role in understanding and interpreting the student-athletes' varsity environment and the problems they face. Inspired by BEST (1979) and Chambers et al. (2018b), a stakeholder map was used to illustrate the ecological system and organizational structures to support the interpreted findings. By blending these frameworks, the environmental influences on

student-athlete MH were visually portrayed (Chambers et al., 2018b), further identifying inhibitory and supporting factors within the broader Canadian sports system.

In addition, fictional personas and scenarios were used to understand the student-athletes' needs comprehensively. The findings illuminated through the personas were consistent with various motivational profiles demonstrated by DC athletes (Stambulova & Wylleman, 2019). Personifying the student-athlete experiences enabled readers to follow stories more closely, form an emotional bond with the findings (Tschimmel, 2012), and envision experiences outside their own (Liedtka, 2015). One possible explanation for this compassion process can be attributed to person positivity bias (Sears, 1983). Person positivity bias is a tendency for people to evaluate individuals more positively than the groups they compose (Sears, 1983). For example, whereas providing general overarching statistics on the prevalence of MH and MI is key for informing policies and practice (e.g., 19.8% of student-athletes experiencing psychological distress; Sullivan et al., 2019), this thesis demonstrates the value of personable stories for facilitating compassion and informing actionable implications. Personas were an effective tool for readers to walk in the student-athletes' shoes and observe their pains and gains with genuine compassion (Liedtka & Ogilvie, 2011).

The overall findings of the thesis will be used to guide the remaining steps of the DT process (Ideate, Prototype, Test; HPI, 2018). Progressing into the 'solution space,' the focus will be designing a solution that not only satisfies the needs of student-athletes but also the business needs of varsity sports departments to ensure innovation is sustained (Lockwood, 2010).

The stakeholder analysis was essential for identifying the relevant stakeholders and understanding their role in future phases. Although the level of influence and involvement in the research outcomes varies, strategic planning can optimize stakeholder engagement across all

categories with diverse communication strategies (Hendricks et al., 2018; Lewrick et al., 2020). This ensures an inclusive approach to keeping stakeholders informed on a need-to-know basis and facilitates the successful implementation of future solutions (Hendricks et al., 2018). Additionally, research outputs such as digital stories and empathy maps will be revisited and reflected on throughout the DT stages. The iterative nature of DT can help reduce cognitive biases and ensure the future prototype remains aligned with the contextual environment and effectively addresses the identified student-athlete needs.

Contributions

This thesis makes significant theoretical, methodological, and practical contributions to student-athlete literature and practice within Canadian varsity sports departments.

First, the thesis extends current student-athlete MH literature, particularly through a sports-informed MH theoretical lens. Durand-Bush and Van Slingerland's (2021) Three-Dimensional Model of MH, MI, and MP served as a unique layer to conceptualize student-athlete MH. They influenced the interpretations of dual-career stressors and organizational support. This is significant as Kegelears et al. (2022) found that only 5% of student-athlete MH literature explicitly explored DC-specific stressors. Furthermore, Stambulova and Wylleman (2019) advocate for more research in this area to prevent sports/ school burnout and dropout. Additionally, the stakeholder mapping guided by BEST principles (Bronfenbrenner, 1979; Chambers, 2018b), coupled with the exploration into uOttawa's HP IST, contributed diverse stakeholder perspectives on the explored topic. This holistic approach to generating ecological insights is increasingly advocated in broader athlete MH literature (e.g., Poucher et al., 2023).

Second, to the best of my knowledge, this thesis contributes the first set of manuscripts fully employing a DT approach in a sports psychology context. The significance of being

published in a sports psychology journal will be symbolic, paving a pathway for DT as an acceptable paradigm, methodology, and set of tools to solve complex sports psychology challenges (Laursen & Tollestrup, 2017).

Third, the thesis leveraged digital and visual methods applicable to addressing various sports psychology topics. These methods' descriptions provide a road map for qualitative researchers to utilize stakeholder mapping and analysis, digital storytelling, empathy mapping, and fictional personas. Being explicit in the procedures section for each chapter was prioritized, as I personally found it challenging to find sources to guide my work. The intention was not to create a rigid set of procedures but to serve as a source of inspiration for other qualitative researchers new to using digital and visual methods.

