ESPORTS

AOASM

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Outline

• Explain the phenomenon of esports.

• Discuss the categorization of esports as a sport.

• Explain the health and injury considerations of the esports player.

• Defend a healthcare model for the management of the esports player.
What do you think when you hear the term "ESPORTS"?
Tuesday through Friday are “normal” working days

- **7am** Daily gym sessions
- **9:45am** Catered breakfast—“fruits or a Mediterranean omelet”
  - “no breads or doughnuts or anything like that”
- **10:30 am** Team meeting
- **10:45 am** Break
- **Noon** First block of scrims
- **2pm** Lunch prepared by executive chef
- **3pm** Practice block
- **6pm** Dinner
- **7pm – 10pm** Required solo queue practice hours
  - Stream those practices on Twitch if they wish.

*Some stream until 2 am, either in the facility or back at their bedrooms. Others opt to return to the gym at 10 pm.*

What is esports aka competitive gaming?

- Difficult to define
- Catchall term for games that resemble conventional sports
  - Superstars, playoffs, fans, uniforms, comebacks, and upsets.
- Organized video game competitions
- All action is online
  - Contestants hardly move
- Not sedentary sports video games i.e. MLB 19: The Show, NBA 2K19, Madden NFL 19, and FIFA 19
- Not bound by a specific genre of game
- Competitions centered on fantasy worlds
Esports Facts

• **258 million** unique viewers globally
  • NFL regular season 204 million

• **$1.5 billion** in revenues 2017
  • Projected $2 billion by 2021
  • NFL ~ $13-$14 billion, MLB ~$10 billion, NBA ~$8 billion, NHL ~$4 billion

• **50%** of viewers 21-35 yo, 27% 10-20 yo

• **$41.6 million** prize pool for *Dota 2*

• **MSG, Staples Center** SOLD OUT
  • 40,000 fans in South Korea World Cup Stadium

League of Legends (LoL) Riot Games
• Most popular title in esports
• Multiplayer online battle arena game
• Players work together to take down their opponents’ base
• Strategize the best approach to attack opponents’ base and to protect their own
• 100 million monthly active users

Overwatch Blizzard/Activision
• First-person shooter
• Strong focus on team play
• Escorting a payload to a destination
• Protecting/attacking key points on a map

Which had more viewers?

League of Legends 2018: 100 million
Super Bowl 2018: 103 million
Super Bowl 2019: 100.7 million

Example League of Legends

https://youtu.be/LNQ8nfvwcf5?t=9s
Esports Viewing

- **Twitch**
  - Founded in 2011
  - Acquired by Amazon 2014
  - One of leading internet traffic sources in North America
  - Video game streaming, talk shows, etc.
- **YouTube**
  - Leader in esports streaming
- **ESPN2/3**
- **TBS**
  - ELeague

Esports and Intercollegiate Athletics

- June 2014 – Robert Morris University recognized esports as varsity sport
  - $15 MILLION in “athletic” scholarships awarded
- 2018- 50 varsity programs
- National Association of Collegiate esports (not NCAA) main home for most of those organization
  - >500 college esports clubs
- Purported benefits to universities:
  - Revenue generation
  - Participant diversity in athletic departments
    - Increased representation of Korean and Asian Americans
  - Physical activity??

Esports a sport?

- 2017 – IOC recognizes esports as a sporting activity

- The National Association of Intercollegiate Athletics (NAIA) recognizes eSport as a sport

- Not yet sanctioned by National Collegiate Athletic Association (NCAA)-under investigation
  - Rules to follow if sanctioned

- Most esport teams placed in athletics department.
  - Problems?

Athletics department – should they be held to same standards?

**Typical NCAA Teams**
- Teams practice together
- Must maintain GPA
- Must have a physical to participate
- Protocols are followed:
  - E.g. return to play, concussion, surgery, orthopedic injuries
  - Curfews are set

**E-Sport Teams**
- Teams practice sometimes together- not necessary to do in person
- No GPA minimum standard
- There is no medical clearance needed-
  - must rely on coach or individual to recognize issues
- No protocols established for return to play
- Curfews may be problematic
Play: voluntary, intrinsically motivated activity which is performed for fun or enjoyment

- Games also considered structured play
- Play-> game-> sport continuum
- Childhood play restrained, structured, and codified as games
  - when fully institutionalized, becomes sport
- Competitive video gaming must be viewed beyond a juvenile game to be a sport

Conclusion: MEETS CRITERIA
Esports a Sport?

