EVALUATION ASSIGNMENT 1

CS5760 – Graduate Human-Computer Interaction

Abstract

An investigation of stakeholders, goals and influences, personas, and simplified hierarchical task analysis for the ACL Risk Indication Application

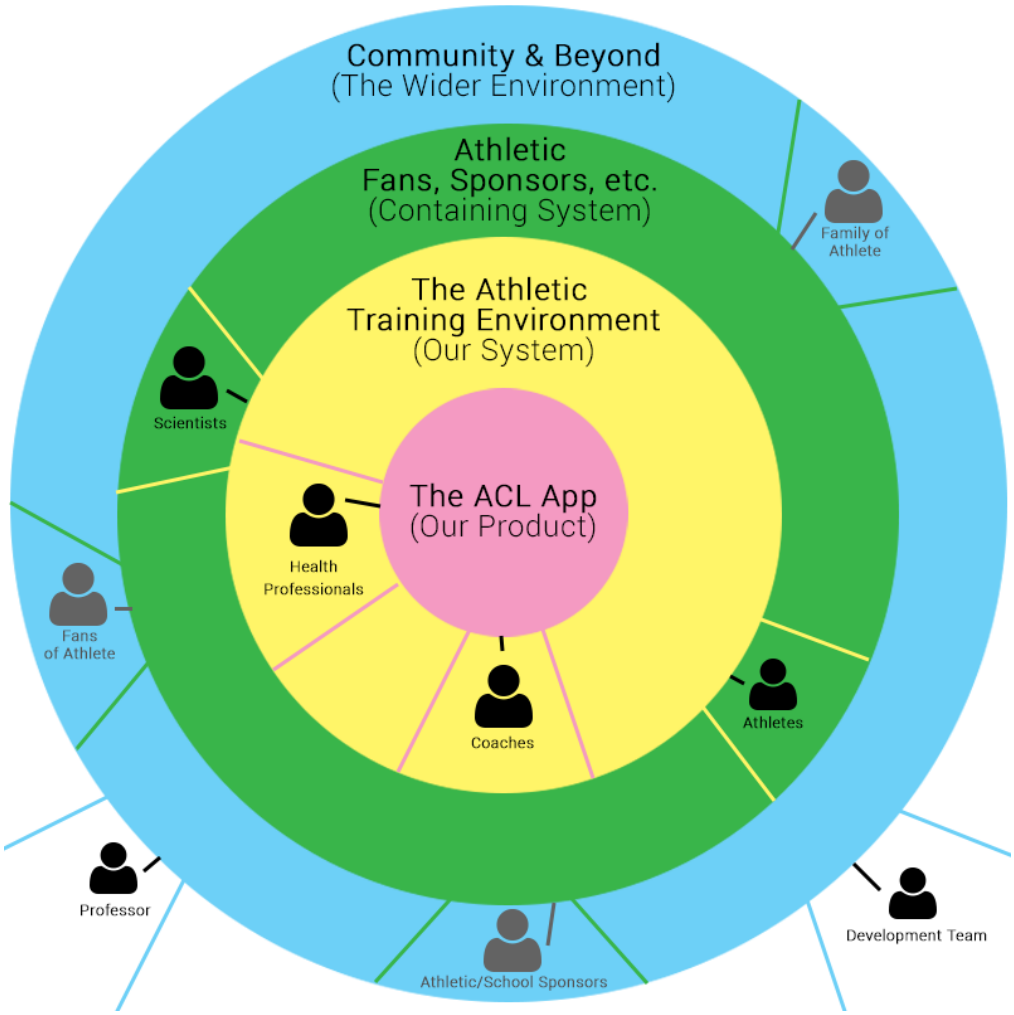
Briana Bettin – Team 3 (E2Big)

January 26, 2017

Description of Undergraduate System

The undergraduate team E2Big will be creating an ACL Risk Identification application. The purpose of this application is for coaches to obtain information about their athlete's risk of an ACL injury based upon their current form in certain training and exercises so that they can take measures to prevent such an injury from occurring. Health professionals such as doctors, physical therapists, and sports trainers will review video taken by coaches and submitted through the app of athletes, and provide feedback and risk indication for the coaches upon review. Scientists will also be able to utilize data from this application's usage in order to better understand factors related to ACL injuries.