Finally, the case study methodology exemplified how this knowledge has applied relevance in addressing student-athlete MH challenges unfolding in real-world scenarios (Hodge & Sharpe, 2016). The uOttawa Gee-Gees presents an illustrative case study that could inspire other institutions to evaluate their own context regarding MH facilitators, barriers, and areas for improvement. Offering sports-informed mental health counselling and utilizing an IST have long been considered uncommon or even unrealistic practices amongst Canadian varsity sports departments (Edwards, 2021). This case demonstrates this integrative, collaborative approach's potential to become a reality if prioritized and implemented thoughtfully.

Study Quality & Strengths

Beyond the contributions listed above, there were notable strengths of the research that elevated the study quality and fostered the development of competencies for an early career researcher with a keen interest in Design Thinking. Throughout the execution of the thesis, opportunities arose to cultivate design, digital, and data fluencies, which enriched the overall

thick and holistic description of the case (Chambers & Sammon, 2022; Merriam, 1998).

Considering the subjective positioning of the researcher, particularly in qualitative research, these fluencies played an integral role in bringing this thesis to completion (Culver et al., 2012).

Chambers & Sammon's (2022) D³ Prism of Innovation Praxis is used to explain how these core fluencies served as the driving force for impact and study quality across the Understand,

Observe, and POV phases.

Design Fluency

Design fluency encompasses innovation, creation, and curiosity competencies (Chambers, 2021). This fluency was first fostered by engaging in reflexive practices and carrying this habit throughout the research process (Merriam, 1998). As in qualitative research, explicit statements of the researcher's background (i.e., personal assumptions, values, and commitments) are considered a strength of the DT approach (Braun & Clarke, 2018; Gasparini, 2015). Such statements welcome empathetic insights from everyone, including the primary investigator (Gasparini, 2015). To achieve this, I stated personal, practical, and intellectual goals within the conceptual framework and used research biographies in both articles. These exercises sparked curiosity and a desire to seek diverse perspectives and learn from others (Schweitzer et al., 2016).

The use of interdisciplinary collaboration played an integral role in developing creative competencies. As a group of researchers and IST members, we collectively created a visual illustration of the HP IST Framework that the varsity department can use to convey its mission, values, and commitment to holistic student-athlete development in the future. This innovative symbol had not yet existed prior to the thesis, and it became a reality through a deep

understanding of stakeholder perspectives. The DT process brought together the analytic and creative modes of reasoning to create something new (Liedtka, 2015).

In alignment with the participatory nature of DT, member reflections facilitated research with participants rather than about them (Smith & Sparkes, 2016). Across all stages of the thesis, participants were sent back either transcripts or other materials to review. However, the intended purpose of these reviews was not for validation but rather elaboration and feedback to generate further insights (Smith & McGannon, 2018). For example, numerous personal questions arose after transcribing and initially coding each digital story. To gain more context and clarity in support of the stories, a list of questions accompanied the transcripts sent to student-athletes. This iterative and participatory technique of sending materials back and forth led to a robust understanding of the student-athlete's experience (Smith & McGannon, 2018).

Digital Fluency

Digital fluency is the ability to leverage technology to create new knowledge, new challenges, and new problems and to complement these with critical thinking, complex problem-solving, and social intelligence to resolve new challenges (Chambers, 2021, p. 26). The selected methods were intentionally designed to appeal to Generation Z (Gen Z) participants, with the anticipated student-athlete participants born between 1995-2009 (McCridle & Fell, 2019). Therefore, crafting the thesis to embrace Gen Z's digital, global, social, mobile, and visual defining characteristics was intended to attract participation (McCridle & Fell, 2019). For example, there are over 1 billion users on TikTok, with 43% of the audience between 18-24 years (TikTok, 2022). The potential for digital storytelling through this application is realized by Georgakopoulou (2021), who emphasized TikTok's pivotal role in shifting social media from

sharing single moments towards a transient, live streaming format. This provided the rationale for the use of TikTok in the presented research.

As previously mentioned in Article 2, digital methods afford a deep understanding of the lived experiences of people who might not participate in research initiatives due to time constraints. Technology was leveraged to streamline logistical processes (i.e., QR codes, Google Forms, and text reminders), making participating more convenient for student-athletes. Additionally, using an array of digital storytelling tools such as text messages, voice memos, TikToks, and the Student-Athlete Emoji Guide granted student-athletes agency throughout the research process. These tools empowered student-athletes to tailor their digital stories to meet their personal storytelling goals. To reiterate the limitations addressed in Article 2, the presented research highlights the potential for digital storytelling with a larger sample size, generating more stories, using a variety of storytelling methods (e.g., visual stories), and collaborating with diverse populations.