**Organized:** sports are all goal-directed activities adhering to rules

- detailed rules and regulations specify tournament and match regulations
- detailed instructions regarding game and server settings
- teams play within a well-defined virtual environment

**Conclusion:** MEETS CRITERIA

Esports a Sport?

**Competition:** Sports must resulting in a winner/s and loser/s

- Winning an esports match → execute strategies that outperform the strategies of the opposing team
- Jeu’s (1972) classic discourse “What is Sport”
- Sports → competition means *physically* overcoming one’s opponent
- Sport exists in physical realm games do not

**Conclusion:** MEETS CRITERIA
Esports a Sport?

**Skill:** Involve play where chance or luck is not the sole reason for winning

- Semi-professional/professional play rewarding fast reflexes, good manual dexterity and excellent hand-eye coordination
  - Leisure activities do not
- Skillful coordination of controller to manage on-screen avatar
- Esports require game sense and (tactical and strategic) judgment to act effectively
  - Training increases competency in complex strategic decisions
  - Some evidence of increased cognitive capacity
- Esport pros rapid rate of keyboard and mouse inputs
  - 300/per minute 10/per second
- Red Bull High Performance esports Lab in Santa Monica, CA
  - analyze effect of stress, competition, and fatigue on concentration & reaction time

**Conclusion:** MEETS CRITERIA

Esports a Sport?

Broad following: sport must move beyond a game that is merely a local attraction or fad

- 88% 8-18 play video games 3-4x/week,
- Boys- 16 hrs./week, Girls 9 hrs./week
- 2-4 billion hours of live esports footage streamed per year
- esports stadiums etc.
- **Conclusion: MEETS CRITERIA**

Institutionalization: Standardized rules, formalized game learning, expertise, governing bodies

- Multiple professional governing bodies
- Manufacturers determine rules
  - New versions of games → fluid rules
  - video game developers may become at odds with a governing body
- Disagreement on common term or spelling for esports
- Time before stability
- Conclusion: DEBATABLE

Physicality: sport must consist of physical contests
What elevates a game to the level of a sport?
• Physical movement by the participant must be integral to the successful completion of the task
  • Moving chess piece vs. executing jump shot
• How a button is pushed on controller → no consequence to outcome
• Jenga? Requires physical precision for success
• Fine motor vs. Gross motor skills
• Most sports integrate fine motor with gross motor → whole body precision
  • Layup, swinging baseball bat, sliding
  • Only Olympic sports w/o gross motor → archery and shooting

Physicality continued

- Kane et al. the authors make the argument that eSport has been studied and that it fits the criteria for the physical exertion category
- One game was played sitting
- One high intensity game with abrupt arm movements while standing

- The high intensity game produced the greatest change in V02 reserve.
  - 4 METs
Physicality continued

• MET-physiological measure used to define the energy cost of an activity based on oxygen consumption (V02).

• 1 MET = 3.5 mL.O2.kg

• Activity equivalents:
  • Gardening (no lifting) 4.4
  • Household tasks, moderate effort 3.5
  • Running 8-10

• 4 METs equivalent to raking leaves
Physicality continued

- Bronner, Pinsker, and Noah, (2013) male and female participants MET’s raised between 4-9 while participating in video games that involved dancing.
- Stroud et al., (2010) was able to get their participants VO2 and MET at a low to moderate activity level by standing and shaking Nintendo Wii controllers.
- “This shows physical exertion being demonstrated during the playing of video games”
- Does it? Not comparing the same task
Physicality continued

- Motion based video gaming (MBVG): motion-detection sensors and software to simulate physical movements for avatar
  - Nintendo Wii, X-Box Kinect etc.
  - Increase EE, heart rate, METs, VO2 max up to 300% above resting → Moderate intensity exercise (ACSM)
    - BUT → considerably less exercise than traditional sports

- Most esports competitions sedentary war strategy or first-person shooter games

- Conclusion: DEBATABLE
Health and Injury Considerations

- Computer Vision Syndrome
- Circadian Rhythm Disorders
- Metabolic Dysregulation
- Upper Extremity Dysfunction
- Neck and Back Pain
- Mental Health
Computer Vision Syndrome

- >40% report eye fatigue
- Eyes fixed on computer for long periods
  - 2 hours before standing break in >50% of respondents
- Characterized by
  - Blurry vision
  - Low back pain
  - Tension headache
- Found in >90% use computer >3hrs/day
- Lack of definition - pixelated image
  - Increased - Saccades, Accommodation/Convergence
  - Decreased - blink rate

Interventions

- Gaming station organization
  - 20-28” distance
  - 5-6 “ below straight
  - Limit glare
- Correct refractive errors, astigmatism
- 20-20-20 rule
- Near far focusing
- Palming