Stakeholder Onion Diagram



Description of Onion Diagram Roles

In the onion diagram above of stakeholders and their rings of influence, two color codes for stakeholders are shown. In black, we have "primarily involved" stakeholders – those we must consider in greater detail for the purposes of this application. In grey, "influencing" stakeholders are shown – those who will not specifically touch this application but have stake in that their influence is likely of high importance to stakeholders within the onion. These influencing user roles require less investigation, but are pertinent to note and remember as exploration is done.

Primary Users:

Coaches: The primary users beginning the usage chains of the application. Without coaches uploading videos, health professionals do not have anything to provide feedback on. Thus, the coach begins the chain of use within the app and is in this regard the most primary of users. The coach may be motivated by influencers in order to assess athlete risk, by the goal of keeping athletes in peak performance, or by athletes concerned for their health, as a number of examples that may motivate use of the application by a coach.

Health Professionals: Once a coach has uploaded a video, health professionals utilize the app to review and provide feedback on the video. Because of their direct touching of and role in the app, the health professionals are the other primary user in this model. Health professionals may be working to assist with preventative care in reviewing videos on this app, may be affiliated in some way with the application (through research or organizational purposes), or may be training and maintaining their skills on recognizing symptoms "in the field", which a doctor in an office may not often get a chance to. These motivators may be some reasons for a health professional to utilize the application.

Secondary Users:

Athletes: The athletes will be having their videos uploaded for review, and so they directly benefit from the feedback provided and while they do not touch the application, are obviously involved in and a central focus of the process. Athletes want to maintain peak condition and train hard without "breaking" in any way in order to do their best in their athletic pursuits, and would have this motivation to be recorded for review of their ACL risk.

Scientists: Scientists associated with the application will be able to review data in the form of usage and other user-provided or entered data, and can thus formulate theories and conduct analysis for academic purposes. While the scientists likely never touch the application, its usage has a direct impact on their ability to conduct quality research with valuable data. Thus, the scientists have a stake in seeing the app's success among primary users, and a vested interest in what data can be collected and furthering its value.

Tertiary Users:

Development Team: As the creators of the application, the development team must have an interest in the application's success – be the motivations financial, merit-based, academic, or passion for the cause. The development team must understand the relationships between primary and secondary users and interacts with them and in regards to them to meet development goals, but is not involved in the direct ecosystem of the application's function beyond their design of it.

Professor: The professor is interested in the application's success as it reflects upon their course and their students. They understand care about the success of the projects, but are not directly involved in their development, instead "overseeing" the development teams.

"Mid" Influencers – Seated Between Secondary and Tertiary:

These influencers exist in a closer relationship to the secondary and primary users than the tertiary stakeholders do, but do not have a direct stake in the application, only an influence that may affect stakeholders. Given their unique position, they have been assigned a ring of the onion between secondary and tertiary users to better reflect their correlation in the system as a whole.

Parents of Athletes: Parents would like to see their athlete do well but also see them avoid injury. Concern for the wellbeing of their athlete may influence coaches to use the application to assess risk.

Fans of Athletes: Fans would like to see their sporting team do well, and while injuries may make a game "interesting", serious injuries often tug at the heartstrings and can result in disappointed fans as a team loses playable athletes or favorites.

Sponsors of Athletics (Booster Club, etc.): Sponsors have a vested (often monetary) interest in the success of an athletic department or program, and want the program to be recognized respectfully. In this regard, they do not want their program to be known for a high rate of injuries. Thus, they may influence coaches to take more precautions so they can state with pride the safety and success of their athletic program.

Stakeholder Goal Influence Table

Stakeholder	Goals	Associated Influences
Coaches	• Keep athletes at top performance for competitions. • Correct behaviors that may cause an athlete to be susceptible to injury • Maintain a reputation of a healthy and hardworking team	• Crowd/Fan pressure for successful games • Parental pressure for safety measures, but also for their kids to see playing time • Pressure from athletes to be pushed and see success