Data Fluency

Finally, data fluency is “the capacity to use data sets to make informed decisions” (Chambers, 2021, p. 26). I think significant growth was experienced during the empathy mapping analysis and merging of the six individual maps to construct the three fictional personas. Each submitted digital story on its own was incredibly rich and provided a wealth of valuable insight. This made it increasingly difficult to interpret group behaviours over individual experiences. Fortunately, the iterative nature of DT helped navigate the back-and-forth movements between the individual and combined empathy maps, and at times (re)reading and watching the raw digital story data. Writing in first-person for the persona scenarios was one remedy that helped adopt a student-athletes’ viewpoint. Perspective-taking effectively reduces

cognitive bias and enables naturalistic generalizability (Liedtka, 2015; Smith, 2018). Naturalistic generalizability occurs when “the research resonates with the reader’s engagement in life’s affairs or vicarious, often tacit, experiences” (Smith, 2018, p. 140). Therefore, using language that was displayed throughout the digital stories (e.g., non-athletic regular people; NARPs) and ‘slang’ words such as “res” (a short form for residence) was essential to enhance the scholarly rigour and interpretations (Smith, 2018). Furthermore, the importance of the Understand phase was underscored throughout the empathy mapping process in Article 2. Collecting rich data on the environment and stakeholders’ perspectives improved my ability to imagine experiences outside my own. (Liedtka, 2015).

Collectively, this section demonstrates methodological coherence (Poucher et al., 2019), the congruence between the employed DT paradigm, methodology, and set of tools (Laursen & Tollestrup, 2017). Moreover, commitments to Merriam’s constructivist case study approach guided by the HPI 2018 DT model are exemplified, thereby fostering the trustworthiness of the case (Smith & Sparkes, 2016). The constructivist underpinning claims there are multiple versions of knowledge since it is the product of a construction act between “knower” and “known.” (Yazan, 2013). Therefore, extensive research supported the interpretations of a holistic, multidimensional, and ever-changing reality at uOttawa (Hodge & Sharpe, 2016; Merriam, 1998; Simon, 2009). From this lens, the data was seen as generated and interpreted rather than discovered and measured as in quantitative research (Denzin & Lincoln, 2011; Merriam, 1998).

It is worth noting that DT inherently embraces diverse qualitative methodologies, as reflected in the recursive nature and employment of multiple methods. Taylor (2014) highlighted the complexity of working within this realm as the researcher must actively make links between the epistemological, methodological, and theoretical assumptions of the research. On numerous

occasions, there was a temptation to jump right into the solution space, most commonly after an inspiring enabler interview. However, that was not the purpose of this thesis. Currently, I have a running list of ideas that may become useful down the line, but fully embracing the compassion space ultimately led to a deep understanding of the end-users' needs. This foundation will lay the base for future innovation.

Limitations

As with any research, this thesis presents some limitations primarily related to participant recruitment. This section enabled critical reflection to improve future research initiatives.

Although the ability to generate six digital stories through experience sampling during stressful time periods throughout the semester was a considerable strength, it did pose limitations for the breadth of recruitment. Recruitment took place in January 2023, the start of the Winter semester. When coaches were initially contacted to seek interest in having the athletes participate in the study, I was met with much hesitancy and resistance. Several coaches were happy to connect after the season ended, but that was not the purpose of this research. Overall, this impacted the number of teams participating. We hoped to have at least three teams (1 men's, 1 women's, and 1 mixed). However, I was unsuccessful in recruiting a men's team. While I still believe connecting with athletes through their coaches and doing an in-person team presentation is an appropriate recruitment method, it can be improved by initiating the process earlier in the academic calendar. This would afford more time for the athletes to create their digital stories (possibly creating more than one) and permit additional opportunities for the primary investigator to check in with teams, provide reminders, and answer arising questions.

