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Annotated Bibliography for Capstone

Actual product - There is a version of what I want to make on the market however, the design I have in mind is entirely different from what is out there. The one on the market shoots out and could be a hazard especially if you are doing any kind of pullover motion, the one I want to make will be more user-friendly. So it's easier to use and it doesn't have the potential to on the user by shooting out at a velocity that can definitely hurt some kneecaps or any other sensitive area. I also just want to improve the overall feel and quality of the design since the majority of the products on the market are very low quality.

Cable Machine - A schematic and large pdf explaining all of the ins and outs of a cable machine, which includes how the mechanism of selecting the weight works and how the cable use pulleys and wire to keep tension on the handle.This Source will definitely be useful since it has everything in anything that I need to know about a cable machine including the dimensions of the pin how the pulley system works how much weight is used the capacity the stress test it has any and every measurement that I would need to pull off this capstone. Plus there are engineering drawings which will help Elevate the accuracy of the final products.

Cable machine usefulness - Explains why a cable machine is relevant in the first place, why use it, what the implications are outside of just weightlifting, can it help joint mobility or recovery of tendons or ligaments. Why is it important to use tension under a cable versus gravity through free weights? Cable machines use a system of pulleys and weight stacks to provide resistance. This source will help image the design including how weight is selected and adjusted, and will help ensure the drop set pin integrates effectively with existing equipment. It will also help justify the making of the equipment instead of just dealing with the current state of the equipment in the niche of weightlifting. There are suddenly a whole realm of possibilities that you're able to reach with some reasoning behind it rather than just being slightly better.

3d printed material real world applications - in this video, 3d printed gym equipment was put under stress tests, wear tests, and overall general usage to see if it is a good let alone safe substitution for the real versions of the equipment.This proves that the idea of 3D printing gym equipment does work and it originally served as a huge inspiration for this Gap Zone I also feel like I can use this video as a guide to always look back to see if my equipment somehow in some

way matches up with the evidence and reasoning that in the hypothesis and the result of that this person got in the video with their own 3D models.

Drop Set Training Methodology

Drop sets involve performing an exercise to the point of muscle fatigue, then immediately reducing the weight to continue the set. This technique enhances muscle endurance and growth by extending the time muscles are under tension. Understanding this method is crucial, as your device aims to facilitate seamless weight transitions during such workouts. “A drop set is an advanced resistance training technique in which you focus on completing a set until failure or the inability to do another repetition. Drop sets promote muscle gain by fully fatiguing all muscle fibers in a specific muscle.” When you train a set to failure, you’re fatiguing all of your smaller muscle fibers.

Spring Ejection System - This Source shows a very complex way in ejecting a setItem using a spring. I don't think I will implement this sort of system just simply because it is too complex with my traditional or item in the sense that this ejection method uses Servo Motors and a time delay using an Arduino versus my design would simply just use the spring which is triggered by a release of some potential energy it allows it to Spring Forward thus making it simpler. and so overall I don't need to fit Electronics into that pin since that also might interact or affect the durability of the product.

Material Selection and Durability

Good product that is not just limited to the drop set pin but it also will affect the colors as well. although since the colors and the drop set pin have different functions they will most likely need different filaments or materials that I will use for the 3D print and this Source helps or will help with deciding which type of material is better for which of the job AKA which material has a better structure or which material feels the smoothest or which one's the most durable which was the cheapest overall there are so many pros and cons to different types of materials but this Source will help me narrow it down and select the right type for each different product.

User Interaction

Consider how users will interact with your device. An ergonomic design that is easy to handle

and operate will enhance user experience and encourage widespread adoption.This is also similar to the cable machine schematic in the sense that it will allow for more in-depth knowledge of a cable machine which will then in turn improve the overall quality of the drop set paint itself and also the colors as well as the barbell extender if I just allowing the designs to be more well thought of why because they include multiple other factors including stress test, user interface, easy to use, etc.

Prototyping and Testing Processes

Learn about prototyping methods, such as 3D printing and CNC machining, to create functional models of your design. Additionally, understand testing procedures to evaluate performance, safety, and durability under real-world conditions. This Source just goes over key ideas of prototyping and building and Manufacturing a given product. It will serve as an incredibly useful source to always look back to and reflect and see if my methods of manufacturing and developing equipment for weightlifters is lining up with the engineering design process that not only we learned in class but also the design process of this given document. it will definitely prove to be useful

Market Analysis and User Needs

This once again just gives more reasoning behind the whole gym equipment for beginners thing in the first place. why would someone that's a beginner weightlifter decide to use random STL files to print equipment when they can just deal with not equipping it. this just shows that there is a growing Market for people who want a more accessible or smoother transition into weightlifting and this will this Source will definitely serve as reinsurance that My Capstone is not too Niche but it's also not too broad and you just have that Goldilocks effect of user needs and demand in the market which will just help me reassure myself that this Capstone is not just for a grade not just for a passion of mine but also to help people.

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