Athletes	• Stay in peak condition for the season while continually growing in skills • Avoid injuries that would cause inability to participate • Help the team work to the best of their abilities, striving toward a win • Work toward personal bests and records of achievement for personal gratification	• Pressure from parents, fans, coaches to push themselves harder in order to win • Pressure and also support from team to impact matches and help toward team goals
Scientists	• Gather data that may assist in drawing conclusions on athletic training and ACL risk • Use data observations and insights to recognize more areas that must be researched.	• Pressure from funding committee or organization to produce results • Need for better and/or more data to represent possible trends • Pressures from current academic and social environments to draw certain conclusions or study certain aspects
Doctors/Health Pros	• Preventative care to ensure injury does not occur, often a goal in the health community to lower occurrence of more costly procedures and therapies • Training and recognition for symptoms in kinetic observation – which a doctor seeing a patient in an office may not always get	• Pressure to help patients attain wellness despite obstacles or in spite of patient regressions • Health policy climate, pushes by insurance and organizations toward preventative care • Divide between care and attentiveness for each patient in room, and need to treat patients in a timely manner • Work/Life Balance, often work is brought home
Development Group	• Hands on experience with designing for usability purposes • Ability to work on a real project as students, which can be a portfolio/resume highlight • Learn and complete enough work to be graded well and pass the course	• Professor's goals for course and interpretation of them for deliverables • Interpretation and understanding of scientist information and feedback • Development skill level for aspects of application

Professor of Class	• NSF Grant project produces valuable results from student creators, scientist feedback, and citizen usage • Student work shows understanding of materials taught and can show course's value and professor's expertise	• Assessment of student understanding of topics and projects • Relationship with client scientists • NSF proposal needs for project writeups, etc.

Summary of Stakeholder Goal Influence Table

The stakeholder goal influence table has actually been described quite a bit in the descriptions of the stakeholders following the onion diagram. However, we will again review the details with a different lens as we examine more closely these motivators.

Coaches are motivated by a wish to have a team performing well and learning/growing, and to also be respected and regarded as a good coach. In this regard, influencer opinions and input may come in such excess that it must be ignored, but may also provide valuable feedback regarding how their team is perceived and in turn, how their coaching is regarded. If influencers are concerned with a coach's expectation of performance over safety, the coach will likely feel pressure to take measures to ensure safety is seen as valuable within the team and influencer circles. Coaches also know an injured athlete is an athlete who cannot perform, and so there is intrinsic motivation within the team dynamic and not just influencer pressure to care deeply about athlete safety and risk assessment.

Health Professionals are motivated by likely their professional motivation – to help care for others. Preventative care helps to keep others well, rather than "fix" things when they become unwell. Thus, an application like this fulfill the goal of preventative health care by stopping an ACL injury before it occurs. Health professionals may be influenced by their community or by organizations they belong to that they should become feedback providers on this application, which may play pressure or suggestion on them to become users.

Athletes are motivated by their goal to do well in their athletic endeavor of choice and to help their team toward success. If the athlete is injured, they cannot perform their function within the team composition to their fullest ability. Thus, the athlete is likely to have intrinsic motivation to avoid injury as much as possible. However, the athlete also has pressure from fans, family, coaches, and their team to push themselves in their endeavors, and thus subsequently become more prone to injury. This makes it ever more important that they recognize this risk and willingly become involved with risk assessment.

Scientists are motivated by the goal of gathering data and conducting analysis of it for research conclusions and to pave the way for future research. They may be pressured by organizations they conduct research for, grant deadlines, or public opinion to complete certain aspects of research more

quickly or to search for specific information. The scientist needs data that is of value to draw good conclusions, and an abundance of valuable data is ever more valuable. Thus, the scientist wants to see the application have successful use, so there are many more data points to draw from.

Development Teams are motivated by the end result value of their work – a salary, a grade, or some other sort of merit or award. Their goal is to produce the best work so that they do not have to conduct rework, so their work is viewed respectfully and thus reflects competence upon them, and so that they can of course obtain their end reward. They are influenced by pressures coming from these end results deadlines and those who enforce them, and may experience stress, confusion, or other factors because of these pressures. The influence of the client requesting their services of course informs their work and better clarifies the end goal, so they can use this influence as a positive source to drive toward the final result.

A Professor is motivated to see their students succeed, to pass on their expertise, and by various research and grant opportunities. Professors may have the influence of a grant organization, research deadline, or proposal influencing them in similar ways to Development Teams, and this may affect their decisions pertaining to course policies that affect development teams. Their relationship to client scientists who may request work can also influence projects, as their end goal is to see the projects and students do well is impacted by these discussions and agreements with the client scientists.