The lack of male-identifying participants posed another limitation regarding the participant demographics. In Article 2, all six participants identified as Caucasian women, which

was not the intention. Unfortunately, this thesis is nothing unique in that males tend to participate less in research, particularly MH research (e.g., Pankow et al., 2021). A plausible cause could be additional MH barriers for men deeply tied to traditional attributes of hypermasculinity (DeLenardo, 2013). The challenge of obtaining diverse gender perspectives was highly anticipated and considered throughout the design of the 2x2 digital storytelling matrix. One of the intentions for including text messages and the emoji guide was to empower male and non-binary athletes to share their stories more confidentially by removing the primary investigator from plain sight. However, this does not explain why there was a lack of male and non-binary participation from the mixed team. Not recruiting a men's team limited the ability to gather these perspectives. Therefore, increased recruiting efforts (e.g., more reminders, clear instructions, and opportunities for collaboration) may improve overall participation from gender-diverse participants at large.

In addition, such recruitment efforts may contribute to more use of diverse storytelling mediums. Five of six participants selected text messages as their preferred method. Despite the ample benefits and opportunities afforded through alternative research methods alluded to throughout this thesis, only one TikTok was created. To encourage the use of visual or audio methods, it would have been helpful to have an example to show participants and even a brief trial video-making session while emphasizing creative freedom to present the information they want.

Most of these limitations may have resulted from only recruiting athletes from two sports. Further, the sample was skewed towards swimmers as five women were on the swim team and one from volleyball. This is important to note, as swimmers race individually to contribute points towards a team score at competitions. Thus, the ability for coaches to implement a flexible

training schedule as an MH facilitator might be more feasible for sports of this nature in comparison to team sports such as basketball, soccer, or volleyball. Opening recruitment to more teams would help overcome this. However, a thorough evaluation of the logistics and feasibility of recruitment methods would have to be undertaken. Once a participant completed the Google form through QR Code 1, the primary investigator would be notified, then manually input the participant's contact information into Reminderbase and set times to their preferences. Perhaps more suitable applications that are equally secure and efficient in streamlining this process should be explored.

Finally, upon the completion of enabler interviews and digital stories, the need for academic and administrative perspectives surfaced. In April 2023, the same recruitment email sent to IST members (Appendix C) was sent to professors and various faculty members. Attempts were made to reach several university departments, particularly outside of Human Kinetics. Studies have shown that student-athletes tend to pursue educational degrees in kinesiology, physical education, or related fields (e.g., White et al., 2013). At uOttawa, the Faculty of Health Sciences, in which the School of Human Kinetics is housed, an official notice is sent to all professors regarding making accommodations for student-athletes who must miss exams due to competitions. However, we did not receive any responses, which could have been correlated to the timing of recruitment being near the end of the exam period and the university school year. Identifying and addressing these limitations early in the DT process will be helpful in future recruitment for the ideation, prototype, and test phases (Eames, 2019).

Chapter 7: Conclusions

This thesis accepted the design challenge to reimagine student-athlete mental health support at the University of Ottawa. This process began by pushing aside assumptions to focus on the end-users of the case. Several DT methods proved effective, as understanding and observing student-athletes within their localized environment was crucial for identifying their needs. Ecological and empathetic insights were presented, yielding compassion towards improved MH outcomes for the uOttawa Gee-Gees.

The findings suggest academics and varsity sports are currently competing with one another, imposing dual-career barriers upon student-athletes and exacerbating MH challenges. This is not to say that there is only one underlying problem nor a singular fixed solution that will solve the evident MH concerns within varsity sports departments across U Sports (e.g., Sullivan et al., 2019). However, this conflict does prompt future ideation sessions; how might we foster collaboration between varsity sports, administrators, and academics to help mitigate MH challenges for student-athletes?

Collectively, this thesis contributes a novel approach to exploring sports psychology issues, particularly incorporating creative, collaborative, digital, and visual methods to generate contextual insights into a case. A human-centred approach has proven valuable in facilitating empathy for end-users and igniting genuine compassion in stakeholders to make a difference through sports (Chambers, 2021). Using DT in this context has been a privilege and a truly rewarding experience that contributes towards tangible innovation outcomes and hopefully, some positive impact beyond the boundaries of this case study.

#GGNation and Go Gee-Gees!