Neck and Back Pain

“Because of pain in my spine, sometimes my arm will go numb. My shoulders feel terrible. Sometimes I can’t even pick up the mouse”

- Jong Hyun “MVP” 2013 (age 24)

Neck Dysfunction

• In 30 min. forward head displacement
Back Dysfunction

- **Slumping posture**
  - Increases force on intervertebral discs
- **Back rests**
  - Common in gaming chairs
  - Flattened lordosis
  - Posterior pelvic tilt
  - Increase tension
    - Paraspinals
  - Weakness
    - Transversus abdominus


“My wrist injury is something I simply cannot ignore, it limits my ability to play and its not fair to my team”

- Hai Lam 6 years pro

RETIRED 26 years old

“Now, I suppose there could be no correlation between Price’s new injury (carpal tunnel syndrome) and a new video game that is eating up to one-eighth of Price’s daily routine...”

- Michael Silverman
Sports Reporter, Boston Herald
Upper Extremity Dysfunction

- >3hrs. Gaming -> shoulder pain
- >30% report hand/wrist
- Quick repetitive movements
- Flexor tendons – hypertrophy
- Median nerve – increase swelling ratio
  - 30-60 min. keyboard use increased pressure – worse w/ ulnar deviation wrist
- Joystick video games – de Quervain’s tenosynovitis

<table>
<thead>
<tr>
<th>Swelling Ratio</th>
<th>30-minute * mean [SD] (range)</th>
<th>60-minute ** mean [SD] (range)</th>
<th>90-minute mean [SD] (range)</th>
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<tbody>
<tr>
<td>D 1.02 [0.14]</td>
<td>1.07 [0.17]</td>
<td>1.08 [0.16]</td>
<td>1.05 [0.16]</td>
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<tr>
<td>(0.81–1.39)</td>
<td>(0.79–1.55)</td>
<td>(0.72–1.64)</td>
<td>(0.75–1.52)</td>
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<tr>
<td>N 1.05 [0.14]</td>
<td>1.12 [0.14]</td>
<td>1.10 [0.13]</td>
<td>1.06 [0.14]</td>
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<tr>
<td>(0.86–1.41)</td>
<td>(0.86–1.48)</td>
<td>(0.87–1.47)</td>
<td>(0.85–1.37)</td>
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\[
SR (F(3,108) = 7.970, P < 0.001, \eta_p^2 = .181)
\]
**Neck and Back Treatments**

- **Stretching**  
  - anterior/medial/posterior scalenes, upper trapezius, levator scapulae, pectoralis minor, and pectoralis major

- **Traction**

- **Exercise therapy**  
  - Exercise type not determinate

- **Electrotherapy**  
  - Low quality evidence

- **OMM**
  - Postural manipulation  
    - Increase cervical extension ROM  
    - Decrease forward head posture

  - HVLA, muscle energy  
    - Decreased neck pain

  - Soft-tissue mobilization, muscle energy techniques, and mobilization for lumbar segment  
    - reduced pain intensity and improved physical function and mental health in LBP


Shoulder
• Fascial distortion model -> increase shoulder ROM
• HVLA, LVHA -> improve shoulder recovery

Wrist/Hand
• Rest, NSAIDs, immobilization
• BLT interosseous membrane
• HVLA carpal bones
• Extension and release of the transverse carpal ligament w/ opponens pollicis roll maneuver
• Myofascial increase carpal tunnel dimensions
“.... I have a beef jerky for energy so I can keep gaming longer”

- Anonymous

NYIT Esports Player 2018
Metabolic Dysregulation

- Esports - practice 5-10 hrs. day
- Seated >3 hrs.
  - Negative impact – peripheral and vascular health
- Not Hypothetical
  - 2013, StarCraft 2 player Geoff “Incontrol” Robinson suffered a DVT
  - Treatment delayed -> lack of knowledge
- Energy drinks
  - G fuel – “Official Drink” – Claim enhanced focus
    - Unrestricted amounts of caffeine
    - ++ Sugar
• 40% no regular physical activity

• 15% reported 3 hours or more without a standing break

• Exercise deficit disorder
  • < 60 min./day physical activity children

• Reverse - negative spiral of inactivity

• Understanding of the signs and symptoms of DVTs to prevent unnecessary complications
• Nutrition habits of their patients
• 7,000-10,000 steps to be taken daily
• 150 minutes of moderate-intensity aerobic activity a week.
• Activity trackers or phone applications can be an effective tool to help patients attain these goals.

“‘Fortnite,’ that’s my competitor right now ... ‘Fortnite’ is tougher than the Boston Celtics.”