Research Notes for Audience

On Coaches:

Based on: http://www.michigantechhuskies.com/athletics/directory/index - a directory of athletic coaches and representatives at Michigan Tech, which is a prominent upper peninsula college with several sporting teams:

- Coaches trend male more than female, even among female teams.
- Coaches trend Caucasian in race
- Head coaches trend higher in age (40-60) while assistant coaches trend younger (20-mid 30s)
- Coaches may represent more than one sport simultaneously (this trend can be observed in several more rural areas, interesting to see it at a larger university like MTU, but also a bit unsurprising)
- While exceptions do occur, almost every coach has a strong athletic past – meaning they are likely to bring their perceptions of the sport as they played it during their time as athletes (gives them experience, but can also at times have downsides pertaining to bias)

On Athletes:

Based on: general makeup of an average university and high school, coupled with Upper Peninsula population considerations:

- Athletes for schools trend under 18 – likely that concern for ACL injury would trend toward high schoolers more so than elementary/middle school given body development
- College age athletes trend 18-25
- High impact and rigorous training sports in the UP most likely to be Basketball, Football, Hockey in this area – largely meaning a trend toward male athletes more so than female. However, individual training regimens of course vary and further investigation of athletics in the area may reveal heightened regimens in female sports or an equal trend.
    - Track in particular can be expected to have box-jump training and other motion-impact exercises, as well as Volleyball with varying footwork. All sports present risk and training that may impact the ACL – this is simply "at a glance" observation based on the nature of sports often represented in UP athletics.
    - Despite this, according to http://www.pharmacytimes.com/publications/issue/2014/june2014/sports-injuries-are-women-more-at-risk female athletes are much more likely to develop ACL issues due to their propensity for greater knee and foot injuries. Volleyball, Basketball, and Soccer are particularly difficult sports on the ACL.
        - Additional detail on female sporting injuries: http://www.health.harvard.edu/blog/the-gender-gap-in-sports-injuries-201512038708
- Students are most likely to trend Caucasian given population information about the UP. In college areas, athletes are more likely to have a greater amount of diversity. Rosters of several college teams do still often reflect the Caucasian trend of the area despite this however.

On Health Professionals:

Based on: http://www.portagehealth.org/our-services/fitness-center/meet-our-staff , http://www.portagehealth.org/our-services/other-services/sports-injury-clinics , http://www.mgh.org/for-healthcare-professionals/family-medicine-residency/our-staff

- Health professionals specializing in sports and fitness tend (at least, in areas of the UP that are larger college/athletic hubs) to be female, averaging age 20-40 trending lower on the spectrum.
    - Caucasian trends higher with regard to race in this area
- Practicing MD/General practice related doctors in the area seem to trend male, Caucasian, and averaging age around 40-50

Persona Designs

Coach Personas

(In the future, more personas can be designed. As coaches are the main user whose stake must be appealed to for the apps success, variants of coaches have been represented here)

James Phineman – "Committed to Success"

Key Characteristics:

- Age: ~42
- Stays fit to practice techniques and hustle to athletes during matches, but is not as strongly athletic as his youth
- Keeps a cool temperament on the court for the most part, but during tough or close matches has been known to get passionate and heated.
- Cares for athletes and their success, often pours over stats and game replay videos.
- Enjoys the coaching process and watching athletes grow, but if an athlete seems resistive or rebellious, can become quickly frustrated working with them.

James adores the on season for the sport he coaches and can't wait to see his roster of players and how their skills and personalities synergize during play. He believes practice is key to success, and ensures his athletes are working hard before the big game as well as refining and reviewing after each match.

James wants to see his athletes succeed but knows they have to want it too. He can be known to push a little hard at times, but would never want his athletes to see injury. He certainly wants to ensure that they are not being set up for failure with their training. As a seasoned coach, he has an eye for many movements that don't look "quite right", but of course as he's not a medical professional, certain things can slip through the cracks. He would like to find a way to quickly verify his suspicions, or to gain additional counsel on exercises and ensure his athletes are at peak performance with as little risk for injury as possible.

Robert Halester – "Involved but Inexperienced"

Key Characteristics:

- Age ~40
- Works out on occasion, but doesn't make as much of a point of it as he perhaps wishes he could
- Can easily become hot-headed in situations related to refereeing or a player who seems to not care.
- Wants to see the athletes succeed, but can sometimes lose the trees in sight of the forest and become more concerned with the win than an athlete's feelings or condition.
- Is finding joy in coaching, but can still stumble over the desire for winning and allow that to get in the way of that joy.