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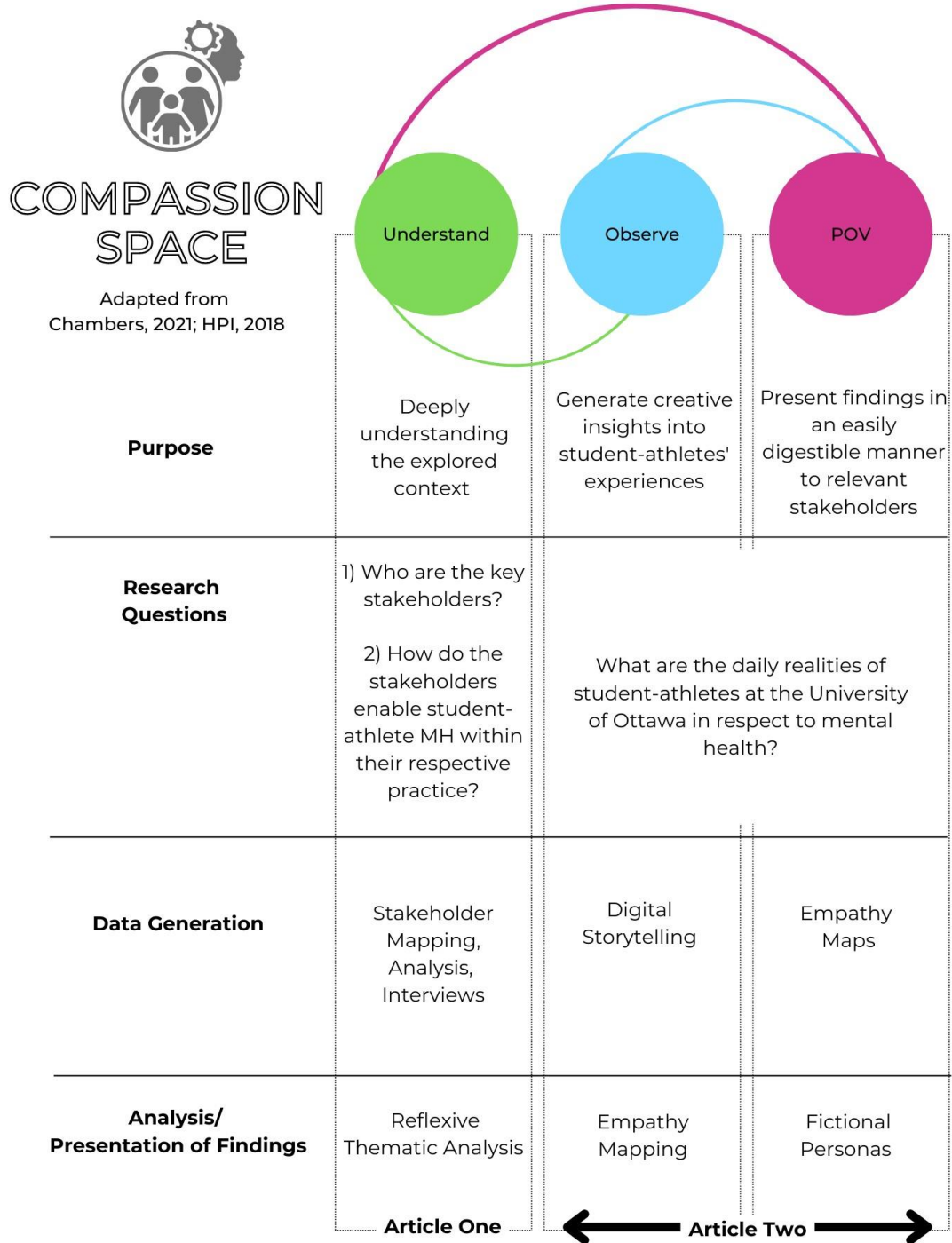
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Appendix A

Project Overview

Design Challenge: to reimagine student-athlete mental health support at the University of Ottawa using a Design Thinking (DT) approach.



Appendix B

Recruitment Email(s)

Coaches Version – to recruit student-athletes

Hello Coach **Insert Name**,

My name is Sydney Graper, and I am a Master of Human Kinetics Student here at the University of Ottawa under the supervision of Dr. Diane Culver. For my thesis, I will be doing a case study on the uOttawa Gee-Gees exploring student-athlete mental health.

The vision I have for this study is quite creative and collaborative with the end goal being an innovative solution to support your athletes in maintaining school-sports-life balance and in turn enhance overall well-being and performance.

I would love the opportunity to schedule a quick meeting over Zoom to see if there is a potential for you and your team to collaborate on this project. Participation entails athletes digitally documenting a day in their life as a uOttawa Gee-Gee.

Attached to this email is a poster providing further details on the study. Please let me know if you are interested, as well as a day/time that works best for you to chat!