-David Fizdale, 2019
Head Coach NY Knicks

Internet gaming disorder (IGD)

- 5 or more of the below for 1 year:
  - Preoccupation
  - Withdrawal
  - Tolerance
  - Unsuccessful attempts to control
  - Loss of interest
  - Continued use despite psychosocial problems

- Controversial
  - Validity
  - Operational definition

• Video games alter brain structure and function
• On-line gaming addiction (POGA) vs. professional video game (PG)
  • different consequences
• Anterior cingulate (AC) gyrus is pathway from the thalamus (conditioned responses) to the hippocampus (memory center)
  • focusing attention (attention maintenance) on emotionally significant events
  • regulating addictive behaviors
• PG significantly increased gray matter volume in the cingulate gyrus vs. POGA
• POGA increased gray matter volume in the thalamus

Mental Health

- Anxiety
- Depression
- Alexithymia
- Multiplayer online battle arena games (MOBAs) (LOL, DOTA 2)
  - Regulate emotions
- Massively multiplayer online role-playing games (MMORPGs) (WoW)
  - Correlate w/ mood disturbances


**Mental Health**

- Ten-Item Internet Gaming Disorder Test (IGDT-10)

Source: Király O, Sleczka P, Pontes HM, Urbán R, Griffiths MD, Demetrovics Z. Validation of the Ten-Item Internet Gaming Disorder Test (IGDT-10) and evaluation of the nine DSM-5 Internet Gaming Disorder criteria. Addict Behav. 2017;64:253-260.


Circadian Rhythm Disorders

- Computer monitors light-emitting diodes (LEDs)
- Perceived as white actually in the blue spectrum 400-490
- Blue light ->
  - Increases alertness and thought processing
  - Decreases sleep latency and duration
- Stimulation of intrinsically photosensitive retinal ganglion cells (iPSCs) -> suprachiasmatic nucleus -> pineal gland
  - Suppression of melatonin secretion in the pineal gland. Specifically, the melatonin suppression peaks at 460nm.
- Altered sleep patterns and insomnia
  - Fatigue
  - Mood disorders
  - Substance abuse
  - Weight gain


Circadian Rhythm Disorders

- Proper sleep hygiene
  - Limiting light exposure before bedtime
  - Daytime naps <30 min.
  - Avoid certain foods (Fried, spicy, citrus, carbonated drinks)
  - Caffeine, nicotine
  - Pleasant sleep environment (60-67° F, comfortable)
  - Relaxing routine (reading, shower)
- Validated sleep questionnaires (Pittsburgh Sleep Quality Index)
- Blue light blocking lenses have been studied as a potential solution with mixed results


Circadian Rhythm Disorders

- 36 healthy subjects (20 male; 16 female) randomized
- No-block, low-blocking, high-blocking eyeglasses
- Perform a 2-hour computer task.

CONCLUSION:
Lack of high quality evidence to support using BB spectacle lenses for the general population to improve visual performance or sleep quality, alleviate eye fatigue or conserve macular health.

Health Management Model
# Team Roles

## Table 1: eSport management team roles

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<tr>
<th>Professional</th>
<th>Role</th>
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| eSports athlete                       | Report any symptoms of physical discomfort  
                                             Be honest in the amount of game play and any addictive behaviours they may feel they have  
                                             Be in good academic standing                                                                                                                                 |
| Team physician                        | Oversee all healthcare of the student-athlete  
                                             Ask focused questions to physical activity and nutrition  
                                             Evaluate social behaviour  
                                             Inquire about academic performance  
                                             Inquire about musculoskeletal complaints  
                                             Evaluate vision                                                                                                                                 |
| Psychologist/psychiatrist             | Perform assessments if suggested on addictive behaviour.                                                                                                                                 |
| Athletic trainers/sports medicine staff | Perform pre-season assessments on athletes. Some basic tests may include the standardised step up test.  
                                             Flexibility testing, body composition testing, overall activity status with recommendations.                                                                                      |
| Physical therapy/occupational therapy | These specialists should be on referral from the team physician should handle, wrist, neck or back pain arise. Ergonomic evaluation of playing position, strengthening exercises, flexibility exercises. |
| Ophthalmologist                      | This specialist should be on referral to evaluate retinal damage, and photoreceptor damage from excessive blue light exposure. Ophthalmologists have the ability to treat retinal damage whereas an optometrist does not. |
| Coach                                 | Assist in implementation of therapies and treatment, support the medical staff and the protocol. |
Outline

• Explain the phenomenon of esports.

• Discuss the categorization of esports as a sport.

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