Robert is a coach in a relatively rural area, who played some sports in his past and entered into coaching to become involved again. Robert remembers the thrill of winning and the excitement of the crowd – and sometimes, he gets a bit too wrapped up in it. It's not that he does not care about his athletes, he's just rather prone to getting caught up in everything.

Due to his inexperience or at times misdirected goal visions, his athletes can often come under risk for various minor injuries. Nothing to keep them out more than a game or a few minutes of practice usually, but parents are beginning to have some concerns about the potential for bigger incidents. Robert doesn't know what else he can do but train them in what he knows, and at times of anger can feel that it's too much time or effort to be expected of him to try and figure out the root causes of at times varying injuries. He needs a solution to ensuring safe training for his athletes, but he's not entirely excited about being under the microscope for it, and will likely walk into any possible solution with reservations and some pessimism.

Simplified Hierarchical Task Analysis

Home

Log In

- Video Responses from Doctors (Coach View)
- Upload a Video (Coach View)
- Video Upload Tips (Coach View)
- View Video Inbox (Doctor View)
- Video View Tips (Doctor View)
- Respond to Video Form (Doctor View)
- Response Question Informational Detail (Doctor/Coach View)
- Feedback System for Doctor/Coach Discussion/Review/etc (Doctor/Coach View)

Forgotten Password/Login Help

Help/Support for App

Summary/Description of Simplified HTA Views

Home: A home screen for the application's initial load up, regardless if a user is logged in or not. This may contain the log in screen, or it may contain other information related to ACL injuries, etc. as a sort of dashboard, with log in as a separate page.

Log In: Due to the semi-confidential nature of health professional assessments of this type for athletes, a log in will likely be needed to ensure videos are "closed loop" for one coach and one health professional, rather than viewable to all. The log in will likely be username/email and password based.

Video Responses from Doctors: Coaches will need to be able to review the feedback a doctor sends with regard to videos of their athletes. A view pertaining to a sent video with its response report once completed will be needed for coaches to receive the information.

Upload a Video: Coaches will need the ability to upload a video for doctors to review, and thus will need a view through which to submit them to the "doctor side" of the loop for this review to be conducted. Coaches may need to complete some sort of survey in order to submit the video as well, as doctors may need to in order to leave feedback.

Video Upload Tips: Certain aspects of a video may make it easier or harder for a doctor to properly assess the ACL risk. Some sort of view helping coaches understand what to do and not to do in order to send the best video for the best assessment possible will be useful for both doctors and coaches.

View Video Inbox: Doctors will need to be able to know when a video is available for their review so that coaches can receive feedback. When a coach submits a video, it should appear within an inbox of sorts for the doctors to review.

Video View Tips: Just as the coaches may have tips to make their videos easier for doctors to view, doctors may have a tips page that points out indications to watch out for in the video, key motions, etc. While doctors are likely to already know this information, a brush up can always be useful, especially when using a new application or technology, and can also work to keep all doctors standardized in their evaluation of videos.

Respond to Video Form: When a video is sent by a coach, a doctor must be able to review it and submit feedback. This feedback will likely be some sort of form, with text fields for qualitative feedback, a risk score, and potentially several other questions/factors to look for and check off that will help each doctor hold the same standard of assessment for each video.

Response Question Information Detail: Certain questions doctors are expected to answer on the form, or certain questions a coach may have to answer to submit the video, may be confusing in what they are asking. A view from some sort of more information indicator that specifies in greater detail what this question means may be useful to ensure accuracy in answers.

Feedback System for Doctor/Coach Review/Discussion: Coaches may have additional questions about a doctor's response to a video, such as recommended exercises, etc. Likewise, a doctor may want to follow up with a high-risk video to see if the athlete is improving, etc. A closed loop system similar to the one for submitting and evaluating videos may be useful to allow the doctor and coach to communicate within the application.

Forgotten Password/Login Help: Users may forget their log in information for the application, and thus need a retrieval method.

Help/Support for the App: Frequently asked questions, where to report bugs, help navigating its features, and so on may be useful for potential users, new users, and even veteran users.

Appendix

My additional notes beyond the undergraduate team's notes would be the audience notes, which have already been included to introduce the persona designs in the section above entitled: "Research Notes for Audience".

All notes from the interviews with the scientist can be found on the undergraduate team's page for documentation: http://www.csl.mtu.edu/classes/cs4760/www/projects/s17/group3/www/