Stakeholder Version

Hello **Insert Name**,

My name is Sydney Graper, and I am a Master of Human Kinetics Student here at the University of Ottawa under the supervision of Dr. Diane Culver. For my thesis, I will be doing a case study on the uOttawa Gee-Gees exploring student-athlete mental health using Design Thinking.

The vision I have for this study is quite creative and collaborative with the end goal being an innovative solution to better support student-athletes in maintaining school-sports-life balance and in turn enhance overall well-being and performance.

Given your role within varsity sports, your participation would be instrumental in designing such a solution. I would love to interview you to better understand your role and how might you provide student-athlete support in your practice. Interviews are kept short and sweet (approx. 30 minutes) given how busy it is at this point in the season. The interview would be held over Zoom.

Attached to this email is a poster providing further details on the study. Please let me know if you are interested, as well as a day/time that works best for you to chat!

Appendix C

Consent Form for Stakeholders

Project Title: #GGNation: A case study exploring student-athlete mental health at a Canadian university using Design Thinking

Principal Investigator: Sydney Graper, Researcher, M.A. Student, University of Ottawa

Supervisor: Dr. Diane M. Culver, Associate Professor, Faculty of Health Sciences, School of Human Kinetics, University of Ottawa

Hello, NAME

Project Overview: The broader goal of this study is to reimagine student-athlete mental health at the University of Ottawa. To develop a deeper understanding of this case, it is only appropriate to get insights from the individuals whom student-athletes interact with (directly or indirectly) on a daily basis. The perspectives of coaches, support staff, integrated support team members, and administrators will be quite valuable in the pursuit of developing an innovative solution for supporting varsity student-athlete mental health.

Your participation is completely voluntary, and you may choose to resign from your participation at any point without consequence.

Participation: You will participate in a virtual interview (30-45 mins) held on Zoom at an agreed-upon time that is convenient for both you and the researcher. The interview is to discuss your lived experiences supporting student-athlete well-being in your position within the University of Ottawa's athletic department. This interview will be audio and video recorded. In addition, the transcripts will be sent to the interviewee to review and confirm the accuracy of the information. The interviewee will be given two weeks to provide any revisions. Otherwise, the transcripts will be accepted as is.

Assessment of risks: Your participation in this study entails limited foreseeable risks. However, you may experience emotional or psychological discomfort during the interview, as the questions and subject matter may indirectly remind you of unfortunate incidents in the past that have occurred to a student-athlete (e.g., alcohol/substance abuse, disorders, suicidal ideation, death). If you experience any discomfort, the lead researcher has assured you that she will make every effort to minimize this discomfort. You may decide to stop your participation at any time without consequence, and a resource list containing contact information for applicable psychological and emotional support will be always on hand.

In case you need immediate care, Crisis Services Canada is available for youth and adults across Canada in need: Toll-Free (24/7): 1 (833) 456-4566 or Text support (4 pm-12 am ET daily): 45645.

Benefits: As a participant, you are positively contributing to the design of a bespoke solution for the future uOttawa Gee-Gees. In addition, you are taking part in a movement within the

Appendix D

Stakeholder Interview Guide

Thesis Title: # GGNation: A case study exploring student-athlete mental health at a Canadian University using Design Thinking

Article One:

Purpose: First, to develop an in-depth understanding of the uOttawa Gee-Gees varsity sports environment in which the student-athletes interact. Second, identify, prioritize, and engage with relevant stakeholders within the uOttawa Gee-Gees varsity sports department.

RQs:

- 1) Who are the key stakeholders?
- 2) How do the stakeholders enable student-athlete MH within their respective practice?
- 3) Where are the existing gaps to improve student-athlete MH?

** Interviews were designed to answer the second and third questions.

Interview Guide:

1. Can you start by telling me about the role you play for the uOttawa *Insert sports*'s team?
2. Can you tell me more about your sports background and what led you to pursue this career path?
 - a. Athletic background (i.e., Sports experience? Coaching experience?)
 - b. Educational background (how did they get into this field of work)
3. How do you support student-athlete mental health in your practice?
 - a. Can you give me some specific examples?
4. What challenges do you face supporting student-athlete mental health?
5. How does the university help you in a role to be able to support student-athlete mental health?
6. What more could the university do to support you better, which would in turn support the athletes better?
7. Finally, what does mental health mean to you? and what does that look like for a student-athlete?

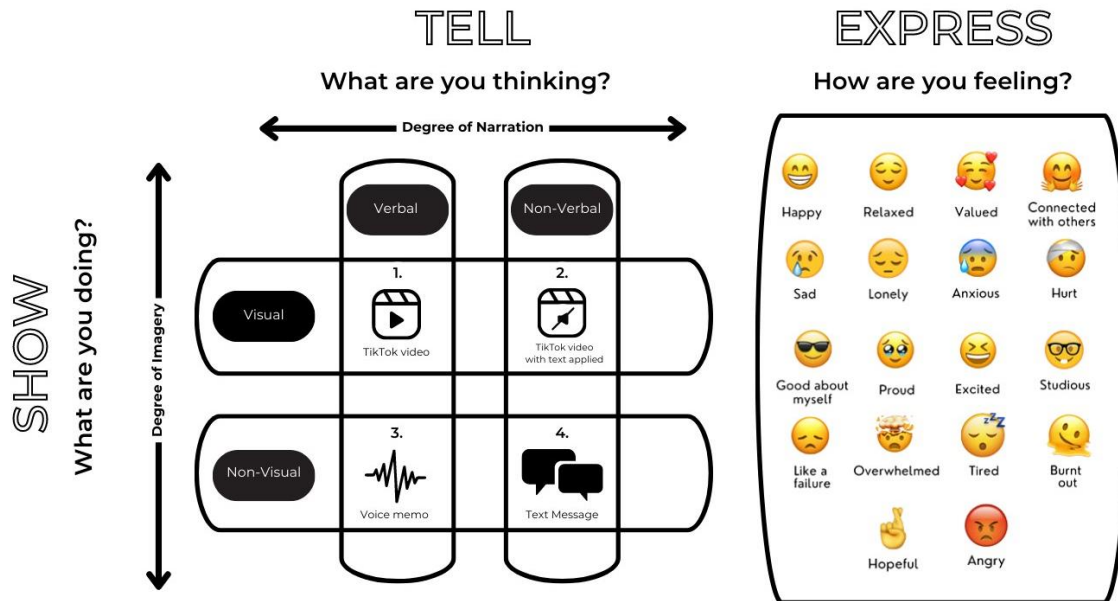
Appendix E

Enabler groups, descriptions, and identifiers (with responsibilities)

	Enabler Group	Job title	Identifier	Responsibilities
1	Administration	Director, Recreation & Varsity Sports	DRVS	Provides oversight to ensure alignment between the IST operations and strategic plan
2	Administration	Senior Advisor, Student-Athlete Operations	SA	Designated mediator, responsible for facilitating coordination with athletes, coaches, IST, and admin.
3	IST Member	Varsity Sports Mental Health Counsellor and Coordinator	MHC	Provide MH counselling to all student-athletes and coordinate MH workshops for teams
4	IST Member	Mental Performance Consultant	MPC	Provide individual and group consultations to all varsity teams aimed to develop MP core competencies
5	IST Member	Lead Performance Coach	PC	Design, implement, and evaluate strength training programs tailored to sports-specific needs.
6	IST Member	Athletic Therapist	AT	Assess, diagnose, treat, and support the rehabilitation process of varsity athlete injuries.
7	IST Member	Eligibility & Compliance Coordinator	ECC	Guide student-athletes throughout their academic journey from admission to graduation
8	Team	Head Coach	HC	Recruit, train, and lead varsity athletes to a national championship while promoting holistic development
9	Team	Mental Performance Consultant Apprentice	MPC- A	Provide individual and group consultations to one varsity team while obtaining certification requirements.

Appendix F

Overview of Digital Storytelling Activity



Student-athletes were tasked with creating a digital story documenting a typical day in their life as a uOttawa Gee-Gee. Student-athletes were asked to select a day that a game, practice, team-related event, or exam falls on. They may choose any of the four methods to answer *all* the following questions:

1. What are you doing right now?
2. What are you thinking right now?
3. How are you feeling right now?

Instructions

- 1. Consent.** Scan the first QR Code labelled “start here” with any mobile device that has an installed camera. The QR code is linked to a Google Form that must be completed before creating your digital story.
- 2. Choose a Method.** Select one of the four methods from the 4-way digital storytelling matrix (variations of visual, audio, and written responses).
- 3. Select a Date.** Select the day you plan on documenting your digital story. A minimum 24-hour notice is required to support the administrative tasks in step 4.
- 4. Set up text reminders (Optional).** Provide a phone number or email address if you would like to set up automatic reminders. This entails 8 automatic messages using Reminderbase, scheduled for 8:00 am, 10:00, 12:00, 2:00, 4:00, 6:00, 8:00, and 10:00 pm.
- 5. Create.** Document a typical day in your life! Respond to the three questions using the digital storytelling method of your choice.
- 6. Submit.** Once completed, scan the second QR code labelled “Submit here”. The QR code is linked to a Google form that will ask you to complete a brief questionnaire, upload any supporting documents (I.e., mp4 video) if applicable, and add insight related to the topic of student-athlete mental health that was not reflected in your story.

An example of what the reminders will look like is provided in the images below. The first reminder (top left) is sent 24 hours before the selected date. The standard reminder (top right) will be sent 8 times through the selected date. The third reminder (bottom left) is the last reminder you will receive to conclude your participation in the study.



TikTok Features

STEP 1.

RECORDING

Creative tools

Record Here!

Upload videos and pictures from camera roll

15s to 3 minute time limit

STEP 2.

EDITING

To edit individual clips

Tell us what you are thinking and doing

Add live narration here

Apply text here: pick which emoji best reflects how you are feeling in this moment. You may also choose to write down what you are doing.

STEP 3.

SUBMITTING:

Caption: A typical day in the life of a uOttawa Gee-Gee (S. Graper-Game Day)

Use this barcode to upload your digital story. There will be a brief questionnaire expected to be filled out as well.

Save it to your drafts where you can upload it to your personal camera roll.

TikTok Tutorial

- 1 Tap the + sign at the bottom of your screen. You can also tap "Create video" on your profile page
- 2 Capture what you are **doing** through multiple pre-existing videos and photos from your Camera Roll. Or start filming by tapping the red Record button. If you are recording, you can choose whether to make a 15-second, 60-second or 3-minute video.
- 3 Trim the length of your clips and re-order them by tapping "Adjust Clips" on the right-hand menu.
- 4 Add music by tapping the button at the top of the screen. TikTok will recommend tracks based on the content of your video, but you can also use the search bar to find other songs or sound effects.
- 5 You can add video effects, stickers, and text. Here, you will click the text icon and select an emoji that best reflects how you are **feeling** based on the provided guide.
- 6 You can also add a voiceover. This will be layered over the original sound in your video clips or the track you selected. Let us know what you are **thinking** while doing these activities captured in the clips.
- 7 Once your day has been captured, click "next" and save to drafts. From here, you can save the video onto your camera roll
- 8 Once completed, please scan the QR code labelled "Submit here" to upload your digital story and complete a brief questionnaire.

Appendix G

Recruitment Poster

QR Code 1*

GET STARTED!

24 HOURS IN ADVANCE

DESIGN THINKING
A creative & collaborative problem-solving technique to design innovative solutions

VIABILITY, DESIRABILITY, FEASIBILITY

QR Code 2*

SUBMIT HERE!

EMOJI SCALE

Happy	Relaxed	Valued	Connected with others	Proud
Sad	Lonely	Anxious	Hurt	Stydious
Excited	Tired	Good about myself	Angry	Burnt out
		Like a failure	Overwhelmed	Hopeful

DIGITAL STORIES 4 WAYS

A CASE STUDY EXPLORING

Student-Athlete Mental Health

AT A CANADIAN UNIVERSITY

USING **DESIGN THINKING**

SYDNEY GRAPER ✉ SGRAP007@UOTTAWA.CA MA. HUMNAN KINETICS

SUPERVISOR: DR. DIANE CULVER (DCULVER@UOTTAWA.CA)

Appendix H

QR Code Instructions

Google Form 1: Student-Athlete Consent Form



The first QR code (QR1) labelled “Get Started!” will direct you to Google Form 1. The athletes are asked to scan the QR1 24 hours in advance to sign the consent form virtually, select their chosen digital media submission type, and activate their email/text reminders.

Google Form 2: Student-Athlete Submission Form



The second QR code (QR2) labelled “Submit Here!” will direct you to Google Form 2. When student-athletes have completed their digital story, they will complete a brief demographic questionnaire, upload their digital media file (if applicable), and add any additional insights on the topic of student-athlete well-being.